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ABSTRACT
               This self-pacing program is the result of a
cooperative curriculum development project between The Maryland
Department of Education and The Baltimore County Schools. Included is
a teachers guide for the use of the materials. The philosophy of this
approach is that of individualization of instruction wherein the
student moves at a pace commensurate with his ability and background.
He studies a topic, either individually or with a small group, then
he takes a test measuring mastery of the material. The test is marked
"complete" or "incomplete." If he "completes" the topic unit, he
proceeds to the next; if not, he does some remedial work until he
"completes" the topic unit. It is suggested that written progress
reports be kept for each student continuously and that grades for the
course be based on number of units completed. The content of this
course includes sets, number properties, open sentences, operations
with variable expressions, functions, and graphing. Also included is
an extensive itemized list of behavioral objectives for each topic,
student assignment sheets for each topic, tests and keys for each
topic unit. (Author/CT)

A SELF-PACING PROGRAM IN ALGEBRA, VOLUME I

- A Tentative Guide -

A Cooperative Project
of
The Maryland State Department of Education
and
The Baltimore County Public Schools

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The Self-Pacing Program in Algebra which this letter accompanies is the result of a cooperative curriculum development project between the State Department of Education and a local school system. We in the State Department of Education are most anxious to encourage and support such ventures. Cooperation in curriculum development between our staff and that of a local school system, as well as cooperation between local school systems, should have the effect of multiplying our available resources.

One of the serious problems facing educators today is that of rapidly increasing costs to the taxpayer. Shared efforts in curriculum construction which hopefully minimize duplication and maximize quality, may help to hold down these costs. At the same time, when these co-operative projects attain a product which encourages diversity and creativeness rather than conformity, then resources can be made more immediately available to various curriculum areas. It is hoped that the curriculum materials contained herein will measure up to these goals and will serve as one more step toward full and effective pro-gress in mathematics education for Maryland.

Sincerely,

State Superintendent of Schools

FOREWORD

In recent years, there has been increasing interest in the
development of mathematics programs which emphasize individualization
of instruction. This interest has been generated by a desire to provide
each student with the opportunity to use the instructional materials
best suited to his needs. Among the programs considered have been
a number of efforts involving computer-assisted instruction, programed
instruction and self-pacing programs.

Each of the preceding programs, of necessity, requires
increased expenditures in time, personnel, materials, and money.
Of the programs considered, the self-pacing format offers increased
individualization of instruction with minimum expenditures for
specialized materials and equipment.

The Office of Mathematics of the Board of Education of
Baltimore County, in cooperation with the Maryland State Department
of Education has developed A Self-Pacing Program in Algebra. It
is hoped that this program will serve as a model for future efforts
which use self-pacing techniques and offer suggestions for their
implementation.

Any suggestions for improvement of this program would be
greatly appreciated. The evaluation sheet is enclosed for this
purpose.

Special thanks are offered to Mrs. Carolyn Bruder and
Mrs. Linda Tieman for their untiring efforts in typing and
reproducing this guide.

TABLE OF CONTENTS

iii

4

PHILOSOPHY

Educators agree that students learn at different rates.
Although curriculum specialists and teachers have attempted to
devise programs to meet individual needs in past years, much
work remains to achieve the goal of individualized instruction.

There is a definite need for developing a system which
provides for individualization of instruction and greater
flexibility. Lack of differentiation in the teaching process
results in boredom for students for whom the pace is too slow
and frustration for those students for whom the pace is too fast.
Often this leads to problems of classroom control and high
failure rates.

One approach which is attracting attention in educational
circles is that of self-pacing programs, wherein the student
moves at a pace commensurate with his ability and background.
An example of efforts along this line is the Individually Prescribed
Instruction program of the Oakleaf Schools in Pittsburgh. In
addition, an increasing number of textbook publishers have been
influenced by this trend.

Preliminary returns of experimentation and pilot programs
indicate that emphasis upon student success results in a more
positive attitude by the student toward the subject, teacher, and
school environment.

Suggestions for Implementation

The successful implementation of any self-pacing program in mathematics depends upon the cooperation and teamwork of the administration and the teaching staff.

The first administrative concern for the implementation of a self-pacing program of instruction is the construction of the school master schedule. To provide the necessary flexibility for such a program classes should be scheduled in a parallel manner whenever possible. For example, if a school has eight algebra classes, they might be scheduled during the same period of the day or in two blocks of four classes.

Secondly, these classes should be located in adjacent rooms or as near as possible to each other for greater flexibility. Ideally, an additional room should be assigned to the teaching staff during each period to provide extra space for small group instruction, independent study, student-teacher conferences, and testing.

Another feature of scheduling should be the provision of at least one common planning period during the school day for all teachers in the program. This provides the team with opportunities to discuss common problems, evaluate materials, plan daily lessons, regroup students, and develop new materials.

Because of the varied activities occurring simultaneously in any self-pacing program, the teacher should be provided with sufficient paraprofessional help. The possibility of assigning student teachers from nearby colleges to each department member should also be considered. If this is not possible, one or two student teachers might be assigned to the entire department. These college students could then be assigned to the teachers indicating the greatest need on a day-by-day basis. Besides providing a service to the teachers and students, this experience can be immensely valuable to the professional growth of the student teacher. He will have the opportunity to work with and observe more than one experienced teacher, work with small groups before encountering the traditional large class, and develop teaching skills necessary in an informal situation.

v

A further source of paraprofessional help consists of student volunteers who are advanced in mathematics. Student volunteers can be extremely useful in tutoring individuals within the classroom, correcting tests, and performing other clerical functions.

Also, every community contains a nucleus of parents who are eager to serve their community and schools. These people should not be overlooked when searching for additional classroom help.

Part of the role of the teacher in the self-pacing program is to coordinate the activities of the paraprofessional team which might consist of a student teacher, a volunteer student, and a community volunteer.

Class size is an important factor in the effectiveness of a self-pacing program. Thus, the administration should make every effort to reduce class sizes to provide for greater individualization of instruction. Initially, a teacher might be assigned about 20 to 25 students. However, after regrouping has occurred several times, it is possible that one teacher could have a class of 35 students, while a second teacher has only 10.

In the ideal self-pacing program a building might be designed to include large rooms with portable separators. Modular scheduling with several consecutive modules of time devoted to independent study may be a feature of the new curricula. It is hoped that the role of the paraprofessional will be minimized in the ideal situation by assigning several qualified teachers to each class.

It is evident that the role of the teacher will become more complex in the self-pacing program. Each teacher will direct the activities of individual students in two or more groups. This means that more than one activity in the traditional sense must be prepared. The teacher may choose to spend the entire period instructing one group and providing meaningful activities for the other groups. These latter groups can be assigned to paraprofessional aides. A typical situation might find the teacher instructing a group of 12 to 15 students in one part of the room, a student teacher teaching a smaller group of 5 to 7 students in another part of the room or in a different room,

and a student volunteer helping individuals in a third place. A suggested arrangement of the room is shown below.
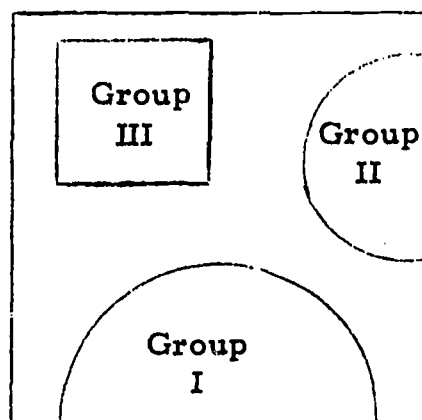
The physical arrangement may change from day to day depending upon the activities planned.

The teacher may wish to spend part of his time working with each group or with individuals. These suggestions in no way exhaust the possibilities for grouping. It may be useful for special purposes to teach the entire section as a whole. No one method should be used exclusively throughout the year. All of the suggested techniques should be considered and others explored.

One of the teacher's main responsibilities is to coordinate the activities of all groups in his class. Daily conferences between the teacher and his team are essential if each group is to have the benefit of planned instruction. Instead of preparing one lesson for the entire class, the teacher is responsible for planning material for each group in his room. Ideally, teachers in a self-pacing program will be provided planning periods for coordination of the team activities in addition to consultation with other members of the professional staff.

Continuous evaluation of student progress should be made. Regrouping within and between classes should be done as frequently as necessary on the basis of the evaluation. In general, no student should be a permanent member of any single group. Individuals should not be placed in groups on the basis of intelligence alone.

The first activity of a self-pacing program should be a diagnostic test. The students can then be assigned to the various sections on the basis of their background. Thus, all students in the program begin at different points.

In order to provide for maximum flexibility, at least two types of grouping should be utilized:

a) intra-class grouping, in which students are grouped within the same section under the same teacher.

b) inter-class grouping, in which students are re-assigned to different sections and teachers.

An important feature of intra-class grouping is the flexibility that it provides. In intra-class grouping, students are regrouped daily on the basis of their immediate needs. Intra-class grouping can be accomplished in a variety of ways.

One method provides the opportunity for some students to work independently using student assignment sheets for direction. The remainder of the class can be grouped on the basis of their performance on a drill given at the beginning of the period. The drill should contain material from the past several days' work. Students doing well on the drill can proceed to new material while those who need additional work can be directed to a review group. It is not necessary to record "grades" for these drills, since the drills should be diagnostic in nature.

A second method of daily grouping is to divide the class into two or more groups, depending upon their progress within a given unit.

A third method requires the student to indicate verbally the area in which he needs help. Students having similar difficulties can be grouped accordingly. These possibilities are not intended to be exhaustive.

Inter-class grouping is done less frequently. The basis of this type of grouping is the students performance on periodic evaluations by the professional staff. This evaluation is based on the judgement of the teacher and achievement on unit tests.

The exact technique of regrouping may take several forms. If only a few students in a given class complete the unit successfully, they can move on to the next higher section. Conversely, if only a few do not complete the unit successfully, they may either be re-assigned to a slower group within the class or to a slower section conducted by a different teacher.

The purpose of the achievement test is not to determine a student's grade on the unit. The function of this test is to determine whether the students' background is sufficient to insure success in subsequent units. The level of acceptable performance will vary from unit to unit depending upon the difficulty of the material and its relevance to future concepts. Acceptable scores should be determined for each test by the teaching staff before it is administered. Experience may revise the acceptance levels either upward or downward. A student receives either a "complete" or "incomplete" for the unit and never a numerical or letter grade.

If the student receives a grade of "complete", he moves on to the next unit. If a student's score is "incomplete", the teacher must diagnose the areas of difficulty and prescribe appropriate remedial action. The student may be instructed to restudy the entire unit or merely one or more topics in the unit. When he shows evidence of having completed this prescribed remedial program, he is retested. This retesting may take several forms. The student may take a retest on the entire unit. Therefore, several alternate forms of each unit test should be available. However, a student need not retake the entire test. The students may be tested only on those areas in which a lack of competence was indicated. This test may be written or oral. If the material still is not mastered adequately, the student is again recycled in the remedial process. A student is permitted to progress only when he has earned the grade of "complete". Since it very often happens that a student must restudy a unit several times, a variety of materials other than the text should be available. These should include additional texts, programmed materials, filmstrips, listening posts and recorders, overhead projectors, and remedial materials such as the SRA ALGEBRA KIT and MAST TEACHING.

The mobility of the students in a self-pacing program necessitates a different device for recording student progress than the traditional grade book. A more useful device is a student profile sheet where an entire page is devoted to each student. (See Appendix D.) When student transfers are made, the teachers exchange student profile sheets. The most valuable characteristic of these sheets is that they contain a complete record of the student's academic progress, attendance information, term grades, anecdotal records. They provide a more realistic basis for future placement than the traditional grade.

A sensible method of grading in a self-pacing program is to assign the higher grades to those students who have completed the greatest number of units, while lower grades would be assigned to students completing lesser numbers of units at the end of the term.

ix

The above ideas for implementation of a self-pacing program
are merely suggestive and are not intended to be mandatory or
exhaustive. Continuous evaluation and refinement of this program
can be best accomplished by the participating teachers. Your reactions
and comments will prove invaluable for subsequent revision of this
effort.

x

TOPICAL OUTLINE

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

SETS, SENTENCES AND THE NUMBER LINE

UNIT I

1. Set membership, one-to-one correspondence, empty set.

2. Subset of a set.

3. Finite and infinite sets.

4. Symbols of equality and inequality.

5. Identification of sentences as equations or inequalities.

6. The number line.

7. Order of operations and symbols of grouping.

- 2 -

VARIABLES

UNIT II

1. Variables and evaluation of open phrases.

2. Factors, coefficients and exponents.

3. Translation of English phrases and sentences into algebraic phrases and sentences.

- 3 -

14

NON-NEGATIVE NUMBERS OF ARITHMETIC

UNIT III

1. Axioms of equality.

2. Closure properties of addition and multiplication.

3. Commutative and associative properties of addition and multiplication.

4. Distributive property of multiplication over addition.

5. Addition and multiplication properties of zero.

6. Multiplication property of one.

- 4 -

NEGATIVE NUMBERS

UNIT IV

1. Graphs of directed numbers.

2. Order of rational numbers.

3. Additive inverse of a number.

4. Absolute value of a number.

5. Addition, subtraction, multiplication, and division of directed numbers.

6. Product of monomials.

7. Combination of similar terms.

OPEN SENTENCES, EQUATIONS AND INEQUALITIES

UNIT V

1. Solution of open sentences by replacement.

2. Solution of open sentences by the addition, subtraction, multiplication and division properties of equality.

3. Solution of equations involving combination of similar terms.

4. Solution of equations involving variables in both members of the equation.

5. Solution of equations involving formulas.

6. Solution of simple inequalities.

17

TOPICAL OUTLINE

POLYNOMIALS

UNIT VI

1. Exponent, power, base, coefficient.

2. Laws of non-negative integral exponents.

3. Addition and subtraction of polynomials.

4. Multiplication of polynomials and squares of binomials.

5. Division of polynomials.

18

SPECIAL PRODUCTS AND FACTORING

UNIT VII

1. Factorization of an integer into prime integers.

2. Factorization by removing a common factor.

3. Product of the sum and difference of two numbers.

4. Factorization of the difference of two squares.

5. Square of a binomial and product of two binomials.

6. Factorization of quadratic trinomials.

7. Combinations of several types of factoring.

8. Solution of quadratic equations by factoring.

- 8 -

UNIT VIII

1. Restrictions on the variable.

2. Reducing fractions.

3. Ratio.

4. Multiplication and division of fractions.

5. Addition and subtraction of fractions.

6. Simplification of complex fractions.

7. Solution of open sentences with fractional coefficients.

8. Solution of fractional equations.

20

UNIT IX

1. Open sentences in two variables.

2. Graphs of points in the Cartesian plane.

3. Graphs of linear equations.

   a. chart method

   b. slope y-intercept method

4. Determination of the equation of a line given:

   a. point and slope

   b. slope and y-intercept

   c. two points.

5. Graphs of inequalities in two variables.

6. Solution of simultaneous equations in two variables.

   a. graphic method

   b. addition-subtraction method

   c. substitution method

   d. Cramer's rule

21

TOPICAL OUTLINE

THE REAL NUMBERS

UNIT X

1. Rational numbers - fractional form, decimal form.

2. Irrational numbers - roots of rational numbers.

3. Properties of irrational numbers.

4. Product and quotient properties of radicals.

5. Addition, subtraction, and multiplication of radicals and quadratic surds.

6. Rationalization of denominators containing radicals and quadratic surds.

7. Solution of open sentences containing radicals.

- 11 -

1. Relations.

2. Functions.

3. Proportion.

4. Direct variation.

5. Inverse variation.

BEHAVIORAL OBJECTIVES

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

UNIT I.   <u>Sets, Sentences, and the Number Line</u>

The student should be able to:

1.   identify members of a set.

2.   list the members of a set described by a rule.

3.   write a rule describing a set whose members are given.

4.   state whether or not a one-to-one correspondence exists between two sets.

5.   identify finite sets, infinite sets, the null set.

6.   identify subsets of a given set.

7.   list all the subsets of a given set of three or fewer members.

8.   state that the null set is a subset of every set and every set is a subset of itself.

9.   identify the symbols which represent the null set among the following list:

    a. 0

    b. $\{0\}$

    c. $\{\emptyset\}$

    d. $\emptyset$

    e. $\{\ \}$

10.   graph appropriate sets on a number line. These include:

    a. $\{1, 3, 5\}$

    b.   {all numbers between 3 and 5}

    c.   {all numbers between 0 and 1 including 0 and 1}

    d.   {all numbers greater than 4}

11.   on the number line locate a point associated with a given coordinate.

12.   name the coordinate associated with a given point on a number line.

13.   decide by computation whether the right and left hand side of a number statement name the same number.

14.   place the proper inequality symbol, $<$ or $>$, between two number statements to make a true inequality.

15. state that if one number is greater than a second, the former's graph is found further to the right than the latter's on a number line.

16. compute correctly the value of a number phrase by using the order of operations rules.

UNIT II.   Variables

The student should be able to:

1.   identify (and he need not be required to write definitions for the following terms):

   a.   variable.

   b.   replacement set.

   c.   constant.

   d.   factor.

   e.   term.

   f.   coefficient.

   g.   exponent.

   h.   base.

   i.   power.

2.   distinguish between factors and terms.

3.   state the number of terms in an algebraic expression.

4.   write 3 times a as 3a, (3)(a), $3 \cdot a$.

5.   given a phrase such as $\frac{3a}{4}$ write its equivalent, $\frac{3}{4}a$.

6.   distinguish between $(2b)^2$ and $2b^2$ by stating to which quantity the exponent refers in each case.

7.   evaluate formulas by substituting numbers for variables.

8.   write an algebraic expression representing a written phrase such as "five times a number, increased by three".

9.   write an algebraic sentence representing a written sentence such as "a number increased by five is twelve".

16

27

UNIT III.   Non-negative Numbers of Arithmetic and Elementary Structure

The student should be able to:

1.   identify the reflexive property of equality, given a statement such as 5 = 5.

2.   identify the symmetric property of equality, given a statement such as 5 = 3 + 2 implies 3 + 2 = 5.

3.   given a statement such as 3 = 5 - 2 and 5 - 2 = 2 + 1 implies 3 = 2 + 1, identify it as an application of the transitive property of equality.

4.   given the first two parts of the transitive property of equality, supply the third statement.

5.   state whether or not a given set of numbers is closed with respect to a given operation.

6.   given a number sentence illustrating <u>one</u> of the following properties, identify the property:

    a.   commutative property for addition or multiplication.

    b.   associative property for addition or multiplication.

    c.   distributive property for multiplication over addition.

7.   identify distinct terms involving one variable as similar or not similar.

8.   combine similar terms by addition and subtraction.

9.   identify the multiplicative property of 1, i.e. $a \cdot 1 = a$ for all numbers a.

10.   identify the additive property of zero, i.e. $a + 0 = a$ for all numbers a.

11.   name 1 as the multiplicative identity element.

12.   name 0 as the additive identity element.

13.   identify the multiplicative property of zero, i.e. $(a)(0) = 0$ for all numbers a.

14.   state that $\frac{a}{0}$ names no unique number of arithmetic consequently one cannot divide by zero.

15.   state that $\frac{0}{a} = 0$ if $a \neq 0$.

17

16. given a series of equalities of no more than four members and a list of the names of basic properties of equality and the non-negative numbers of arithmetic, be able to write the reason supporting each step.

Example: Prove $3(a + b) + c = 3a + (c + 3b)$

Statement		Reason	
1.	$3(a + b) + c = (3a + 3b) + c$	1.	_____
2.	$(3a + 3b) + c = 3a + (3b + c)$	2.	_____
3.	$3a + (3b + c) = 3a + (c + 3b)$	3.	_____
4.	Thus, $3(a + b) + c = 3a + (c + 3b)$	4.	_____

17. given a non-negative number of arithmetic, write its reciprocal.

18. state the property of multiplicative inverses, i.e. a and b are multiplicative inverses if and only if $(a)(b) = 1$.

19. given a non-negative number of arithmetic, write its multiplicative inverse.

20. state that 0 has no multiplicative inverse.

UNIT IV.   Negative Numbers of Arithmetic

The student should be able to:

1.   construct a number line showing the integers.

2.   using the number line tell which of two rational numbers is greater in value.

3.   arrange a set of not more than five directed numbers in ascending or descending order.

4.   translate verbal statements such as "a loss of three dollars" into an algebraic phrase using directed numbers.

5.   name the additive inverse of any given directed number.

6.   write the absolute value of any directed number.

7.   add, subtract, multiply, and divide directed numbers.

8.   state that a minus b means a plus the opposite of b.

9.   state that division is multiplication by the reciprocal of the divisor.

10.   state the three ways in which the minus sign is most commonly used in algebra, that is, as:

    a.   part of the name of some integers

    b.   as the symbol which represents the operation of subtraction.

    c.   as a shorthand symbol for the phrase "the additive inverse of"

11.   add and subtract two monomials, binomials, or trinomials, or combinations of these involving the first power of one or two variables given in either horizontal or vertical form.

12.   use the property of (-1) to write equivalent statements for a given algebraic statement. For example:

    a. $-5 = (-1)(5)$

    b. $-a = (-1)(a)$

    c. $-(a + b) = (-a) + (-b)$

19

UNIT V.   Open Sentences - Equations & Inequalities

The student should be able to:

1.   identify

    a.   open sentence,

    b.   equation.

    c.   left member.

    d.   right member.

    e.   solution set.

    f.   root.

    g.   inequality.

    NOTE: Replacement sets should be given for each
            problem now and throughout the course.

2.   intuitively solve simple open sentences by guessing.

3.   test by substitution whether or not a given number is the
       root of a given open sentence.

4.   using pencil and paper, solve linear equations in one unknown
       using the addition property of equality.

5.   using pencil and paper, solve linear equations in one unknown
       using the multiplication property of equality.

6.   using pencil and paper, solve the following types of linear
       equations:

    a. $2a - 13 = 30$ f. $7(y + 4) = -14$

    b. $5b + 9 - 3a = 20$ g. $3(5 - z) = 7$

    c. $15 - 4a + 3a = 17$ h. $-6(6 - 4x) = 19$

    d. $5d = 7 = 3d$ i. $5(3 + 2x) - 4x = 7x - 9$

    e. $6(x - 4) = 17$

7.   graph the solution sets of these above types of equations on
       a number line.

8.   state the addition and multiplication properties of inequalities.

20

31

9. using pencil, paper, and the properties of inequalities, solve the following types of linear inequalities:

a. $5a > 10$

b. $-6b \leq 13$

c. $d + 4 > 9$

d. $5(2a - 1) \leq -4$

e. $7(3e + 1) - 2e \geq 3(2e - 1)$

f. $\dfrac{a}{2} < 6$

g. $\dfrac{-3}{4} c \leq -7$

10. graph the solution sets of these above types of inequalities on a number line.

UNIT VI.   Polynomials

The student should be able to:

1.   identify a polynomial in one or two variables.

2.   name a polynomial according to the number of terms –
      monomial, binomial, and trinomial.

3.   name the degree of a polynomial.

4.   arrange a polynomial in one variable in order of ascending
      or descending powers of the variable.

5.   add and subtract polynomials in both horizontal and vertical
      notation. (Review additive inverse of a polynomial.)

6.   state the basic laws of exponentiation in both symbols and
      words:

      a. $a^m \cdot a^n = a^{m+n}$, where m and n are positive integers.

      b. $(a^m)^n = a^{mn}$, where m and n are positive integers.

      c. $a^m \div a^n = a^{m-n}$, where m and n are positive
            integers and $m > n$.

      d. $a^m \div a^n = \dfrac{1}{a^{n-m}}$, where m and n are positive
            integers and $m < n$.

      e. $(ab)^m = a^m b^m$, where m is a positive integer.

7.   state the definitions for a^0, $(a \neq 0)$, and a^1.

8.   simplify an expression involving one-step application of
      the laws 6(a) – 6(e).

9.   simplify an expression involving several applications of
      the laws 6(a) – 6(e).

10.   multiply polynomials involving the product of:

      a.   a monomial and a polynomial of more than one term.

      b.   two polynomials of more than one term and less than
            four.

11.   recite a rule for determining the product of two binomials
      (FOIL) and squaring a binomial.

12. find the product of any two binomials without pencil and paper.

13. divide a polynomial of more than one term by a monomial.

14. divide a polynomial of more than one term by a binomial.

UNIT VII.   Special Products and Factoring

The student should be able to:

1.   distinguish between prime and composite numbers.

2.   write an integer as the product of prime factors.

3.   name the GCF of two or more integers.

4.   express a monomial as the product of prime factors.

5.   name the GCF of two or more monomials.

6.   name the following special products:

   a.   difference of two squares.

   b.   perfect square trinomial.

7.   factor into prime factors a polynomial involving one-step factoring of the following types:

   a.   common monomial factor.

   b.   difference of two squares.

   c.   trinomials, general case with integral coefficients.

   d.   polynomials of four terms by grouping to reveal a common binomial factor.

8.   state a procedure for factoring a polynomial into prime polynomial factors.

9.   using pencil and paper, factor into prime polynomial factors, polynomials using two or more types of factoring.

10.   state that the product of two or more quantities is zero, if and only if at least one of the factors is zero.

11.   using pencil and paper, solve problems of the following types:

   a. $(x - 2)(x + 1) = 0$ g. $z^2 = 25$

   b. $(2a + 1)(a - 3) = 0$ h. $0(x - 9) = 0$

   c. $c^2 + 2c + 1 = 0$ i. $(x)(x - 4) = 0$

   d. $x^2 - 4 = 0$ j. $y^2 = 5y + 6$

   e. $2y^2 + 3y + 1 = 0$ k. $x^3 - 6x^2 - 40x = 0$

   f. $w^2 + 3w = -10$

12.   multiply at sight any polynomial by (-1) and name that the additive inverse of the polynomial.

24

35

UNIT VIII. Fractions

The student should be able to:

1. define a fraction as the indicated quotient of two integers or polynomials.

2. identify the numerator and denominator of a given fraction.

3. determine which value or values of the variable make the denominator of a given fraction zero and, hence, are not permissible replacements.

4. reduce to lowest terms a fraction whose numerator and denominator are polynomials.

5. compute the product of two or more fractions including such cases as:

    a. $\dfrac{x-y}{x} \cdot \dfrac{y}{y-x}$

    b. $5c^2 \cdot \dfrac{c}{3}$

    c. $(3x)\left(\dfrac{2x-4}{x^2-9}\right)$

    d. $\dfrac{x+1}{2x+3} \cdot \dfrac{x+2}{x-2}$

6. compute the quotient of two rational expressions.

7. add and subtract two or more rational expressions which have equal denominators.

8. calculate the LCM of two or more polynomials.

9. add and subtract two or more rational expressions which have unequal denominators.

10. simplify a complex fraction whose numerator and denominator are rational expressions.

11. calculate the ratio of two quantities.

12. determine the fourth term of a proportion in the form $\dfrac{a}{b} = \dfrac{c}{d}$

13. solve equations and inequalities with fractional coefficients.

25

UNIT IX.   Graphs and Sentences in Two Variables

The student should be able to:

1.   identify:

    a.   coordinate axes.

    b.   origin.

    c.   quadrant.

    d.   abscissa, ordinate.

    e.   ordered pair.

2.   graph an ordered pair in the Cartesian plane.

3.   name the quadrant in which a point lies given its coordinates.

4.   determine if a point lies on a given axis given its coordinates.

5.   state that the point with coordinates (x, y) can lie in <u>any</u> quadrant or on either axis.

6.   distinguish between subscripts and exponents.

7.   solve equations of the form $Ax + By + C = 0$ for y in terms of x.

8.   determine several solutions (ordered pairs) to an open sentence in two variables.

9.   graph, using the chart method, linear equations in two variables.

10.   determine the x and y intercepts of a linear equation in two variables by (a) graphing, and (b) substitution.

11.   graph the solution set of the special cases (a) $x = a$ and (b) $y = a$.

12.   state the equation of the x and y axes.

13.   state that the graph of $x = a$ is a vertical line and that the graph of $y = a$ is a horizontal line.

14.   state whether or not an equation is linear.

15.   given the graph of a line with several given points, determine the slope of the line.

16.   given two points which determine a line, calculate the slope of the line algebraically.

17. state that the slope of a line is constant regardless of the pair of points used to determine the slope.

18. state that a horizontal line has 0 slope and that the vertical line has no slope defined.

19. distinguish between positive and negative slopes and be able to state their geometric interpretations.

20. plot a line given:

    a.   two points.

    b.   point-slope.

    c.   slope-intercept.

    d.   intercepts.

21. plot a line given its equation in:

    a.   point-slope form.

    b. $Ax + By + C = 0$ or general form.

22. write the equation of a line given:

    a.   its slope and y-intercept.

    b.   its slope and the coordinates of one point on the line.

    c.   the coordinates of two points on the line.

22. graph inequalities of the form:

    a. $x > a$, $x \geq a$, $x < a$, and $x \leq a$

    b. $y > a$, $y \geq a$, $y < a$, and $y \leq a$

    c. $Ax + By + C > 0$, $Ax + By + C \geq 0$, $Ax + By + C < 0$, and $Ax + By + C \leq 0$

24. using the chart method, graph parabolas of the form $y = ax^2$, $a \neq 0$.

25. determine the common solution to a pair of linear equations in two variables by each of the following methods:

    a.   graphing.

    b.   substitution--when one of the equations is "easily" solved for one of the variables. This occurs, of course, when one of the variables has a coefficient of one.

    c.   addition-subtraction method.

    d.   determinants.

27

UNIT X. The Real Numbers

The student should be able to:

1. define a rational number as the quotient of two integers.

2. given an integer or a decimal with one, two or three places of decimals, write it as a rational number.

3. write a common fraction as a decimal.

4. distinguish between a terminating and periodic decimal.

5. given one of the two standard notations for periodic decimals, write the equivalent.

   Example: $.8\overline{3} = .8333...$

   $.6363:.. = ..\overline{63}$

NOTE: A class discussion on the principle that a rational number in the form $\frac{p}{q}$, where p and q are relatively prime, either terminates in decimal expansion or repeats in a block of fewer than q digits is appropriate at this time.

6. determine by computation which of two given rational numbers is the greater in value.

7. state the trichotomy principle for rational numbers.

8. by averaging, determine a rational number between any two given rational numbers.

NOTE: A class discussion on the density property is appropriate at this time.

9. given a repeating decimal (nonterminating) of period 1 or 2, determine the equivalent rational number in the form $\frac{p}{q}$.

10. state the principle that all terminating decimals and infinite periodic decimals name rational numbers.

11. state the definition of the square, cube, and fourth roots of a number.

12. identify the index and radicand of the radical $\sqrt[n]{a}$.

13. write the square roots of perfect squares up to 225.

14. state that square roots of negative numbers do not exist in the real number system.

28

39

15. state the rules:

   a. $(\sqrt{a})^2 = a, \ a \geq 0$

   b. $(\sqrt{a^2}) = a, \ a \geq 0$

16. use the rules developed in item 15 to simplify expressions involving their one step application.

17. state the product and quotient properties of square roots:

   a. $\sqrt{a} \ \sqrt{b} = \sqrt{ab}$, $\quad a \geq 0$ and $b \geq 0$

   b. $\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$, $\quad a \geq 0$ and $b > 0$

18. give the square roots of monomials of the form:

   a. $100z^2$

   b. $49x^2 y^2$

   c. $\dfrac{9p^2}{w^2}$

   NOTE: Restrictions on the variable should not be emphasized at this point. The main objective is that the student can apply the laws of square roots to simplify a monomial.

19. calculate square roots of such numbers as .57, .023, and .0023 by using a table of roots.

20. distinguish between the two meanings of an expression containing a radical sign, i.e. as an operation and as naming a number.

21. calculate the product of two radicals using the product property for such problems as:

   a. $\sqrt{7} \ \sqrt{3} = \sqrt{21}$

   b. $(5\sqrt{3})(7\sqrt{2}) = 35\sqrt{6}$

22. simplify radicals such as:

   a. $\sqrt{20}$

   b. $5\sqrt{96}$

   c. $\dfrac{1}{3}\sqrt{27}$

   d. $\dfrac{1}{5}\sqrt{72}$

   e. $\sqrt{\dfrac{7}{8}}$

   f. $\sqrt{\dfrac{5}{9}}$

   g. $\sqrt{\dfrac{9}{5}}$

   h. $\dfrac{2}{\sqrt{7}}$

   i. $\dfrac{7\sqrt{3}}{2\sqrt{5}}$

   j. $\dfrac{\sqrt{11}}{3\sqrt{2}}$

29

23. simplify such radicals as:

a. $(\sqrt{a})(\sqrt{8a})$

b. $(5\sqrt{b})^2$

c. $(-2\sqrt{a})(6\sqrt{ab})$

d. $\sqrt{7a^2}$

e. $\sqrt{15a^2b}$

f. $(\sqrt{7ab})^2$

g. $\frac{1}{2}\sqrt{8a}\sqrt{12a}$

h. $\sqrt{\dfrac{6a}{7}}$

i. $\sqrt{\dfrac{5a^2}{3}}$

j. $\sqrt{\dfrac{7}{2a}}$

k. $\sqrt{\dfrac{3x^2}{2}}$

l. $\sqrt{\dfrac{9y^2}{3x}}$

m. $\dfrac{\sqrt{x}}{\sqrt{y}}$

n. $\dfrac{\sqrt{8x}}{\sqrt{2z}}$

NOTE: The point is that at this level all indices should be two, the quantities involved should be monomials, and only the first and second degree should be employed.

24. identify similar terms or similar radicals in a group such as:
$\sqrt{3}$, $\sqrt{2}$, $\sqrt[3]{3}$, $7\sqrt{2}$, $2\sqrt{7}$.

25. add and subtract radicals.

26. calculate the product of binomials which contain radicals.

27. determine the conjugate of real numbers of the form:
$a + \sqrt{b}$, $a - \sqrt{b}$, and $c\sqrt{b}$.

28. rationalize denominators of real numbers of the form:

$$\frac{a}{\sqrt{b}-\sqrt{c}}, \quad \frac{a}{\sqrt{b}+\sqrt{c}} \quad \text{and} \quad \frac{a\sqrt{b}+c\sqrt{d}}{d\sqrt{f}+g\sqrt{h}}$$

29. solve radical equations with one radical whose radicand can be a monomial or binomial. He must check for extraneous roots.

30. define the real numbers as the set of all decimals.

UNIT XI.   Relations, Functions and Variation

The student should be able to:

1.   distinguish between a set of elements which are not ordered pairs and a set whose elements are ordered pairs.

2.   list the first coordinates and second coordinates of a set of ordered pairs.

3.   define a relation as a set of ordered pairs.

4.   given a finite relation in roster form, write its domain and range.

5.   graph a relation, given the set of ordered pairs.

6.   given the graph of a relation, determine its domain and range.

7.   given a rule (formula) graph the relation on a limited domain, i.e., a subset of the reals.

8.   given a table of values, find the graph of a relation.

9.   given a table of values, write a relation in ordered pair notation.

10.   state that a relation may be defined by a set of ordered pairs, graph, formula (rule), or table of values.

11.   given a table of values defining a linear relation of the form $y = mx$ or $y = x + a$, find the correct formula and then determine missing values.

12.   define a function as a relation whose elements contain distinct first members.

13.   given a set of ordered pairs, tell whether it defines a function or not.

14.   write the domain and range of a function defined by:

a.   roster.

b.   table of values.

c.   graph.

15.   tell whether a graph defines a function or relation.

16.   given the set of ordered pairs, determine if it is a direct variation.

17.   determine by examining a linear graph, if it is one of direct variation.

31

18. given a direct variation defined by a table of values, write a rule relating the domain and range, i.e., a statement of the form $y = mx$.

19. given either a table of values or a rule defining a direct variation, write the constant of proportionality.

20. identify the means and extremes of a proportion given in the form $\frac{a}{b} = \frac{c}{d}$ or $a:b = c:d$.

21. state the product property of proportions.

22. determine whether two ratios are equal.

23. solve (for a variable term in) a proportion using the product property of proportions.

24. given an English sentence describing a direct variation, write a formula correctly describing this result.

25. given a set of ordered pairs or table of values, determine whether this describes an inverse variation.

26. translate English statements concerning an inverse variation into valid formulas.

27. given a set of formulas, identify those which define a direct variation, inverse variation, or neither.

NOTE: Joint variation and combined variation will not be considered.

STUDENT ASSIGNMENT SHEETS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

The previous sections on Topical Sequence and Behavioral
Objectives may be used with any modern algebra text. In
order for teachers to see how this may be done, the
following section uses a typical algebra text, Modern Algebra,
Book I, by Dolciani, Berman and Freilich as an illustration.

STUDENT
ASSIGNMENT SHEET

UNIT I   SETS, SENTENCES, AND THE NUMBER LINE

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
1. Set concept, set membership, one-to-one correspondence, and empty set	Pp. 10-11 Pp. 13-14	P. 12 1,3,9,13,17,25,27,29,32 Pp. 14-15 Oral Ex. 1,2,4,9,10,13,14,15,16 Written Ex. 1,2,4,5,9,18,23-34	
2. Subsets	P. 18	Pp. 18-19 Oral Ex. 1,2,8,9,11,12,13,15 Also: Write all subsets of A where A = { 3,4 }. SEE INSTRUCTOR FOR TEST	

- 34 -

45

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
3. Numerical equations	Pp. 5-6	P. 6 Written Ex. 1,3,4,6,9,12,13,15,18	
4. Signs of inequality	Pp. 7-8	P. 9 Written Ex. 2,4,9,10,17,20,24,25,33,37	
5. Identification of expressions involving equations and inequalities		Tell which of the following are equations, inequalities or neither. 1. $\{1,2,3\}$ 2. $8+1=6+3$ 3. $5=21-10$ 4. $\{a,b,c\} \neq \{1,2,3\}$ 5. $21+4$ 6. $13<8$ 7. $10 \neq 5 \cdot 2$ 8. $\frac{2}{3} \cdot \frac{5}{7} < 1$ 9. $1 \cdot 7 + 3 \cdot 3 = 5 \cdot 2 - 0 \cdot 2$	
6. The number line	Pp. 1-2 F. 16	P. 3 Oral Ex. 1-8, 21,24,25,26 Pp. 4-5 Written Ex. 7,10,11,15,16,24,25 P. 17 Written Ex. 1-5,8,10,11,12,13,15	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
7. Symbols of inclusion and order of operation	Pp. 19-21 P. 23 SEE INSTRUCTOR FOR TEST	P. 22 Written Ex. 1,2,5,3,7-15,20 P. 24 Written Ex. 1,2,4-7,11,12,17,18, 19,23	

47

UNIT II

VARIABLES

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
8.	Variables and evaluating open phrases	Pp. 35-37	P. 37 Oral Ex. 1-9, 21-24 Written Ex. 1-9	
9.	Factors, coefficients, exponents	Pp. 40-41	Pp. 42-43 Written Ex. 1,2,4,5,7,8,10,11,14,16, 17,18,19,21,25,27,28,29, 30,31,33,35,36 Pp. 41-42 Oral Ex. 15-56 P. 43 Problems 1,2,4,5	
10.	Thinking with variables	P. 51	P. 54 Written Ex. 1,4,5,7,8,11,12,13,15,17, 19,21,23 Pp. 52-54 Oral Ex. 1,3,5,8,12,13	
11.	Writing open sentences		Pp. 57-58 Oral Ex. 2,4,5,8,10,12,13,14 SEE INSTRUCTOR FOR TEST	

48

UNIT III   NON-NEGATIVE NUMBERS OF ARITHMETIC

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
12. Axioms of equality	Pp. 69-70	Pp. 69-70 Oral Ex. 1-4	
13. Closure properties of addition and multiplication	Pp. 71-72	P. 72 Oral Ex. 1,2,3,5,9-12 P. 73 Written Ex. 2,5,11	
14. Commutative and associative properties for addition and multiplication	Pp. 73-74	P. 74 Oral Ex. 1-19 (omit 9,13) 21,24	
15. Distributive property and properties of 1 and 0	Pp. 75-77	P. 78 Oral Ex. 1,4,5,8,11,13,14,16,19,20, 21,23,27,28 P. 79 Written Ex. 1-7,9,11,15,19,22,25,26, 29 SEE INSTRUCTOR FOR TEST	

49

NEGATIVE NUMBERS

UNIT IV

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
16. Directed numbers	Pp. 111-112	Pp. 112-113 Oral Ex. 1, 4, 5, 5, 11-14, 17, 24, 27, 28 P. 113 Written Ex. 1-12	
17. Order of rational numbers	P. 114	P. 114 Oral Ex. 1-20 P. 115 Problems 1, 3, 4	
18. Addition of directed numbers on the number line	Pp. 116-117	Pp. 117-118 Oral Ex. 1, 5, 7, 9, 11, 12, 13, 17, 18, 19, 20, 22, 23, 24 Written Ex. 2, 3, 7, 8, 12	
19. Additive inverse	Pp. 120-122	P. 122 Oral Ex. 1, 4, 6, 8, 9, 10, 12, 17, 18, 19 Written Ex. 1-8 Do also: 1. $5 + (-5) =$ _____ 2. $(-7) + (+7) =$ _____ 3. $(-3) + (+3) =$ _____ 4. $(+7.2) + (-7.2) =$ _____ 5. $a + (-a) =$ _____	

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
20.	Absolute value	P. 123	P. 124 Oral Ex. 1-24	
21.	Addition of directed numbers	Pp. 124-126	P. 126 Oral Ex. 1-18 P. 127 Written Ex. 1,2,3,5,7-10,13,14,18, 2/-35 P. 128 Problems 1,5	
22.	Subtraction of directed numbers	Pp. 128-130	P. 130 Oral Ex. 1,4,5,7,9,11,12,17,18,20, 21,27-32,36 P. 131 Written Ex. 21,22,27,28	
23.	Multiplication of directed numbers	Pp. 133-135	P. 135 Oral Ex. 1-21 P. 137 Written Ex. 1,3,5,11,12,15,16	

51

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
24.	Product of monomials		Determine the product: 1. $(3x)(2y)$ 6. $(-5ab)(-2bc)$ 2. $(-4z)(3d)$ 7. $(-3x)^2$ 3. $(6c)(-4d)$ 8. $(-5a)^3$ 4. $(-2d)(-4a)$ 9. $(-5x^2)(-3y^2)$ 5. $(6xy)(-2x)$ 10. $(2x)(-3y)(-2z)$	
25.	Division of directed numbers	Pp. 138–140	P. 140 <u>Oral Ex.</u> 1–20, 33–42, 49, 51	
26.	Combining similar terms	Pp. 133–135	P. 137 <u>Written Ex.</u> 21–24, 26, 27, 31–34, 36–44 Remove the parentheses and combine similar terms: 1. $3(x-2)-7$ 2. $-2(y+8)+3y$ 3. $4(2x+5)+8(-2x-3)$ 4. $-3(3x+7)+2(4x+7)$ 5. $-2(-7x+3a)+5(2x-6a)$ 6. $-1(6x-3)-5(2x+1)$ 7. $-4(2a+3b)-7(-3a+b)$ 8. $-5(5y+3)-6y+8$	

SEE INSTRUCTOR FOR TEST

UNIT V   OPEN SENTENCES, EQUATIONS & INEQUALITIES

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
27. Solving open sentences by replacement	Section 2-3	P. 46 Oral Ex. 1,2,3,4,5,9,15,17,18,21, 22,30 Pp. 47-48 Written Ex. 1,3,4,5,7,11,16,18,19, 20,22,23,25,27	
28. The addition and subtraction properties of equality	Pp. 80-82	P. 82 Oral Ex. 1,3,7,11,17,19 P. 83 Written Ex. 1,3,6,7,8,10,11,21 P. 59 Problems 13,16	
29. The multiplication and division properties of equality	Pp. 83-84	Solve each equation using the multi-plication property of equality. Show an intermediate step. 1. $5a = 15$ 8. $\dfrac{4d}{5} = 20$ 2. $7a = 23$ 9. $\dfrac{7}{8}f = -21$ 3. $16 = 5b$ 4. $-7a = 106$ 10. $\dfrac{3}{4}a = -7$ 5. $-5d = -13$ 11. $-\dfrac{2}{3}n = 15$ 6. $\dfrac{1}{4}f = 7$ 12. $-\dfrac{5}{6}n = -\dfrac{3}{4}$ 7. $\dfrac{2}{3}h = -18$	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
		13. $\dfrac{-2a}{5} = 4$ 19. $\dfrac{h}{7} = -3$ 14. $\dfrac{-5m}{3} = \dfrac{-2}{3}$ 20. $\dfrac{m}{-2} = -5$ 15. $1.2d = 2.4$ 21. $\dfrac{-a}{3} = 6$ 16. $3.9 = 1.3f$ 22. $\dfrac{b}{7} = \dfrac{1}{2}$ 17. $5.4 = -1.8h$ 23. $\dfrac{c}{-2} = -\dfrac{3}{4}$ 18. $-10c = .5a$	
30. Combining terms and use of transformation principles	Pp. 86-88	Pp. 88-89 Written Ex. 2,3,4,5,7,8,9,10,11-16, 27,29,30,36,41,47,49	
	Pp. 158-159	P. 158 Oral Ex. 1,2,3,4,5,6,7,10,13 P. 59 Problems 4,8	
31. Solving equations with variables in both members of the equation.	Pp. 91-93	P. 93 Written Ex. 1,2,3,5,5,7,8,9,11,12, 14,15,16,18,20,21,23,24, 26,28,30,31,32 P. 170 Problems 1,4,5,8 Pp. 58-59 Problems 1,5,15	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
32. Solving formulas	Pp. 157-158	P. 159 Written Ex. 2,3,5,8,10,11,15,16,23, 24,25,29,30,31,33,34,35 P. 89 Problems 1,3,6	
33. Properties of inequalities	Pp. 159-162	P. 163 Written Ex. 1,2,3,4,5,7,8,11,12,13, 14,15,20,21,22 P. 89 Problems 5,10	
	SEE INSTRUCTOR FOR TEST		

POLYNOMIALS

UNIT VI

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
34. Adding polynomials	Pp. 197-198	Pp. 198 __Oral Ex.__ 1,3,4,5,7,9,10,11,12,14, 17,18,20,21,22,23,24,27, 29,30,31 P. 89 __Problems__ 13,17	
35. Subtracting polynomials	Pp. 200-201	Pp. 201-202 __Oral Ex.__ 1,3,4,5,6,9,10,11,12,13 16,17 P. 202 __Written Ex.__ 10,11,12,14,18,21 P. 94 __Problems__ 2,7	
36. The product of powers	P. 203	P. 204 __Written Ex.__ 3,4,5,8,10,12,15,19, 20,25 Do the following problems: 1. $2^3 \cdot 2^4$ 2. $x^5 \cdot x^2$ 3. $a^3 \cdot a^2 \cdot a^5$ 4. $3x^6 \cdot x^3$ 5. $y^3 \cdot y^o$	

- 45 -

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
37. The power of a product	Pp. 204-205	Do the following problems: 1. $(ab)^2$ 6. $(-2)^2$ 2. $(6a)^2$ 7. $(-2)^3$ 3. $(-2b)^2$ 8. $(3d^2)^3$ 4. $(3xy)^3$ 9. $(-2a^2)^4$ 5. $(d^3)^2$ P. 205 Written Ex. 2,4,5,6,7,9,15,18	
38. The quotient of powers	Pp. 215-217	P. 217 <u>Oral Ex.</u> 1-10 P. 218 <u>Written Ex.</u> 2,3,4,5,10,14,15,19,23	
39. Zero as an exponent	P. 218	Pp. 218-219 <u>Oral Ex.</u> 1-20	
40. Multiplying polynomials by a monomial	Pp. 206-207 Pp. 178-180	Pp. 207-208 <u>Written Ex.</u> 1,2,4,5,6,7,10,12,15, 20,21 P. 202 <u>Written Ex.</u> 17,20,24,27 Pp. 208-209 <u>Problems</u> 1,2,4,9	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
41. Multiplication of two polynomials	P. 209	P. 210 Written Ex. 1,2,3,5,6,7,9,10,12,14, 15,17,19,20,21,27,28,29, 33 P. 212 Problems 2,6	
42. Raising binomials to a power	Pp. 213-214	P. 214 Written Ex. 1,2,3,5,9,11,13 P. 214 Problems 1	
43. Division of polynomials by a monomial	Pp. 219-220	Pp. 220-221 Written Ex. 1,2,3,6,7,10,11,12,13, 14,15,17,18,21,25,28	
44. Division of polynomials by a polynomial	Pp. 221-222	P. 223 Written Ex. 1,2,3,5,6,7,8,9,11,13, 15,16,26,27,28,35	
	SEE INSTRUCTOR FOR TEST		

SPECIAL PRODUCTS AND FACTORING

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
45.	Factoring an integer into primes	Pp. 237-239	P. 239 Oral Ex. 1-22 P. 240 Written Ex. 1,2,5,8,9,11,17,19,21, 23,24,26,29	
46.	Common monomial and polynomial factoring	Pp. 241-242	P. 242 Written Ex. 2,3,5,6,7,8,10,11,12, 13,14,15,17,19,20,21,22 23,29,31,32,34,36	
47.	Product of the sum and difference of two numbers	P. 245	P. 245 Oral Ex. 1,5,8,9,11,12,13,15,16,17, 18,19,20,21	
48.	Factoring the difference of two squares	Pp. 246-247	Pp. 247-248 Written Ex. 1,2,4,5,7,10,11,13,15, 16,21,22,23,27,29	
49.	Squaring a binomial	Pp. 248-249	Pp. 249-250 Oral Ex. 1,3,5,6,7,8,9,10,11,13,15, 16,21,22	
50.	Multiplying binomials at sight	Pp. 253-254	P. 254 Oral Ex. 1,2,3,7,8,9,13,14,15,16, 17,18 P. 254 Written Ex. 1,2,3,4,5,6,7,8,9,10, 12,14,15,17,21	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
51. Factoring the product of binomial sums and difference	Pp. 255-256	Pp. 252-253 Written Ex. 3,4,5,6,11,12,21,28 P. 256 Oral Ex. 2,5,7,8,10,13,15,18 P. 255 Written Ex. 1,2,3,4,5,6,7,8,9,11,13,15,17,18,20,22,23	
52. Factoring the product of a binomial sum and binomial difference	Pp. 257-258	P. 258 Written Ex. 2,3,4,5,6,8,10,11,13,15,16,17,19,21,20,24	
53. Factoring quadratic trinomials	Pp. 259-260	Pp. 252-253 Written Ex. 7,8,9,13,15 P. 256 Written Ex. 1,2,4,5,6,7,9,11,12,13,14,15,16,17,18,20	
54. Combining several types of factoring	P. 261	P. 253 Written Ex. 24,25,26,30 P. 262 Written Ex. 1,3,4,5,6,8,10,11,12,14,15,15,18,20,22,23,25,28,29,31,33,35	
55. Working with factors whose product is zero	Pp. 263-264	P. 264 Written Ex. 2,4,7,8,13,14,15,17,18,19	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
56. Solving equations by factoring	Pp. 254-265	P. 256 Written Ex. 1,3,4,5,7,8,9,11,12,14, 16,17,19,20,22,23,24,26, 27,29,30,31,33,35	
57. Additive inverse of polynomials	Pp. 267-269	P. 269 Problems 2,7,19 Use the multiplication property of -1 to find the additive inverse of: 1. 5x 2. 4yb 3. -7ad 4. -9xyz 5. x-7 6. x+5 7. 2y-5 8. 3y+7 9. -5y+9 10. -6x-4 11. $5x + (-5)$ 12. $4x^2 + 5x - 1$ 13. $7x^2 + 5x + 9$ SEE INSTRUCTOR FOR TEST	

- 50 -

61

UNIT VIII

FRACTIONS

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
58.	Restricting the replacement set of the variable	Pp. 281-282	P. 282 Written Ex. 1, 2, 4, 7, 8, 9, 14, 15, 17 Oral Ex. 1, 2, 3, 4, 6, 8, 11	
59.	Reducing fractions	Pp. 283-284	Pp. 284-285 Written Ex. 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 14, 15, 17, 18, 20, 24	
60.	Ratio	Pp. 286-287	P. 287 Oral Ex. 1, 3, 5, 7, 9, 13, 15 Pp. 287-288 Written Ex. 5, 9 Pp. 288-289 Problems 3, 6, 8	
61.	Multiplication of fractions	Pp. 292-293	P. 293 Oral Ex. 1, 3, 5, 7, 9, 11, 13, 18, 20, 27, 29 Pp. 293-294 Written Ex. 1, 2, 4, 5, 7, 9, 11, 14, 15, 17, 18, 20, 21, 22, 25, 26, 31, 35, 36	
62.	Division of fractions	Pp. 295-296	Pp. 295-296 Written Ex. 1, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 23, 24, 27	

- 51 -

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
63.	Multiplication and division of fractions	Pp. 296-297	Pp. 296-297 Written Ex. 1,3,5,8,11,14,15,20 Pp. 168-169 Problems 1,4,6,11,17	
		SEE INSTRUCTOR FOR TEST		
64.	Addition and subtraction of fractions with equal denominators	Pp. 297-298	Pp. 298-299 Written Ex. 1,2,3,4,5,6,8,9,10,12,13,17,19	
65.	Addition and subtraction of fractions with unequal denominators	Pp. 299-301	P. 300 Oral Ex. 1,3,4,6,7,13,15,17,19 Pp. 301-302 Written Ex. 1,2,3,4,6,8,9,10,11,13,14,15,17,20,22,23,24,25,27,30,31	
66.	Mixed expressions	Pp. 302-303	P. 303 Written Ex. 2,4,7,9,11,13,15	
67.	Complex fractions	Pp. 304-305	P. 305 Written Ex. 1,3,4,5,7,9,10,13,15	
68.	Open sentences with fractional coefficients	Pp. 306-307	P. 307 Written Ex. 1,3,5,8,9,12,14,16,17,21	
69.	Fractional equations	Pp. 312-313	Pp. 313-314 Written Ex. 1,3,5,8,9,11,14,15,17,25	
		SEE INSTRUCTOR FOR TEST		

UNIT IX

GRAPHS OF EQUATIONS

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
70. Open sentences in 2 variables	Pp. 333-335	P. 335 Oral Ex. All problems	
71. Coordinates in the plane	Pp. 337-338	P. 339 Oral Ex. 2,4,6,7,9,11,13,15,17,21-32 P. 340 Written Ex. 1,3,4,5,7,11,12	
72. Graphing of linear equation in 2 variables	Pp. 340-341	Pp. 341-342 Oral Ex. 1,2,3,5,8,10,11,13,14,15, 16,18,28,30 P. 342 Written Ex. 1,3,5,6,7,10,11,13,15,17 Graph: 1. $x = 2$ 6. $y = 3$ 2. $x + 3 = 0$ 7. $y = -8$ 3. $x = -4$ 8. $y + 6 = 0$ 4. $x - 5 = 0$ 9. $y - 4 = 0$ 5. $x = 0$	
73. Slope of a line	Pp. 343-344	Pp. 344-345 Oral Ex. 1,2,3,4,5,6,7,8,9,11,13,16 Pp. 345-346 Written Ex. 1,3,5,6,8,9,10,11,12	

SEE INSTRUCTOR FOR TEST

64

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
74.	Slope-intercept form of a linear equation	Pp. 345-348	P. 348 Oral Ex. 1, 3, 5, 6, 7, 10, 11, 14, 15 P. 348 Written Ex. 1, 3, 5, 7, 8, 10, 11, 12, 13, 15	
75.	Determining equations of a line given point - slope and point - point	P. 349	P. 350 Written Ex. 1, 2, 4, 5, 6, 9, 10, 12, 13, 14, 16, 18	
76.	Graph inequalities in two variables	Pp. 350-352	P. 352 Oral Ex. 1, 3, 7, 8, 9, 12, 13, 14, 15 P. 352 Written Ex. 1, 3, 5, 6, 7, 10, 11 Graph: $y = x^2$ and $y = \sqrt{x}$	
77.	Solution of simultaneous equations - graphic method	Pp. 367-369	P. 370 Written Ex. 1, 3, 5, 9	
78.	Solution of simultaneous equations - addition subtraction method	Pp. 370-371	P. 372 Written Ex. 2, 3, 6, 8, 14	
79.	Solution of simultaneous equations - multiplication in the addition-subtraction method	Pp. 374-375	P. 376 Written Ex. 1, 3, 6, 10	

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
80. Solution of simultaneous equations - substitution method	P. 378	P. 378 Written Ex. 1, 3, 4, 6, 10	
81. Solution of simultaneous equations - determinants	Explanation by instructor	Evaluate the following determinants: 1. $\begin{vmatrix} 3 & 5 \\ 1 & 2 \end{vmatrix}$ 4. $\begin{vmatrix} 4 & -1 \\ 0 & 6 \end{vmatrix}$ 2. $\begin{vmatrix} -5 & 1 \\ 4 & 6 \end{vmatrix}$ 5. $\begin{vmatrix} \frac{1}{2} & 2 \\ 1 & 4 \end{vmatrix}$ 3. $\begin{vmatrix} -1 & -2 \\ 6 & -3 \end{vmatrix}$ P. 372 Written Ex. (Change directions to: Solve by determinants) 5, 7, 11, 12 SEE INSTRUCTOR FOR TEST	

UNIT X

THE REAL NUMBERS

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
82. Nature of rational numbers	Pp. 397-398	P. 399 Oral Ex. 2,3,5,6,10,12,14,15,16,17, 19,22,23 P. 400 Written Ex. 15,16,20	
83. Decimal form of rational numbers	Pp. 400-402	P. 403 Written Ex. 1,4,5,7,11,13,17,18	
84. Roots of numbers	Pp. 403-405	P. 405 Oral Ex. 1,2,3,4,5,7,8,13,14,17,18, 23,24,27,28 Pp. 405-406 Written Ex. 1,2,3,7	
85. Properties of irrational numbers	P. 407	P. 410 Oral Ex. 1,3,4,6,7,8,11,13,14,15, 17,18	
86. Product and quotient properties of radicals	Pp. 414-415	P. 415 Oral Ex. 1,2,3,4,5,9,11,13,14,15, 17-31,33-36 Pp. 415-416 Written Ex. 1,3-7,10-13,16,18,19,23, 26,28,29,30 SEE INSTRUCTOR FOR TEST	

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
87.	Addition and subtraction of radicals	Pp. 417-418	P. 418 Oral Ex. 1,2,4,5,7,9.11,12,15 Pp. 418-419 Written Ex. 1,2,4,5,6,8-11,15	
88.	Multiplication of binomials containing radicals	Pp. 419-420	P. 420 Written Ex. 1,4,5,7,8,9,10,12,13,15	
89.	Rationalizing denominators containing radicals	P. 420 Top Example 3	P. 420 Written Ex. 17,18,19,21,24	
90.	Solutions of radical equations	P. 421	P. 422 Written Ex. 1,3,5,6,9,13,15,17,20	
		SEE INSTRUCTOR FOR TEST		

69

UNIT XI   RELATIONS, FUNCTIONS AND VARIATION

ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
91. Relations	Pp. 435-436	P. 437 Oral Ex. 13, 14, 15, 16, 17, 18 P. 437 Written Ex. 1, 2, 6, 7, 8, 9, 11, 12	
92. Functions	Pp. 438-439	P. 440 Oral Ex. 1-15 Pp. 441-442 Written Ex. 1, 3, 5, 9, 14, 15, 17 Graph: $y = \dfrac{1}{x}$; $x > 0$	
93. Direct variation and proportion	Pp. 442-443	Pp. 444-445 Oral Ex. 11, 12, 13, 16, 18, 22-29 P. 445 Written Ex. 1, 2, 3, 4, 7, 8, 11, 15 Pp. 446-447 Problems 1, 2, 6, 7, 9	
94. Inverse variation	Pp. 447-449	Pp. 450-451 Written Ex. 1, 2, 4, 5, 7 P. 451 Problems 1, 2, 3, 5, 10 SEE INSTRUCTOR FOR TEST	

PROBLEMS UNIT

	ASSIGNMENT TOPIC	READING	ASSIGNMENT	DATE COMPLETED
95.	Translating English s sentences into algebraic sentences	P. 51	P. 54 Written Ex. 1, 6, 7, 8, 12, 13, 16, 17-20 P. 55 Problems 3, 6, 9, 11, 12, 14, 17	
96.	Solving problems with open sentences	Pp. 56-58	P. 58 Oral Ex. 1-12 P. 58 Problems 1, 5, 7, 9, 10, 17, 20, 23	
97.	Number problems		P. 89 Problems 1, 3, 4, 7, 10, 12, 13, 18, 20, 21 P. 94 Problems 3, 5, 7, 11, 12, 15	
98.	Problems with directed numbers	Pp. 116-117	P. 119 Problems 1, 4, 6, 12 P. 128 Problems 1, 5, 6, 9	
99.	Differences of directed numbers		P. 132 Problems 1, 3, 5, 6, 10, 11	
100.	Work problems	Pp. 314-315	Pp. 315-316 Problems 1, 4, 5, 7, 8	

APPENDIX A

DIAGNOSTIC TESTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

A-1

DIAGNOSTIC TEST

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. TRUE or FALSE: 6ε {even numbers greater than 10}.

2. List all members of the set of even numbers between 1 and 11.

3. Write a rule describing all members in the set {a, e, i, o, u}.

4. TRUE or FALSE: There is a one-to-one correspondence between the set {1, 9, 11} and the set {even numbers between 3 and 9}.

5. Which one of the following sets is infinite? Place the letter before the correct answer on your sheet.

   A. {people on earth}

   B. {sand grains on a beach}

   C. {states in the Union}

   D. {whole numbers greater than 10}

6. Which one of the following symbols represents the null or empty set? Place the letter of the correct answer on your sheet.

   A. 0

   B. {0}

   C. ∅

   D. {∅}

7. How many members are there in the set {all people in the room over 10 feet tall}?

8. Find all the sets in the list which are subsets of {a, b, 1, 2}. Place the letter or letters of the correct answers on your answer sheet.

   A. {a, 1}   D. {b}

   B. {a, c}   E. ∅

   C. {a, b, 2}   F. {a, b, 1, 2}

9. Write all the subsets of the set {a, b}.

A-2

10. The graphs of the numbers 1, 2, $\frac{1}{2}$, $\frac{3}{2}$, and $\frac{5}{3}$ are given on the number line below.

A. Which point is the graph of the number $\frac{1}{2}$?

B. What is the coordinate of D?

C. What would be the coordinate of a point halfway between C and E?

```
    A    D    B    E F  C
    ●────●────●────●─●──●──────────────→
    0    1    1    3 5  2
         ─         ─ ─
         2         2 3
```
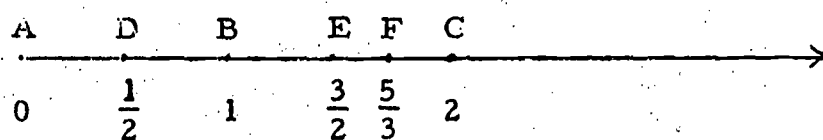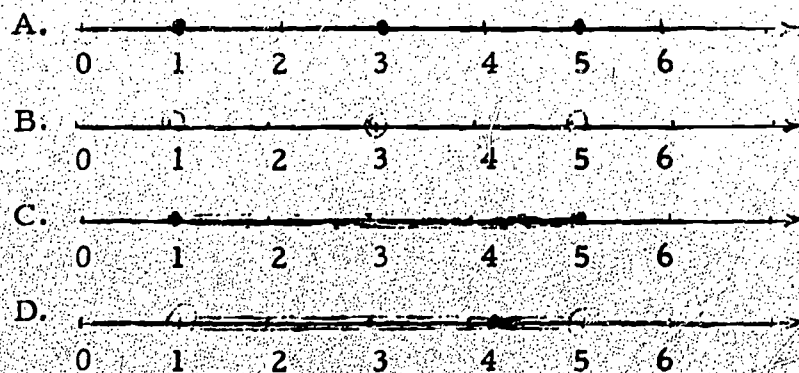
For problems 11 through 14, indicate whether the question mark should be replaced by (a) the = symbol, (b) the < symbol, or (c) the > symbol to make each statement true. Place the letter of the correct answer on the answer sheet.

11. 16+9 ? 5x5

12. 21-4 ? 3x5

13. 15+21 ? 0

14. 19-3 ? 3+7

In problems 15 to 18, tell which of the following graphs represents the given set.

15. {1, 3, 5}

A.
```
   ────●────────●────────●────────→
   0   1   2    3    4    5    6
```

B.
```
   ──────────────────────────────→
   0   1   2    3    4    5    6
```

C.
```
   ────●────────────────────────→
   0   1   2    3    4    5    6
```

D.
```
   ──────────────────────────────→
   0   1   2    3    4    5    6
```

16. {All numbers between three and five}

A.
```
   ──────────────(──────)────────→
   0   1   2    3    4    5    6
```

A-3

B.

C.

D.
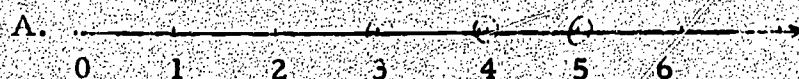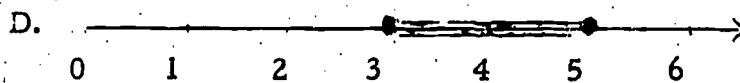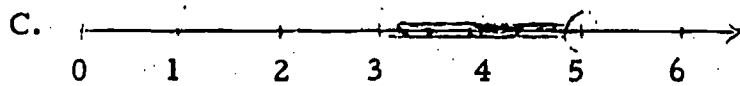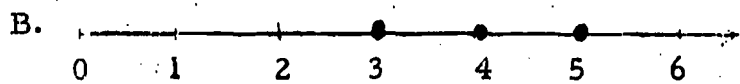
17. {All numbers between 0 and 1, including 0 and 1}

A.

B.

C.

D. φ
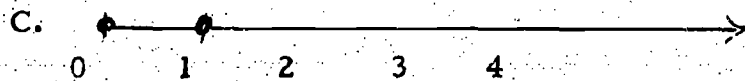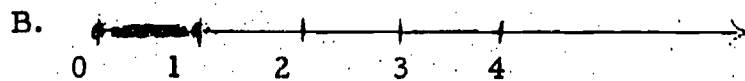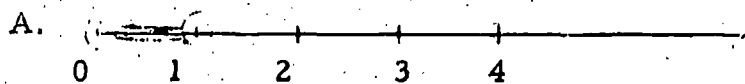
18. {All numbers greater than 4}

A.

B.

C.

D.
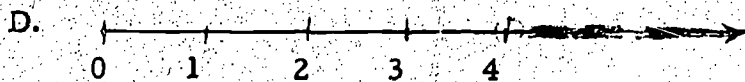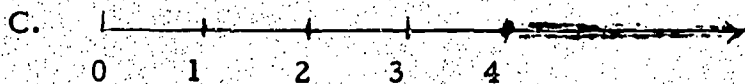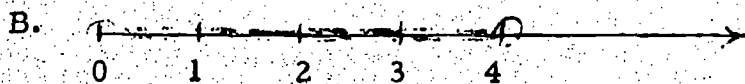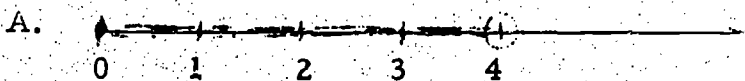
Calculate the value of each number phrase. Place the correct solution on your answer sheet.

19. $(16-4) - 2$

20. $13(13-9) - 9(13-9)$

21. $6-4 \div 2 \times 3$

22. $[6-(4 \div 2)] \times 3$

23. $6+9 - 4 \times 2 + 10 \div 2$

A-4

DIAGNOSTIC TEST

NAME _____   SECTION _____

TEACHER _____   DATE _____

SCORE _____   PERIOD _____

COMMENTS _____

1. _____   20. _____

2. _____   21. _____

3. _____   22. _____

4. _____   23. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. A. _____

    B. _____

    C. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. _____

19. _____

A-5

Acceptable Score $\frac{16}{23}$

TEACHER'S ANSWER KEY

DIAGNOSTIC TEST   First Year Algebra

1.	True	(1)	13.	C	(4)
2.	{2, 4, 6, 8, 10}	(1)	14.	C	(4)
3.	{vowels}	(1)	15.	A	(6)
4.	True	(1)	16.	C	(6)
5.	D	(1)	17.	B	(6)
6.	C	(1)	18.	D	(6)
7.	None	(1)	19.	10	(7)
8.	A, C, D, E, F	(2)	20.	16	(7)
9.	{a, b}, {a}, {b} ⏀	(2)	21.	0	(7)
10.	A. D	(6)	22.	12	(7)
	B. $\frac{1}{2}$	(6)	23.	12	(7)
	C. $1\frac{3}{4}$	(6)			
11.	A	(4)			
12.	C	(4)			

A-6

76

APPENDIX B

ACHIEVEMENT TESTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

DIRECTIONS: Do NOT write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. TRUE or FALSE: 5 ∈ {even numbers greater than 10}

2. List all of the members of the set of odd numbers between 5 and 13.

3. Write a rule describing all the members in the set {a, e, i, o, u}.

4. TRUE or FALSE: There is a one-to-one correspondence between the set {1, 9, 10} and the set {odd numbers between 4 and 10}.

5. Which one of the following sets is infinite? Place the letter of the correct answer on your answer sheet.

   A. {atoms in the head of a pin}

   B. {brilliant algebra teachers}

   C. {whole numbers greater than 15}

   D. {nations in the world}

6. Which one of the following symbols represents the null or empty set? Place the letter of the correct answer on your answer sheet.

   A. ϕ

   B. {0}

   C. {ϕ}

   D. 0

7. How many members are there in the set {all people who have eleven heads} ?

8. Find all the sets in the list which are subsets of {1, 2, b, c}. Place the letter or letters of the correct answer on your answer sheet.

   A. {a, 1}   D. {b}

   B. {a, c}   E. ϕ

   C. {a, b, 2}   F. {b, 1, 2, c}

9. Write all the subsets of the set {0, 1}.

B-2

UNIT I   Sets, Sentences and the Number Line   PART I

NAME _____ _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____

2. _____

3. _____

   _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

UNIT I   Sets, Sentences and the Number Line   PART II
                                                          TEST A
DIRECTIONS: Do NOT write on this test booklet.   Do all scratch work
on the paper provided to you.   Place correct answer in the appropriate
blank of your answer sheet.   Do not spend too much time on any one
problem.

I. Identify each of the following as an (A) equation, (B) inequality, or
    (C) neither.   Write the letter of the correct answer in the space provided.

    1. $7+5 = 12$

    2. $8-3 = 14$

    3. $27 + 5 \neq 17$

    4. $63 + 11 > 4$

    5. $3 - 6 > 9$

    6. $9 + 3 \times 2$

    7. $6 \div 5 < 7$

II. Write TRUE or FALSE in the appropriate space.

    1. $13+ 3 = 13+3$

    2. $3+4 \times 5 = 60$

    3. $7+12 > 4 \times 2+5$

    4. $6 \times 0 < 3+3$

    5. $.5 \times 12 < 15-9$

GO ON TO THE NEXT PAGE

B-4

80

3. {All numbers between 0 and 4, including 0 and 4}

A.

B.

C.

D.
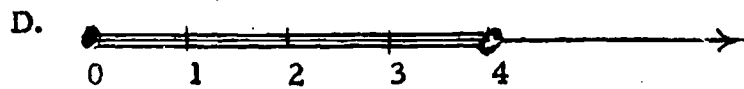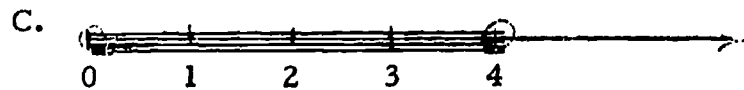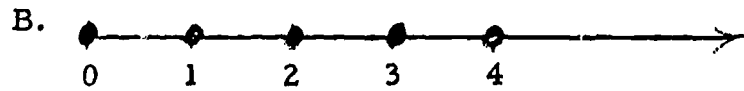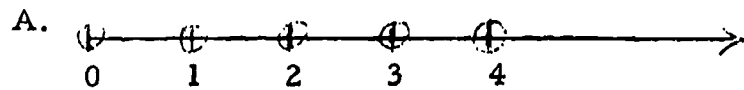
4. {All numbers greater than 2}

A.

B.

C.

D.
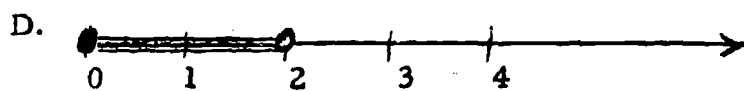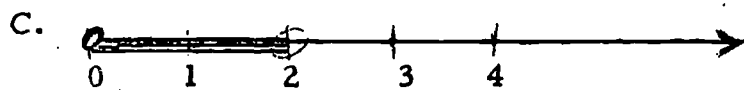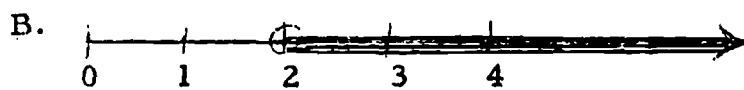
VI. Calculate the value of each number phrase. Place your answer on the sheet provided.

1. $(16-10)-5$

2. $13(11-8)-3(11-8)$

3. $16-4 \div 2 \times 4$

4. $\lceil 3-(3+2) \rceil \times 4$

5. $6+3 - 3\times2 + 10\div5$

B-5

81

III. The graphs of the numbers 0, 1, 2, 3, $3\frac{1}{2}$, 4 are on the given number line below.

    A   D   B   E F C

    0   1   2   3 $3\frac{1}{2}$ 4
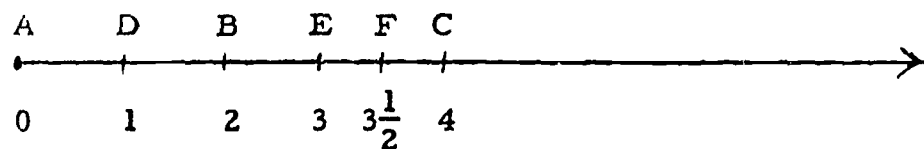
1.   Which point is the graph of the number 2?

2.   What is the coordinate of F?

3.   What would be the coordinate of the point halfway between A and B?

IV. Indicate whether the ? should be replaced by (A) the symbol =, (B) the < symbol or (C) the > symbol to make each statement true.

1.   16+4 ? 3x7

2.   21-6 ? 3x5

3.   5+13 ? 0

4.   19-5 ? 2+3

V. Tell which of the following graphs represents the given set.

1.   {1, 3, 5}
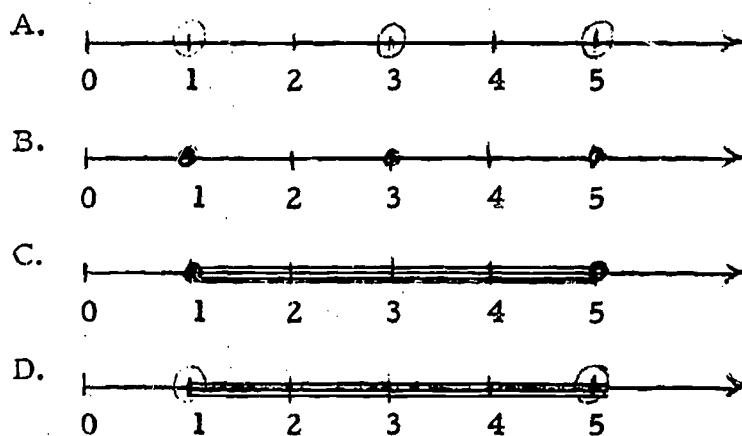
A.

B.

C.

D.

2.   {All numbers between 2 and 3}

A.

B.

C.

D. ϕ
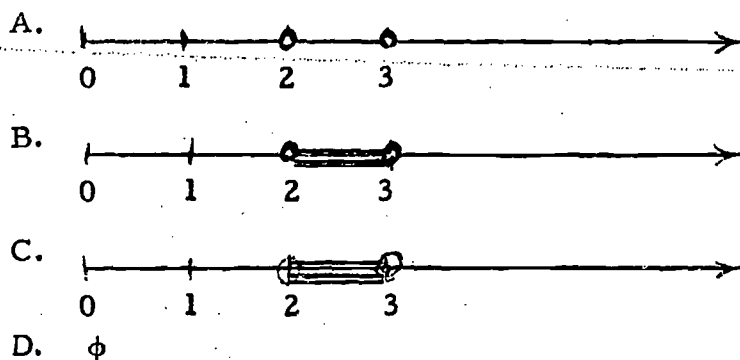
DIRECTIONS: Do NOT write on the test booklet.   Place all answers on the paper provided.

I. Identify each of the following as an (A) **equation**, (B) **inequality**, or (C) **neither**.

    1. $7 + 6 = 13$

    2. $3 - 4 = 4$

    3. $27 + 6 = 76$

    4. $76 + 96 > 67$

    5. $6 - 4 < 7$

    6. $8 + 5 - 6$

    7. $9 - 5 < 5 - 3$

II. Write TRUE or FALSE in the appropriate space.

    1. $3 + 14 = 1$

    2. $4 + 5 \times 8 = 44$

    3. $5 + 9 > 7 + 9$

    4. $9 - 6 < 3 + 4$

    5. $4 \times 3 > 2 + 0$

III. The graphs of the numbers $0, 1, 2, 3, 3\frac{1}{2}, 4$ are on the given number line below.

```
        D     A     E     H     K     L
    •————+—————+—————+—————+—————+————————————————
        0     1     2     3    3½     4
```
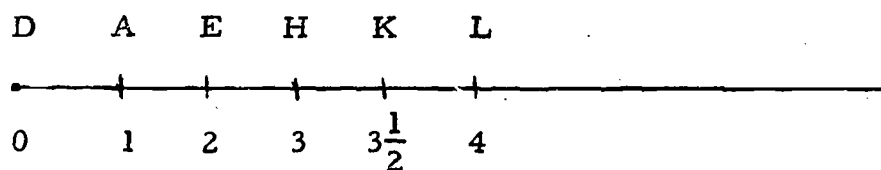
    1.   Which point is the graph of 3?

    2.   What is the coordinate of H?

    3.   What is the coordinate of the point halfway between A and H?

B-7

4. {All numbers greater than 4}

A.

B.

C.

D.
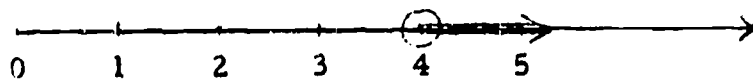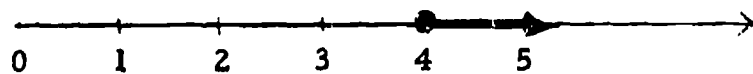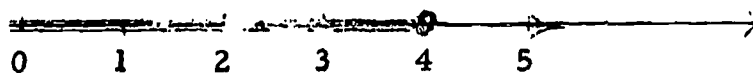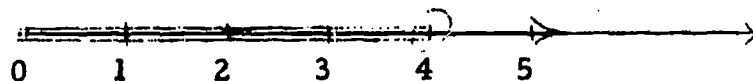
VI. Calculate the value of each number phrase. Place your answer on the sheet provided.

1. $26-(10+4)$

2. $12(11-8)-6(11-8)$

3. $20-5x2+6$

4. $16-4 \div 2x4$

5. $16+5-4x5+20 \div 5$

IV. Indicate whether the ? should be replaced by (A) the symbol = , (B) the
< symbol, or (C) the > symbol.

1.   17+4 ? 3x5

2.   29-0 ? 5+7

3.   6+6 ? 3x4

4.   19-5 ? 2+3

V. Tell which of the following graphs represent the given set.

1.   {2, 4}

A.


```
        0   1   2   3   4   5
```

B.


```
        0   1   2   3   4   5
```

C.


```
        0   1   2   3   4   5
```

D.


```
        0   1   2   3   4   5
```

2.   {All numbers between 3 and 5}

A.


```
        0   1   2   3   4   5
```

B.


```
        0   1   2   3   4   5
```

C.


```
        0   1   2   3   4   5
```

D.


```
        0   1   2   3   4   5
```
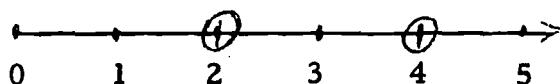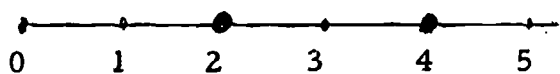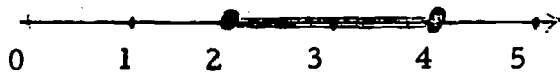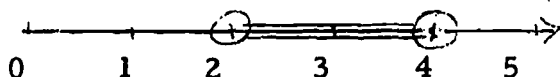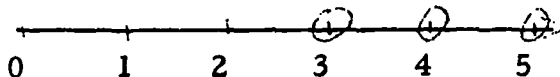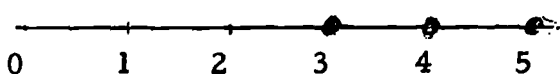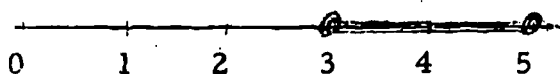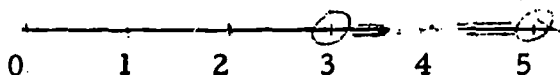
3.   {All numbers between 4 and 6 including 4 and 6}

A.


```
        0   1   2   3   4   5   6   7
```

B.


```
        0   1   2   3   4   5   6   7
```

C.


```
        0   1   2   3   4   5   6   7
```

D.


```
        0   1   2   3   4   5   6   7
```
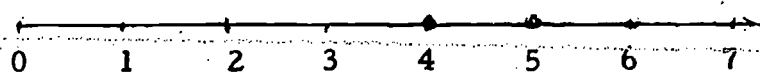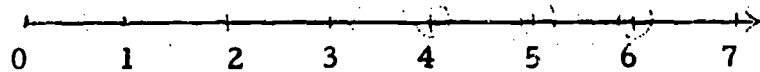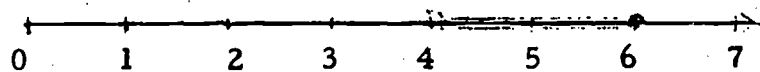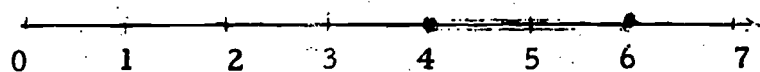
UNIT I   Sets, Sentences and the Number Line   PART II A   B   C   D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

I. - 1.   _____   VI. - 1.   _____

      2.   _____   2.   _____

      3.   _____   3.   _____

      4.   _____   4.   _____

      5.   _____   5.   _____

      6.   _____

      7.   _____

II. - 1.   _____

      2.   _____

      3.   _____

      4.   _____

      5.   _____

III. - 1.   _____

      2.   _____

      3.   _____

IV. - 1.   _____

      2.   _____

      3.   _____

      4.   _____

V. - 1.   _____

      2.   _____

      3.   _____

      4.   _____

DIRECTIONS: Do not write on this test booklet.   Do all scratch work on the paper provided to you.   Place the correct answer in the appropriate blank of your answer sheet.   Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered blank in the paragraph.   Write the letter of the correct answer on the answer sheet.

A.   CONSTANT   B.   BASE   C. POWER   D. REPLACEMENT SET

E.   TERM   F. VARIABLE   G. EXPONENT H. COEFFICIENT

I.   FACTOR

Let A = {1, 2, 3, 4} and consider the expression x^2. If x can be replaced only with numerals of set A, A is called the _____(1)_____ of x. Since x is a symbol which is to be replaced with the names of numbers, x is called a (n) _____(2)_____ .   In the expression x^2, x is called the _____(3)_____ and 2 is called the _____(4)_____.   In the expression $32y^2$, 32 is called the _____(5)_____ of y^2.   32 is also called a (n)_____(6)_____ of the entire expression.   In the expression 10x + y, 10x and y are called _____(7)_____ of the expression.

8.   The expression $15x^2y + 3xy^2 + 7x - 2y$ has how many terms?

9.   The expression (a-b)(a+b)(b-a) has how many factors?

10.   Which expression in the following list is equivalent to $\frac{3}{4}$a?

   A. $\frac{3}{4a}$ C.   Neither A or B

   B. $\frac{3a}{4}$ D.   Both A and B

11.   Which expression in the following list is equivalent to 3 times a?

   A.   3a

   B.   3·a

   C.   (3)(a)

   D.   None of the above

   E.   A, B and C

B-11

12. If $b = 3$, the value of $2b^2$ is what?

13. If $b = 3$, the value of $(2b)^2$ is what?

If $a = 1$, $b = 2$, and $c = 3$, evaluate each of the expressions from number 14 to number 16.

14. $3a + b^2$

15. $(3a + b)^2$

16. $(c + 2)(c + 2b^2)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17 to 23.

17. $n + 4$ a number increased by 4

18. $a - 8$ a number diminished by 8

19. $5b$ 5 more than a number

20. $\dfrac{x}{3}$ one-third of a number

21. $2t - 1$ one less than twice a number

22. $5(w + 2)$ 2 more than five times a number

23. $2 - b$ 2 less than some number

Write an algebraic expression for each English expression in problems 24 through 32. Use the variable suggested.

24. the sum of x and 5

25. 7 less than a

26. 5 diminished by n

27. 7 times c

28. the sum of 6 and two times d

29. 2 less than three times f

30. 5 times the sum of m and 2

31. 2 times w is greater than 3

32. A number x increased by 7 is 15.

Write as a power

33. $b \cdot b \cdot b$

34. $2 \cdot 2 \cdot 2 \cdot 2$

35. $(6a)(6a)$

36. COMPLETION: The value of 0 to any positive power is _____.

37. COMPLETION: The value of 1 to any positive power is _____.

Perform the indicated operations in problems 38 - 42.

38. $4^2 =$ _____

39. $2^5 =$ _____

40. $(4a)(2a) =$ _____

41. $(3a)^3 =$ _____

42. $(9x)^2 =$ _____

B-13

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the paper provided to you. Place the correct answer in the appropriate blank on your answer sheet. Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered blank in the paragraph. Write the letter of the correct answer on the answer sheet.

A. CONSTANT   B. BASE   C. POWER   D. REPLACEMENT SET

E. TERM   F. VARIABLE   G. EXPONENT   H. COEFFICIENT

I. FACTOR

Let $A = \{3, 5, 6, 7, \}$ and consider the expression x^3. If x can be replaced with only numerals of the set A, A is called the _____(1)_____ of x. Since x is a symbol which is to be replaced with the names of numbers, x is called a (n) _____(2)_____. In the expression x^3, x is called the _____(3)_____ and 3 is called the _____(4)_____. In the expression $16y^2$, 16 is called _____(5)_____ of y^2. 16 is also called a (n) _____(6)_____ of the entire expression. In the expression $10y+x$, 10y and x are called _____(7)_____ of the expression.

8. The expression $7x^2y+5xy^2+3x+y$ has how many terms?

9. The expression $(x-y)(x+y)(y-x)$ has how many factors?

10. Which expression in the following list is equivalent to $\frac{3}{5}a$?

    A. $\frac{3}{5a}$ C. Neither A or B

    B. $\frac{3a}{5}$ D. Both A and B

11. Which expression in the following list is equivalent to 4 times a?

    A. 4a

    B. (4)(a)

    C. $4 \cdot a$

    D. All of the above

12. If b= 2, the value of $4b^2$ is what?

13. If b= 2, the value of $(4b)^2$ is what?

    If a= 2, b= 1 and c= 3, evaluate each of the expressions in problems 14-16.

14. $2a + b^2$

15. $(2a + b)^2$

16. $(b + 2)(b + c^2)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17-23.

17.	$n + 2$	a number increased by 2
18.	$a + 3$	a number diminished by 8
19.	$7b$	7 more than a number
20.	$\dfrac{x}{4}$	one-fourth of a number
21.	$2y - 1$	one less than twice a number
22.	$3(w + 2)$	two more than three times a number
23.	$7 - b$	7 less than some number

Write an algebraic expression for each English expression in problems 24-32. Use the variable suggested.

24. the sum of x and 9

25. 12 less than a

26. 11 diminished by n

27. 8 times c

28. the sum of 5 and three times d

29. 1 more than three times f

30. 4 times the sum of h and 3

31. 3 times w is less than 2

32. a number y decreased by 10 is 26.

Write as a Power

33. $b \cdot b \cdot b$

34. $2 \cdot 2 \cdot 2 \cdot 2$

35. $(6a)(6a)$

36. COMPLETION: The value of 0 to any positive power is _____.

37. COMPLETION: The value of 1 to any positive power is _____.

Perform the indicated operations in problems 38-42.

38. $4^2 = \underline{\hspace{1.5cm}}$

39. $2^5 = \underline{\hspace{1.5cm}}$

40. $(4a)(2a) = \underline{\hspace{1.5cm}}$

41. $(3a)^3 = \underline{\hspace{1.5cm}}$

42. $(9x)^2 = \underline{\hspace{1.5cm}}$

B-16

DIRECTIONS: Do not write on this test booklet.   Do all scratch work on the paper provided to you.   Place the correct answer in the appropriate blank of your answer sheet.   Do not spend too much time on any one problem.

On your answer sheet write the letter of the word which correctly completes each sentence of the paragraph.

A.   CONSTANT   B.   BASE   C.   POWER   D.   REPLACEMENT SET

E.   TERM   F.   VARIABLE   G.   EXPONENT   H.   COEFFICIENT

I.   FACTOR

Let $A = \{2, 4, 5, 3\}$ and consider the expression y^2.   If y can be replaced only with the numerals of set A, A is called the _____(1)_____ of y. Since y is a symbol which is to be replaced with the names of numbers, y is called a (n) _____(2)_____.   In the expression y^2, y is called the _____(3)_____ and 2 is called the _____(4)_____.   In the expression $20y^2$, 20 is called the _____(5)_____ of y^2.   20 is also called a (n) _____(6)_____ of the entire expression.   In the expression $3x+y$, $3x$ and y are called _____(7)_____ of the expression.

8.   The expression $10x^2y + 2xy^2 - 6x$ has how many terms?

9.   The expression $(b-a)(a+b)(a-b)c$ has how many factors?

10.   Which expression in the following is equivalent to $\frac{2}{3}R$?

   A. $\frac{2}{3R}$ C.   Neither A or B

   B. $\frac{2R}{3}$ D.   Both A and B

11.   Which expression in the following list is equivalent to five times w.

   A.   5w

   B.   5·w

   C.   (5)(w)

   D.   None of the above

   E.   A, B and C

12. If b= 2, the value of $5b^2$ is what?

13. If b= 2, the value of $(5b)^2$ is what?

   If a= 1, b= 2, and c= 3, evaluate each of the expressions from number 14-16.

14. $4a + b^2$

15. $(3a+2b)^2$

16. $(c+3)(2b^2+c)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the phrase on the right in problems 17-23.

17.	y + 6	a number increased by 6
18.	$\frac{a}{2}$	one-half of a number
19.	2x-1	one less than twice a number
20.	B -4	a number diminished by 4
21.	5(x+3)	3 more than five times a number
22.	2-R	2 less than some number
23.	ION	10 more than a number

Write an algebraic express for each English expression in problems 24 through 32. Use the variable suggested.

24. the sum of x and 2

25. 5 less than N

26. 2 diminished by x

27. 17 times b

28. the sum of 4 and three times y

29. 1 less than two times S

30. 3 times the sum of a and 5

31. 2 times N is greater than 5

32. a number c increased by 5 is 15

Write as a power.

33. $x \cdot x \cdot x$

34. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

35. $(5b)(5b)$

36. COMPLETION: The value of 0 to any positive power is _____.

37. COMPLETION: The value of 1 to any positive power is _____.

Perform the indicated operations in problems 38-42.

38. $3^2 = $ _____

39. $2^5 = $ _____

40. $(3b)(4b) = $ _____

41. $(2b)^2 = $ _____

42. $(5y)^3 = $ _____

B-19

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the
paper provided to you. Place the correct answer in the appropriate blank
on your answer sheet. Do not spend too much time on any one problem.

Choose a word from the following list that correctly completes each numbered
blank in the paragraph. Write the letter of the correct answer on the
answer sheet.

A. CONSTANT   B. PCWER   C. TERM   D. FACTOR

E. EXPONENT   F. COEFFICIENT   G. VARIABLE   H. BASE

I. REPLACEMENT SET

    Let A = $\{1, 2, 4, 5\}$ and consider the expression y^2. If y can be replaced
with only numerals of the set A, A is called the _____(1)_____ of y. Since
y is a symbol which is to be replaced with the names of numbers, y is called
a (n) _____(2)_____. In the expression y^2, y is called the _____(3)_____
and 2 is called the _____(4)_____. In the expression $14y^2$, 14 is called
the _____(5)_____ of y^2. 14 is also called a (n) _____(6)_____ of the
entire expression. In the expression $14y + 2x$, 14y and 2x are called
_____(7)_____ of the expression.

8.   The expression $4x^2y + 2xy^2 + 3x + y$ has how many terms?

9.   The expression $(x-4)(4-x)(4+x)$ has how many factors?

10. Which expression in the following list is equivalent to $\frac{2}{3}a$?

    A. $\frac{2a}{3}$ C. Neither A or B

    B. $\frac{2}{3a}$ D. Both A and B

11.   Which expression in the following list is equivalent to 6 times b?

    A. 6b

    B. 6·b

    C. (6)(b)

    D. None of the above

    E. A, B and C

12. If $b=2$, the value of $3b^2$ is what?

13. If $b=2$, the value of $(3b)^2$ is what?

If $a=1$, $b=2$, and $c=3$, evaluate each of the expressions in problems 14-16.

14. $2a+b^2$

15. $(2a+3b)^2$

16. $(c^2+b)(2+a)$

Write YES or NO to indicate whether or not the expression on the left is a correct translation of the English phrase on the right in problems 17-23.

17. $y + 3$ a number increased by 3

18. $6b$ 6 more than a number

19. $\frac{x}{5}$ one-fifth of a number

20. $y + 5$ a number diminished by 5

21. $3y-1$ one more than three times a number

22. $6(w+5)$ six more than a number increased by 5

23. $6-y$ y less than 6

Write an algebraic expression for each English expression in problems 24-32.

24. the sum of y and 6

25. 8 less than m

26. 12 decreased by y

27. 7 times d

28. the sum of 4 and seven times x

29. 1 less than three times y

30. 7 times the sum of h and 4

31. 4 times v is greater than 6

32. a number m increased by 21 is 43

B-21

Write as a power.

33. $b \cdot b \cdot b \cdot b$

34. $4 \cdot 4 \cdot 4$

35. $(7a)(7a)$

36. COMPLETION: The value of 1 to any positive power is _____.

37. COMPLETION: The value of 0 to any positive power is _____.

Perform the indicated operations in problems 38-42.

38. $6^2 =$ _____

39. $3^4 =$ _____

40. $(4a)(3a) =$ _____

41. $(2a)^3 =$ _____

42. $(7x)^2 =$ _____

UNIT II   Variables   A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   28. _____
2. _____   29. _____
3. _____   30. _____
4. _____   31. _____
5. _____   32. _____
6. _____   33. _____
7. _____   34. _____
8. _____   35. _____
9. _____   36. _____
10. _____   37. _____
11. _____   38. _____
12. _____   39. _____
13. _____   40. _____
14. _____   41. _____
15. _____   42. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____

99

DIRECTIONS: Do not write on this test booklet.   Place all answers on the answer sheet.   Do all scratch work on the paper provided to you.   Do not spend too much time on any one problem.

COMPLETION:

1.   The additive identity element is _____.

2.   The multiplicative identity element is _____.

3.   By the transitive property of equality, if b= a+ 2 and a+ 2= R, then _____.

4.   _____ has no reciprocal.

5.   If x is the multiplicative inverse of y, then (x)(y) = _____.

In problems 6-11, write the answers for each problem.   If the group of symbols has no meaning, write "no meaning" on the sheet.

6.   (16)(1)

7.   15· 0

8. $\dfrac{6}{1}$

9. $\dfrac{0}{5}$

10. $\dfrac{7}{0}$

11. $\dfrac{0}{0}$

Simplify the following expressions.

12.   2(3y)

13. $\dfrac{1}{2}$(12RS)

14.   (4x)(3y)

In problems 15-17, tell whether the statement is TRUE or FALSE.

15.   {0, 1} is closed under the operation of addition.

16.   {0, 1} is closed under the operation of multiplication.

17.   The set of odd numbers is closed under the operation of multiplication.

B-24

In problems 18-22, write the **letter** of the property which is illustrated by the example below.

    A.   Reflexive Property of Equality

    B.   Symmetric Property of Equality

    C.   Transitive Property of Equality

    D.   None of these

18.   If $3 = 9-1$, then $9-1 = 3$.

19. $4(3 \cdot 2) = (4 \cdot 3)2$

20. $5 = 5$

21.   If $4-1 = 3$ and $3 = 2+1$, then $4-1 = 2+1$

22.   If $4+2 = 6$, then $6 = 4+2$

In problems 23-27, write the letter of the property which is illustrated by the example below.

    A.   Commutative Property of Addition

    B.   Associative Property of Addition

    C.   Commutative Property of Multiplication

    D.   Associative Property of Multiplication

    E.   Distributive Property of Multiplication over Addition

23. $5(3+2) = 5 \cdot 3 + 5 \cdot 2$

24. $7+9 = 9+7$

25. $3(2n) = (3 \cdot 2)n$, for all numbers n

26. $5+(4+1) = (5+4)+1$

27. $3+(2+7) = (2+7)+3$

In problems 28-32, write the letter of the property which is illustrated by the example below.

    A.   Additive Property of Zero

    B.   Multiplicative Property of Zero

    C.   Multiplicative Property of One

    D.   None of these

28. $5 \cdot 0 = 0$

29. $(9 \cdot 3)+0 = 9 \cdot 3$

30. $12+1 = 13$

31. $16 \cdot 1 = 16$

32. $0 \cdot 14 = 14$

101

Write the reciprocal of:

33. $\dfrac{3}{3}$

34. 2

35. 1

36. Which term is similar to 6a? Write the letter of the correct answer on the answer sheet.

    A.   6ab

    B.   4a

    C.   6b

    D.   6

    E.   None of these

In problems 37-40 combine by adding or subtracting similar terms.

37. 5a+7a

38. 12q-4q+1 1

39. 22v+9w-10v

40. 2(R+S)+4R-1

DIRECTIONS: Do <u>not</u> write on this test booklet. Place all answers on the answer sheet. Do all scratch work on the paper provided to you. Do not spend too much time on any one problem.

COMPLETION:

1. The multiplicative identity element is _____.

2. _____ has no reciprocal.

3. The additive identity element is _____.

4. If x is the multiplicative inverse of a, then (x)(a) = _____.

5. By the transitive property of equality, if B = a + 2 and a + 2 = D, then

_____.

In problems 6-11, write the answers for each problem. If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $\dfrac{7}{1}$

7. $\dfrac{0}{5}$

8. (6)(1)

9. $\dfrac{0}{0}$

10. 7·0

11. $\dfrac{5}{0}$

Simplify the following expressions.

12. 9(4a)

13. $\dfrac{1}{3}$ (15xy)

14. (7x)(9y)

In problems 15-17, tell whether the statement is TRUE or FALSE.

15. {0, 1} is closed under the operation of multiplication.

16. {0, 1} is closed under the operation of addition.

17. The set of odd numbers is closed under the operation of addition.

B-27

In problems 18-22, write the letter of the property which is illustrated by the example below.

  A. Reflexive Property of Equality

  B. Symmetric Property of Equality

  C. Transitive Property of Equality

  D. None of these

18. If $4-1 = 3$ and $3 = 2+1$, then $4-1 = 2+1$.

19. If $7 = 5+2$, then $5+2 = 7$

20. $6(3 \cdot 5) = (6 \cdot 3)5$

21. If $6+2 = 8$, then $8 = 6+2$

22. $7 = 7$

In problems 23-27, write the <u>letter</u> of the property which is illustrated by the example below.

  A. Commutative Property of Addition

  B. Associative Property of Addition

  C. Commutative Property of Multiplication

  D. Associative Property of Multiplication

  E. Distributive Property of Multiplication over Addition

23. $7+2 = 2+7$

24. $6+(3+5) = (6+3)+5$

25. $9+(2 \cdot 3) = (2 \cdot 3)+9$

26. $3(6+1) = 3 \cdot 6 + 3 \cdot 1$

27. $4(3 \cdot n) = (4 \cdot 3)n$

In problems 28-32, write the letter of the property which is illustrated by the example below.

  A. Additive Property of Zero

  B. Multiplicative Property of Zero

  C. Multiplicative Property of One

  D. None of these

B-28

28. $17 \cdot 1 = 17$

29. $0 \cdot 16 = 16$

30. $15 + 1 = 16$

31. $(3 \cdot 2) + 0 = 3 \cdot 2$

32. $4 \cdot 0 = 0$

Write the reciprocal of:

33. $\dfrac{3}{7}$

34. 9

35. 1

36. Which term is similar to 5b? Write the letter of the correct answer on the answer sheet.

    A. 5ab

    B. 5a

    C. 5

    D. 4b

    E. None of these

In problems 37-40, combine by adding or subtracting similar terms.

37. $9b + 6b$

38. $4q + 7q + 12$

39. $36a + 7b - 20a$

40. $6(a+b) + 3b - 4$

DIRECTIONS: Do not write on this test booklet.   Place all answers on the answer sheet provided to you.   Do all scrap work on the paper provided to you for this purpose.   Do not spend too much time on any one problem.

COMPLETION:

1.   The additive identity element is _____.

2.   The multiplicative identity element is _____.

3.   By the transitive property of equality, if $a = b + 3$ and $b + 3 = Q$, then _____.

4.   _____ has no reciprocal.

5.   If a is the multiplicative inverse of b, then $ab = $ _____.

Write the answers for each problem in arithmetic.   If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $(1)(20) = $ _____

7. $49 \cdot 0 = $ _____

8. $\dfrac{71}{0} = $ _____

9. $\dfrac{8}{1} = $ _____

10. $\dfrac{0}{0} = $ _____

11. $\dfrac{0}{9} = $ _____

Simplify the following expressions.

12. $3(4w)$

13. $\dfrac{1}{3}(24RS)$

14. $(7x)(9y)$

15.   TRUE or FALSE: The set $\{0, 1\}$ is closed under the operation of multiplication.

16.   TRUE or FALSE: The set $\{0, 1\}$ is closed under the operation of addition.

17.   TRUE or FALSE: The set of even numbers is closed under the operation of multiplication.

In problems 18-22, write the <u>letter</u> of the property which is illustrated by the example below.

    A.   Reflexive Property of Equality

    B.   Symmetric Property of Equality

    C.   Transitive Property of Equality

    D.   None of these

18.   If $7 = 3 \cdot 1$ then $8 - 1 = 7$

19. $15 = 15$

20.   If $6 - 2 = 4$ and $4 = 3 + 1$, then $6 - 2 = 3 + 1$

21. $5(3 \cdot 2) = (5 \cdot 3)2$

22.   If $3 + 2 = 5$ then $5 = 3 + 2$

In problems 23-27, write the letter of the property which is illustrated by the example below.

    A.   Commutative Property of Addition

    B.   Commutative Property of Multiplication

    C.   Associative Property of Addition

    D.   Associative Property of Multiplication

    E.   Distributive Property of Multiplication over Addition

23. $7 + 9 = 9 + 7$

24. $3(2n) = (3 \cdot 2)n$ for all numbers n.

25. $5(3 + 2) = 5 \cdot 3 + 5 \cdot 2$

26. $3 + (2 + 7) = (2 + 7) + 3$

27. $5 + (4 + 1) = (5 + 4) + 1$

In problems 28-32, write the <u>letter</u> of the property which is illustrated by the example below.

    A.   Additive Property of Zero

    B.   Multiplicative Property of Zero

    C.   Multiplicative Property of One

    D.   None of these

28. $0 \cdot 14 = 14$

29. $12 + 1 = 13$

30. $5 \cdot 0 = 0$

31. $(9 \cdot 3) + 0 = 9 \cdot 3$

32. $16 \cdot 1 = 16$

107

Write the reciprocal of:

33. $\dfrac{5}{7}$

34. 6

35. 1

36. Which is similar to 7b:

    A. 7

    B. 4c

    C. 6bc

    D. 4b

    E. None of these

Combine by adding or similar terms.

37. $3a + 7a$

38. $10w - 6w + 12$

39. $23q + 3r - 5r$

40. $3(r + s) + 4r - 1$

DIRECTIONS: Do <u>not</u> write on this test booklet.   Place all answers on the answer sheet.   Do all scratch work on the paper provided to you.   Do not spend too much time on any one problem.

COMPLETION:

1.   By the transitive property of equality, if $N = a - 3$ and $a - 3 = B$, then

     _____.

2.   The additive identity element is _____.

3.   The multiplicative identity element is _____.

4.   If x is the multiplicative inverse of y, then $(x)(y) = $ _____.

5.   _____ has no reciprocal.

In problems 6-11, write the answers for each problem.   If the group of symbols has no meaning, write "no meaning" on the sheet.

6. $15 \cdot 1$

7. $\dfrac{5}{1}$

3. $\dfrac{9}{0}$

9. $9 \cdot 0$

10. $\dfrac{0}{0}$

11. $\dfrac{0}{9}$

Simplify the following expressions.

12. $5(3a)$

13. $\dfrac{1}{5}(20xy)$

14. $(3x)(5y)$

In problems 15-17, tell whether the statement is TRUE or FALSE.

15.   The set of odd numbers is closed under the operation of multiplication.

16. $\{0, 1\}$ is closed under the operation of addition.

17. $\{0, 1\}$ is closed under the operation of multiplication.

B-33

In problems 18-22, write the <u>letter</u> of the property which is illustrated by the example below.

    A.   Reflexive Property of Equality

    B.   Symmetric Property of Equality

    C.   Transitive Property of Equality

    D.   None of these

18. $5(3 \cdot 4) = (5 \cdot 3)4$

19. $7 = 7$

20.   If $7 + 3 = 10$, then $10 = 7 + 3$

21.   If $5 + 2 = 7$ and $7 = 6 + 1$, then $5 + 2 = 6 + 1$

22. $9 + 3 = 9 + 3$

In problems 23-27, write the <u>letter</u> of the property which is illustrated by the example below.

    A.   Commutative Property of Addition

    B.   Associative Property of Addition

    C.   Commutative Property of Multiplication

    D.   Associative Property of Multiplication

    E.   Distributive Property of Multiplication over Addition

23. $5 + (3 + 2) = (5 + 3) + 2$

24. $3 + 3 = 3 + 3$

25. $6 \cdot (3 \cdot 5) = (6 \cdot 3)5$

26. $4(6 + 2) = 4 \cdot 6 + 4 \cdot 2$

27. $3 \cdot 5 = 5 \cdot 3$

In problems 28-32, write the <u>letter</u> of the property which is illustrated by the example below.

    A.   Additive Property of Zero

    B.   Multiplicative Property of Zero

    C.   Multiplicative Property of One

    D.   None of these

28. $7 \cdot 0 = 0$

29. $3 \cdot 0 = 3$

30. $17 \cdot 1 = 17$

31. $18 - 3 = 15$

32. $(5 \cdot 6) + 0 = 5 \cdot 6$

110

Write the reciprocal of:

33. 1

34. 6

35. $\dfrac{7}{3}$

36. Which term is similar to 4c? Write the letter of the correct answer on the answer sheet.

    A.   4b

    B.   4

    C.   6c

    D.   4ac

    E.   None of these

In problems 37-40, combine by adding or subtracting similar terms.

37. $8a + 9a$

38. $6a + 4a - 5$

39. $12a - 6b + 4a$

40. $6(x+y) - 3y + 4$

UNIT III   Non-Negative Numbers of Arithmetic   A B C D

NAME _____ SECTION_____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   23. _____

2. _____   24. _____

3. _____   25. _____

4. _____   26. _____

5. _____   27. _____

6. _____   28. _____

7. _____   29. _____

8. _____   30. _____

9. _____   31. _____

10. _____   32. _____

11. _____   33. _____

12. _____   34. _____

13. _____   35. _____

14. _____   36. _____

15. _____   37. _____

16. _____   38. _____

17. _____   39. _____

18. _____   40. _____

19. _____

20. _____

21. _____

22. _____

B-36

112

DIRECTIONS: Do not write on this test booklet.   Work carefully, but do
not spend too much time on any one problem.   Place the answer in the
appropriate space of the answer sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1.   5, -9

2.   -4, -3

3.   -220, 0

4. $\frac{3}{4}$, $\frac{7}{8}$

5. $\frac{1}{4}$, $-\frac{1}{4}$

6.   TRUE or FALSE: All numbers are positive or negative.

   Refer to the following number line for problems 7 to 9.
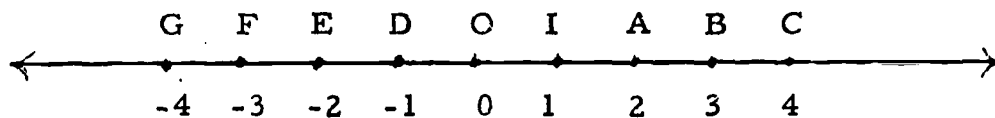
7.   Which point would be associated with a loss of three dollars?

3.   Which point would be associated with a gain of two yards?

9.   Which point would be associated with a temperature of one degree
     below zero?

10. COMPLETION: To subtract b from a, we _____ the
     additive inverse of b to a.

11. TRUE or FALSE: Subtraction is a commutative operation.

12. COMPLETION: To divide a by b, we multiply a by the _____ of b.

13. COMPLETION: To say that n<0 for some number n is the same as saying
     that n is a _____ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 17.

14. 9

15. -4

16. $-\frac{1}{5}$

17. 0

18. COMPLETION: When two numbers that are additive inverses are added, the sum is always _____.

19. COMPLETION: The absolute value of $+20$ is _____.

20. $|-4| =$ _____

21. $|0| =$ _____

22. TRUE or FALSE: $|-3| = |3|$

In problems 23 to 39, perform the indicated operation and write the answer to each on the answer sheet.

23. $(+15) + (+17) =$ _____

24. $(+8) + (-4) =$ _____

25. $(+16) + (-23) =$ _____

26. $(-17) + (+9) =$ _____

27. $(-54) + (-19) =$ _____

28. $(-20) + (+29) =$ _____

29. $(+9)(+4) =$ _____

30. $(-4)(-7) =$ _____

31. $(-17)(+3) =$ _____

32. $(+16) \div (+4) =$ _____

33. $(-32) \div (-16) =$ _____

34. $(-100) \div (+25) =$ _____

35. $(+25) \div (-5) =$ _____

36. $(+23) + (-17) + (-30) + (+6)$

37. $(+18) - (+10)$

38. $(-10) - (+10)$

39. $(+31) - (-41)$

B-38

DIRECTION: Do not write on the test booklet.   Work carefully, but do not
spend too much time on any one problem.   Place the answer in the
appropriate space on the sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1.   4, -7

2.   -7, -6

3.   -167, 0

4. $\frac{5}{6}$, $\frac{2}{3}$

5. $\frac{1}{3}$, $-\frac{1}{3}$

6.   TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7-9.

H	G	F	E	D	O	I	A	B	C
-5	-4	-3	-2	-1	0	1	2	3	4
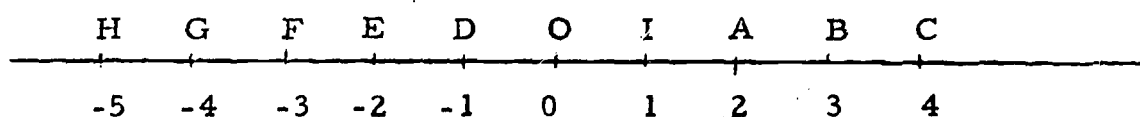
7.   Which point would be associated with a gain of three dollars?

8.   Which point would be associated with a loss of two yards?

9.   Which point would be associated with a temperature of 4 degrees
      above zero?

10.   TRUE or FALSE: To subtract b from a, we subtract the additive
      inverse of b from a.

11.   TRUE or FALSE: Subtraction is a commutative operation.

12.   COMPLETION: To divide b by a, we multiply b by the _____
      of a.

13.   COMPLETION: To say that n>0 for some number n is the same as
      saying that n is a _____ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 19.

14.   7

15.   -3

16. $-\frac{2}{3}$

17. 0

18. TRUE or FALSE: When two numbers that are additive inverses are added the sum is always zero.

19. COMPLETION: The absolute value of + 16 is _____.

20. $\left| -3 \right|$ = _____

21. $\left| 0 \right|$ = _____

22. TRUE or FALSE: $\left| 5 \right|$ = $\left| -5 \right|$

In problems 23 to 39, perform the indicated operation and write the answer on the answer sheet.

23. $(+14) + (+19)$

24. $(+7) + (-3)$

25. $(-16) + (+10)$

26. $(+12) + (-13)$

27. $(-63) + (-17)$

28. $(-4) + (+17)$

29. $(+3)(+3)$

30. $(-5)(+6)$

31. $(-17)(+4)$

32. $(+13) \div (+2)$

33. $(-20) \div (-5)$

34. $(-250) \div (+125)$

35. $(+36) \div (-6)$

36. $(+6) + (-7) + (-9) + (+4)$

37. $(+21) - (+4)$

38. $(-6) - (+6)$

39. $(17) - (-15)$

B-40

DIRECTION: Do <u>not</u> write on the test booklet.   Work carefully, but do not spend too much time on any one problem.   Place the answer in the appropriate space on the sheet provided to you.

State which number in each pair is the <u>greater</u> for numbers 1 to 5.

1.   3, -7

2.   -6, -2

3.   -100, 0

4. $\frac{1}{4}, \frac{3}{8}$

5. $\frac{1}{3}, -\frac{1}{3}$

6.   TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7 to 9.
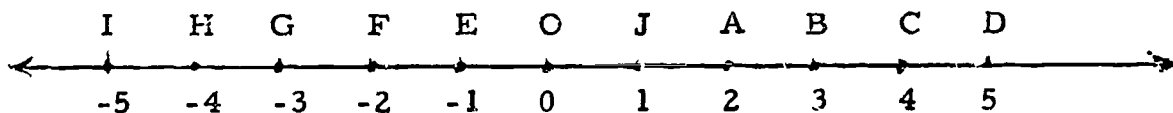
7.   Which point would be associated with a loss of five dollars?

8.   Which point would be associated with a gain of one yard?

9.   Which point would be associated with a temperature of two degrees below zero?

10.   COMPLETION: To subtract a from b, we _____ the additive inverse of a to b.

11.   TRUE or FALSE: Subtraction is a commutative operation.

12.   COMPLETION: To divide a by b, we multiply a by the _____ of b.

13.   COMPLETION: To say that x<0 for some number x is the same as saying that x is _____ (positive, negative) number.

Write the additive inverse of each number in problems 14 through 17.

14.   3

15.   -7

16. $-\frac{1}{3}$

17.   0

18. COMPLETION: When two numbers that are additive inverses are added, the sum is always _____.

19. COMPLETION: The absolute value of +31 is _____.

20. $|-9| =$ _____

21. $|0| =$ _____

22. TRUE or FALSE: $|-11| = |11|$

In problems 23 to 35, perform the indicated operation and write the answer to each on the answer sheet.

23. $(+12) + (+19) =$ _____

24. $(+10) + (-3) =$ _____

25. $(+18) + (-21) =$ _____

26. $(-18) + (+9) =$ _____

27. $(-72) + (-17) =$ _____

28. $(-30) + (+39) =$ _____

29. $(+15) (+3) =$ _____

30. $(-3) (-7) =$ _____

31. $(-17) (+2) =$ _____

32. $(+15) \div (+3) =$ _____

33. $(-30) \div (-15) =$ _____

34. $(-125) \div (+25) =$ _____

35. $(+35) \div (-7) =$ _____

36. $(+23) + (-17) + (-20) + (+5) =$ _____

37. $(+18) - (+6) =$ _____

38. $(-10) - (+9) =$ _____

39. $(+50) - (-40) =$ _____

B-42.

DIRECTION: Do not write on the test booklet.   Work carefully, but do not spend too much time on any one problem.   Place the answer in the appropriate space on the sheet provided to you.

State which number in each pair is the greater for numbers 1 to 5.

1.   6, -3

2.   -2, -4

3.   -160, 0

4. $\frac{4}{5}$, $\frac{2}{3}$

5. $\frac{1}{5}$, $-\frac{1}{5}$

6.   TRUE or FALSE: All numbers are positive or negative.

Refer to the following number line for problems 7 to 9.

```
        G   F   I    B   E   J   D   C   H
      +---+---+---+---+---+---+---+---+---+---+---+--->
       -4  -3  -2   -1   0   1   2   3   4
```
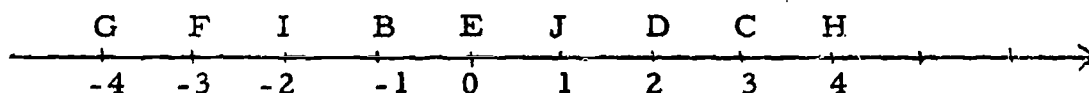
7.   Which point would be associated with a loss of four dollars?

8.   Which point would be associated with a gain of two yards?

9.   Which point would be associated with a temperature of 2 degrees below zero?

10.   TRUE or FALSE: Subtraction is commutative.

11.   COMPLETION.   To say N<0 for some number N is the same as saying that N is a _____ (positive, negative) number.

12.   COMPLETION: To divide b by a, we multiply by the _____ of a.

13.   TRUE or FALSE: To subtract b from a, we add the additive inverse of of b to a.

Write the additive inverse of each number in problems 14 through 17.

14.   6

15.   -2

16. $-\frac{5}{7}$

17.   0

18. TRUE or FALSE: When two numbers that are additive inverses are added, the sum is always zero.

19. COMPLETION: The absolute value of + 17 is _____ .

20. $| -4| =$ _____

21. $| 0 | =$ _____

22. TRUE or FALSE: $| 4| = |-4|$

In problems 23 to 36, perform the indicated operation and write the answer on the answer sheet.

23. $(+7) + (+16)$

24. $(+4) + (-2)$

25. $(-14) + (+7)$

26. $(+11) + (-13)$

27. $(-42) + (-16)$

28. $(-3) + (+14)$

29. $(+9) (+4)$

30. $(-6) (+4)$

31. $(-15) (+3)$

32. $(+20) \div (+4)$

33. $(-15) \div (-5)$

34. $(-75) \div (+25)$

35. $(+42) \div (-6)$

36. $(+4) + (-3) + (+5) + (-9)$

37. $(+6) - (+3)$

38. $(-15) - (+7)$

39. $(+21) - (-6)$

UNIT IV   The Negative Numbers   PART I   A B C D

NAME _____   SECTION _____

TEACHER _____   DATE _____

SCORE _____   PERICD _____

1. _____   26. _____
2. _____   27. _____
3. _____   28. _____
4. _____   29. _____
5. _____   30. _____
6. _____   31. _____
7. _____   32. _____
8. _____   33. _____
9. _____   34. _____
10. _____   35. _____
11. _____   36. _____
12. _____   37. _____
13. _____   38. _____
14. _____   39. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____

DIRECTIONS: Do <u>not</u> write on the test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1.   1

2.   -4

3. $\dfrac{12}{5}$

4. $\dfrac{5}{4}$

5.   COMPLETION: If b is the multiplicative inverse of a, then
       (a)(b) = _____.

6.   COMPLETION: _____ has no multiplicative inverse.

Place "positive" or "negative" in the appropriate space. (7-8)

The value of any even power of a negative number is a _____(7)_____ number, while the value of any odd power of a _____(8)_____ number is a negative number.

Perform the indicated operations in problems 9-11.

9. $(-5x)(3y) =$ _____

10. $(-2a)^3 =$ _____

11. $(-2a)^2 =$ _____

12.   TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under multiplication.

13.   TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under addition.

14. $3x - (-2x) =$ _____

15. $6y + 8y - 24y =$ _____

16.   ADD: $6x - 2y - 3z$
            $\underline{2x + 2y + 4z}$

17. $3x - (2x-y) =$ _____

18. $(5a+2b) + (7a-3b) =$ _____

19. $(6x-y) - 3(2x+y) =$ _____

20.   EVALUATE: If $a = -2$, $b = -3$, and $c = -1$, then $2a-3b+c =$ _____

DIRECTIONS: Do not write on this test booklet.   Place the correct answer
on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. $\frac{1}{7}$

2.   -8

3. $\frac{4}{3}$

4.   1

5.   COMPLETION: If b is the multiplicative inverse of a, then
     (a)(b) = _____.

6.   COMPLETION: _____ has no multiplicative inverse.

Place "even" or "odd" in the appropriate space on your answer sheet. (7-8)

     Any _____(7)_____ power of a negative number is a negative,
     while any _____(8)_____ power of a negative number is a positive
     number.

Perform the indicated operation in problems 9-11.

9.   (-35)(7y) = _____

10. $(-3a)^2$ = _____

11. $(-3y)^3$ = _____

12. TRUE or FALSE: The set of negative integers $\{\dots -3, -2, -1\}$ is closed
     under multiplication.

13. TRUE or FALSE.   The set of negative integers $\{\dots -3, -2, -1\}$ is closed
     under addition.

14. 4x - (-3x) = _____

15. 7y + 9y - 23y = _____

16. ADD: 5x - 2y - 4z
              3x + 2y + 5z

17. 3x - (5x - 2y) = _____

18. (4a + 9b) + (2a - 7b) = _____

19. (9x - 2y) - 3 (x + 4y) = _____

20. EVALUATE: If a = -1, b = -2, and c = -3, then 2a - 3b + c = _____

DIRECTIONS: Do not write on the test booklet.   Place the correct answer
on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1.   3

2.   -5

3. $\dfrac{5}{13}$

4. $\dfrac{6}{5}$

5.   COMPLETION: If b is the multiplicative inverse of a, then (a)(b) =
      _____.

6.   COMPLETION: _____ has no multiplicative inverse.

Place "positive" or "negative" in the appropriate space.   (7-8)

      The value of any even power of a negative number is a _____(7)_____
      number, while the value of any odd power of a _____(8)_____ number
      is a negative number.

Perform the indicated operations in problems 9-11.

9.   (-3y)(5x)

10. $(-2b)^3$

11. $(-2c)^2$

12.   TRUE or FALSE: The set of negative integers {...-3, -2, -1} is closed
      under multiplication.

13.   TRUE or FALSE: The set of negative integers {...-3, -2, -1} is closed
      under addition.

14.   5y - (-2y) = _____

15.   3x + 8x - 19x = _____

16.   ADD: 7x - 2y + 3z
              2x + 2y - 4z

17.   3x - (2x+y) = _____

18.   (5c+3b) + (8c-5b) = _____

19.   (6x-y) - 2 (3x-y) = _____

20.   EVALUATE: If a= -2, b= -3, c= -1, then 3x-2b+c = _____.

DIRECTICNS: Do <u>not</u> write on this test booklet. Place the correct answer on the sheet provided.

Write the reciprocal of each number in problems 1-4.

1. $\frac{2}{5}$

2.   -6

3. $\frac{4}{7}$

4.   5

5.   CCMPLETICN: _____ has no reciprocal.

6.   COMPLETICN: If b is the multiplicative inverse of a, then (a)(b) = _____.

Place "positive" or "negative" in the appropriate space.   (7-8)

The value of any even power of a negative number is _____(7)_____ number, while the value of any odd power of a _____(8)_____ number is a negative number.

Perform the indicated operations in problems 9-11.

9. $(-2y)(3x) = $ _____ _____

10. $(-4a)^2 = $ _____

11. $(-3a)^3 = $ _____

12.   TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under multiplication.

13.   TRUE or FALSE: The set of negative integers $\{\ldots -3, -2, -1\}$ is closed under addition.

14. $4x - (-3x) = $ _____

15. $3y + 4y - 9y = $ _____

16.   ADD: $9x - 3y + 4z$
               $\underline{2x + 3y - 4z}$

17. $9x - (3x - 2y) = $ _____

18. $(4a + 2b) + (6a - 3b) = $ _____

19. $(2x - y) - 2(3x + y) = $ _____

20.   EVALUATE: If $a = -1$, $b = -2$, and $c = -3$, then $2a - 3b + c = $ _____.

UNIT IV   The Negative Numbers   PART II A B C D

NAME _____ SECTION _____

TEACHER _____ _____ DATE _____

SCORE _____ _____ PERIOD _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18. _____

19. _____

20. _____

DIRECTIONS: Do not write on this test booklet.   Place all answers and solutions on the answer sheets provided to you.   Do all work on the scratch paper provided to you.   Do not spend too much time on any single problem. Unless otherwise stated, the replacement set of all equations is the set of numbers of arithmetic.

Complete the following paragraph by filling in the blanks with words from the following list: Write the letter of the correct answer on the answer sheet.

A.   OPEN SENTENCE   B.   INEQUALITY   C.   SOLUTION SET

D.   REPLACEMENT SET   E.   RIGHT MEMBER   F. EQUATION

G.   LEFT MEMBER   H.   SOLUTION

Consider the set $\{1, 2, 3, 4, 5\}$ and the statement $2x + 3 = 4x$.   Since $2x + 3 = 4x$ contains a variable and, hence, has no truth or falsity, it is called a(n) _____(1)_____.   When x is replaced by the name of a number, the statement $2x + 3 = 4x$ becomes then either a true or false _____(2)_____.   If the statement $2x + 3 = 4x$ becomes true when x is replaced with the name of a number, then the replacement number is called a(n) _____(3)_____ of the statement.   If x can be replaced only with members of the set $\{1, 2, 3, 4, 5\}$, then this set is called the _____(4)_____ of x.

5.   TRUE or FALSE: 3 is a solution of the open sentence

$$x^2 - 5x + 6 = 0$$

Solve each of the following open sentences.   The replacement set is the set of numbers of arithmetic.   Place the solutions in the answer sheet.

6. $a + 2 = 5$

7. $d + 5 = -7$

8. $-10 = x - 3$

9. $y + \dfrac{1}{2} = -4$

10. $5 - m = -10$

11. $3x = 9$

12. $5d = 17$

13. $6x = -20$

14. $-15z = 52$

15. $-36 = -7a$

16. $\frac{3}{4} x = 7$

17. $\frac{y}{4} = -3$

18. $1.4x = 6$

19. $2a - 13 = 30$

20. $5b + 9 - 3b = 20$

21. $15 - 4a + 3a = 17$

22. $5d - 7 = 3d$

23. $3(5-z) = 7$

24. $-6(6+4x) = 19$

25. $5(3+2x) - 4x = 7x - 9$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence

$$x - 3 = 2$$

then the solution set of the open sentence is _____.

27. Graph the solution set of
$$5x > 10$$

on the number line provided on the answer sheet.   The replacement
set for x is the set
$$\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

Solve each of the following inequalities.   The replacement set in each case
is the set of real numbers.

28. $-6b \geq 13$

29. $d + 4 > 9$

30. $5(2a-1) \leq 4$

31. $\frac{a}{2} < 6$

32. $-\frac{3}{4} c \leq -7$

33. Graph the solution set of $x \leq 3$ on the number line provided on your
answer sheet.

34. John scored twice as many points as Jim.   If Jim scored a 45, what was
John's score?

Complete the following paragraph by filling in the blanks with words from the following list: Write the letter of the correct answer on the answer sheet.

A.   open sentence   E.   solution set

B.   equation   F.   inequality

C.   left member   G.   replacement set

D.   right member   H.   solution

Consider the set $\{2, 3, 5, 6\}$ and the statement $3x + 4 = 4x$. Since $3x + 4 = 4x$ contains a variable and hence has no truth or falsity, it is called a (n) ___(1)___ . When x is replaced by the name of a number, the statement $3x + 4 = 4x$ becomes either a true or false ___(2)___ . If the statement $3x + 4 = 4x$ becomes true when x is replaced with the name of a number, then the replacement number is called a (n) ___(3)___ of the statement. If x can be replaced only with members of the set $\{2, 3, 5, 6\}$, then this set is called the ___(4)___ .

5.   TRUE or FALSE: 2 is a solution of the open sentence $x^2 - 5x + 6 = 0$.

Solve each of the following open sentences. The replacement set is the set of numbers of arithmetic. Place the _solutions_ on the answer sheet.

6. $a + 4 = 5$

7. $d + 5 = -6$

3. $-10 = x + 3$

9. $y + \dfrac{1}{2} = 4$

10. $4 - m = -10$

11. $3x = 12$

12. $5d = 11$

13. $6x = -40$

14. $-15z = 53$

15. $-37 = 9a$

16. $\dfrac{3}{4}x = -15$

17. $\dfrac{y}{4} = -4$

13. $1.6x = 6$

B-53

19. $3a - 13 = 30$

20. $6b + 3 - 3b = 20$

21. $15 - 5a + 4a = 17$

22. $6d - 7 = 4d$

23. $2(5 - z) = 6$

24. $-5(6 + 4z) = 19$

25. $6(3 + 2x) - 4x = 8x - 9$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence $3x - 2 = 4x$, then the solution set of the open sentences is _____.

27. Graph the solution set of $4x > 8$ on the number line provided on the answer sheet. The replacement set for x is the set $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$.

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-6b \geq 9$

29. $d - 4 > 9$

30. $5(2a + 1) \leq 4$

31. $\frac{a}{3} < 6$

32. $-\frac{3}{5}c \geq -9$

33. Graph the solution set of $x > -4$ on the number line provided.

34. Bob earned $4 less than Mark. If Mark earned $7, how much did Bob earn?

DIRECTICNS: Do <u>not</u> write on test booklet.   Place all answers and solutions
on the answer sheets provided to you.   Do not spend too much time on any
single problem.   Unless otherwise stated, the replacement set of all equations
is the set of numbers of arithmetic.

Write the letter of correct answers on the answer sheet.

A.   open sentence   E.   right member

B.   inequality   F.   equation

C.   solution set   G.   left member

D.   replacement set   H.   solution

Consider the set $\{1. 2. 3. 4. 5\}$ and the statement $3x+2 = 4x$.   Since $3x+2 = 4x$
contains a variable and, hence, has no truth or falsity, it is called a
(n) _____(1)_____ .   When x is replaced by the name of a number, the
statement $3x+2 = 4x$ becomes either a true or false _____(2)_____ .
If the statement $3x+2 = 4x$ becomes true when x is replaced with the name
a number, then the replacement number is called a (n) _____(3)_____
of the statement .   If x can he replaced only with members of the
$\{1, 2, 3, 4, 5\}$, then this set is called the _____(4)_____ of x.

5.   TRUE or FALSE: 3 is a solution of the open sentence

$$x^2 - 4x + 5 = 0$$

Solve each of the following open sentences.   The replacement set is the set
of numbers of arithmetic.   Place the <u>solutions</u> on the answer sheet.

6. $x + 3 = 5$

7. $y + 5 = -3$

3. $-10 = x - 2$

9. $y + \frac{1}{2} = -3$

10. $5 - m = -15$

11. $3x = 12$

12. $4x = 19$

13. $5x = -13$

14. $-11R = 44$

15. $-35 = -6a$

16. $\frac{2}{3}x = 9$

17. $\frac{y}{7} = -5$

18. $1.4x = 8$

19. $2a - 12 = 40$

20. $5a + 7 - 2a = 20$

21. $12 - 4a + 3a = 15$

22. $5y - 6 = 3y$

23. $3(2-w) = 7$

24. $-4(6+3x) = 13$

25. $5(2+3x)-5x = 7x-3$

26. If $A = \{5, 4, 3, 2, 1, 0\}$ is the replacement set of x in the open sentence

$$x - 5 = 4$$

then the solution set of the open sentence is _____.

27. Graph the solution set of

$$3x > 12$$

on the number line provided on the answer sheet. The replacement set for x is the set

$$\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.

28. $-5a \geq 12$

29. $b + 3 > 9$

30. $5(2x-1) \leq 6$

31. $\frac{x}{3} < 6$

32. $-\frac{2}{3}R \leq -7$

33. Graph the solution set of $x \leq 5$ on the number line provided on your answer sheet.

34. One number is 15 more than another number. The sum of the number is 65. Find the larger number.

B-56

Complete the following paragraph by filling in the blanks with words from the following list.   Write the letter of the correct answer on the answer sheet.

A.   solution set   E.   left member

B.   open sentence   F.   right member

C.   inequality   G.   replacement set

D.   equation   H.   solution

Consider the set $\{1, 2, 3, 4, 6\}$ and the statement $3x-2 = x$.   Since $3x-2 = x$ contains a variable and, hence, has no truth or falsity, it is called a (n) _____(1)_____ .   When x is replaced by the name of a number, the statement $3x - 2 = x$ becomes either a true or false _____(2)_____ . If the statement $3x - 2 = x$ becomes true when x is replaced with the name of a number, then the replacement number is called a (n) _____(3)_____ of the statement.   If x can be replaced only with members of the set $\{1, 2, 3, 4, 6\}$, then this set is called the _____(4)_____ .

5.   TRUE or FALSE: 3 is a solution of the open sentence

$$(x+3)(x-2) = 3$$

Solve each of the following open sentences.   The replacement set is the set of numbers of arithmetic.   Place the <u>solutions</u> on the answer sheet.

6. $x + 7 = 9$

7. $y + 4 = -3$

8. $-5 = x + 9$

9. $y + \frac{1}{3} = 6$

10. $5 - m = 16$

11. $4x = 16$

12. $7d = 11$

13. $8y = 34$

14. $-15a = 56$

15. $-61 = 5a$

16. $\frac{7}{8}y = -21$

17. $\frac{m}{3} = -2$

18. $1.5x = 7$

19. $2a - 12 = 27$

20. $4b + 5 - 3b = 16$

21. $12 - 6a + 5a = 15$

22. $8d - 5 = 3d$

23. $4(z+6) = 33$

24. $-4(6+2z) = 17$

25. $5(3+2x) -4x = 8x-9$

26. If $A = \{3, 2, 1, 0\}$ is the replacement set of x in the open sentence $2x-1= 5x$, then the solution set of the open sentence is _____.

27. Graph the solution set of $6x>12$ on the number line provided on the answer sheet. The replacement set for x is the set $\{0, 1, 2, 3, 4, 5, 6\}$.

Solve each of the following inequalities. The replacement set in each case is the set of real numbers.
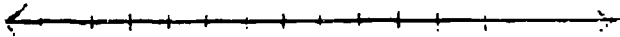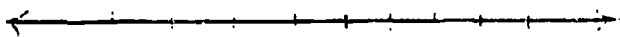
28. $-3y \geq 6$

29. $d-3>9$

30. $4(2a+1) \leq 3$

31. $\frac{a}{7}<6$

32. $-\frac{3}{4}c \geq -12$

33. Graph the solution set of $x \leq -2$ on the number line provided.

34. Mary scored 7 points better than Judy. If Mary scored a 91, what was Judy's score?

UNIT V   Open Sentences, Equations and Inequalities   A B C D

NAME_____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   26. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____   27.

9. _____

← +—+—+—+—+—+—+—+—+—+—+—+ →

-1 0 1 2 3 4 5 6 7 3 9 10

10. _____

11. _____   28. _____

12. _____   29. _____

13. _____   30. _____

14. _____   31. _____

15. _____   32. _____

16. _____   33.

17. _____

← +—+—+—+—+—+—+—+—+ →

-4 -3 -2 -1 0 1 2 3 4

13. _____

19. _____

20. _____

21. _____   34. _____

22. _____

23. _____

24. _____

25. _____

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

Which expressions in the following list are not polynomials? Place the letter preceding the correct answer or answers on the answer sheet.

1.   A. $x^3 - 7x^2 + 6x - 5$ E. $(x-2)(x+3)$

     B. $\frac{1}{3}x^5 - 2x^2 + 9$ F. $7x^2 - 5x + 3 - \frac{2}{x}$

     C. $5x$ G. $\dfrac{x^2 - 5x + 2}{x - 3}$

     D. 4 H. $3x^2y - 2xy^2 + 6y - 3$

2.   Which expression in the following list is a trinomial? Place the letter or letters preceding the correct answer or answers on the answer sheet.

     A. $5x$ C. $x^3 - 3x + 5$

     B. $7x^2 - 2$ D. $7x^4 - 3x^2 + 6x - 2$

3.   What is the degree of $5x^4 - 2x^2 + 6x - 3$?

4.   What is the degree of $3x^2y - 6xy^2 - 5x + 2y - 3$?

For problems 5-31, write the letter of the correct answer on the answer sheet.

5.   Arrange the following polynomial in descending order.

$$4x^3 - 3 + 4x^2 - 5x$$

     A. $-3 -5x + 4x^2 + 4x^3$

     B. $4x^3 + 4x^2 - 5x - 3$

     C. $4x^3 - 3 + 4x^2 - 5x$

6.   ADD: $(5x^2 - 6x + 9) + (7x - 4)$

     A. $5x^2 + x + 5$

     B. $6x^3 + 5$

     C. $5x^2 - 13x - 13$

     D.   None of the above

7. ADD: $8x^3 - 2x^2 + 5x - 3$

   $3x^3 + 2x^2 + 7x + 9$

   A. $5x^3 - 2x - 12$

   B. $5x^3 + 12 + 6$

   C. $11x^3 - 4x^2 + 12x + 6$

   D. $11x^3 + 12x + 6$

8. SUBTRACT: $(4x^2 - 3x - 2) - (2x^2 - 7x + 3)$

   A. $2x^2 - 10x + 1$

   B. $2x^2 + 4x - 5$

   C. $6x^2 - 10x + 1$

   D. $6x^2 + 4x - 5$

9. SUBTRACT: $(2x^3 - 4x^2 - 7) - (2x^2 - 2x + 3)$

   A. $-4x^2 - 2x - 10$

   B. $-4x^2 + 2x - 4$

   C. $2x^3 - 2x^2 - 2x - 4$

   D. $2x^3 - 6x^2 + 2x - 10$

10. SUBTRACT: $7x^2y - 3xy^2$

    $3x^2y - 3xy^2$

    A. $4x^2y$

    B. $4x^2y - 6xy^2$

    C. $10x^2y - 6xy^2$

    D. None of the above

11. What is the additive inverse of $3x^2 - 2x + 4$?

    A. $-3x^2 + 2x + 4$

    B. $-3x^2 + 2x - 4$

    C. $3x^2 + 2x - 4$

    D. $3x^2 - 2x + 4$

B-61

12. Which of the following "laws" are incorrect?

A. $a^m \cdot a^n = a^{m+n}$, m and n are positive integers

B. $(a^m)^n = a^{mn}$, m and n are positive integers

C. $(ab)^m = ab^m$, m is a positive integer

D. None of the above

13. SIMPLIFY: $x^3 \cdot x^2 =$

A. x^6

B. x^5

C. x^9

D. None of the above

14. $(a^5)^2 =$

A. a^7

B. a^{10}

C. a^{25}

15. $b^{15} \div b^3$

A. b^5

B. b^{18}

C. b^{12}

16. $\dfrac{d^9}{d^3} =$

A. d^6

B. d^{12}

C. d^3

17. $(xy)^5 =$

A. xy^5

B. $x^5 y$

C. $x^5 y^5$

D. None of the above

B-62

18. $(5x^2y)^2 =$

    A. $25x^4y$

    B. $5x^4y^2$

    C. $5x^4y$

    D. $25x^4y^2$

19. $(3a^2)(2a^9) =$

    A. $5a^{11}$

    B. $5a^{18}$

    C. $6a^{11}$

    D. $6a^{18}$

20. $(-5g^2)^3 =$

    A. $-125g^5$

    B. $125g^5$

    C. $-125g^6$

    D. $-125g^8$

21. $(4x^2yz^3)(-2xy^3z^2)$

    A. $8x^2y^3z^6$

    B. $8x^3y^4z^5$

    C. $-8x^2y^3z^6$

    D. $-8x^3y^4z^5$

22. $(3st^2v)^2 (-3s^2tv^3)^2$

    A. $81s^6t^6v^6$

    B. $-81s^6t^6v^6$

    C. $81s^8t^8v^8$

    D. None of the above

23. MULTIPLY: $3x^2(5-2x+7x^2)$

    A. $15x^2 - 6x + 21x^4$

    B. $15x^2 - 6x^3 + 21x^4$

    C. $5x^2 - 6x^3 + 21x^4$

24. MULTIPLY: $5y^2-3y + 2$
$\underline{3y - 4}$

   A. $15y^3 - 11y^2 + 18y - 8$

   B. $15y^3 + 29y^2 + 18y - 8$

   C. $15y^2 - 29y^2 + 18y - 8$

25. MULTIPLY: $(4x-3)(5x+1)$

   A. $20x^2 - 11x - 3$

   B. $20x^2 + 11x - 3$

   C. $20x^2 - 19x - 3$

   D. $20x^2 + 19x - 3$

26. MULTIPLY: $(x-4)^2$

   A. $x^2 - 16$

   B. $x^2 + 16$

   C. $x^2 + 3x + 16$

   D. $x^2 - 8x + 16$

27. MULTIPLY: $(2x+1)^2$

   A. $4x^2 + 1$

   B. $2x^2 + 1$

   C. $4x^2 + 4x + 1$

   D. $2x^2 + 4x + 1$

28. DIVIDE: $5x \overline{\smash{\big)}\, 10x^4+5x^3-5x^2+25x}$

   A. $2x^3 + x^2 - x + 5$

   B. $2x^4 + x^3 - x^2 + 5x$

   C. $2x^3 + x^2 + 5$

   D. $2x^4 + x^3 + 5x$

B-64

29. DIVIDE: $x-7 \overline{)x^2-9x+14}$

    A. $x+16+\dfrac{-98}{x-7}$

    B. $x-16+\dfrac{126}{x-7}$

    C. $x+2$

    D. $x-2$

30. DIVIDE: $2x-5 \overline{)6x^3+x^2-13x-33}$

    A. $3x^2+8x+11+\dfrac{22}{2x-5}$

    B. $3x^2+3x+11$

    C. $3x^2-7x+9+\dfrac{-23}{2x-5}$

    D. None of the above

31. DIVIDE: $6x^2-3 \overline{)12x^5-12x^3 \div 3x}$

    A. $2x^3-3x$

    B. $2x^3-3x+\dfrac{-6x}{6x^2-3}$

    C. $2x^3-x+\dfrac{-6x}{6x^2-3}$

    D. $2x^3-x$

32. COMPLETION: $a^0 = $ _____ , $a \neq 0$

33. COMPLETION: $a^1 = $ _____ ,

34. The sum of three times a number and twice the number is decreased by 15, the result is 165. Determine the number.

Which expressions in the following list are <u>not</u> polynomials?   Place the letter preceding the correct answer or answers on the answer sheet.

1.   A. $5x^4 - 7x^3 + 32x^2 - 5x + 2$ E. $(x-1)(x+3)$

     B. $\frac{1}{3}x^6 - 3x^2 + 9 - \frac{4}{x}$ F. $8x^2 - 12x + 3 - \frac{5}{x}$

     C. $5x - 3$ G. $\frac{x^2 - 5x + 2}{x - 3}$

     D. 4 H. $3x^2y - 2xy^2 + 6y - \frac{3}{y}$

2.   Which expression in the following list is a trinomial?   Place the letter preceding the correct answer or answers on your answer sheet.

     A. $5x$ C. $x^3 - 3x + 5$

     B. $7x^2 - 2$ D. $7y^4 - 3y^2 + 6y - 2$

3.   What is the degree of $5x^5 - 2x^2 + 6x + 3$?

4.   What is the degree of $3x^2y^3 - 6xy^2 - 5x + 2y - 3$?

For problems 5 - 31, write the letter of the correct answer on the answer sheet.

5.   Arrange the following polynomial in descending order
$$4x^3 - 3 + 4x^2 + 5x^4$$

     A. $-3 + 4x^2 + 4x^3 + 5x^4$
     B. $4x^3 - 3 + 4x^2 + 5x^4$
     C. $5x^4 + 4x^3 + 4x^2 - 3$

6.   ADD: $(3x^2 - 5x + 11) + (8x - 4)$

     A. $6x^3 + 7$
     B. $3x^2 + 3x + 7$
     C. $3x^2 - 3x - 7$
     D.   None of the above

7. ADD:
$$3x^3 - 2x^2 + 15x + 3$$
$$4x^3 + 2x^2 + 7x + 9$$

A. $12x^3 + 4x^2 + 22x + 12$

B. $12x^3 - 4x^2 + 22x + 12$

C. $12x^3 + 22x + 12$

8. SUBTRACT: $(7x^2 - 6x - 2) - (2x^2 - 3x + 4)$

A. $5x^2 - 14x + 2$

B. $5x^2 + 2x - 6$

C. $5x^2 - 14x - 2$

D. $5x^2 + 2x + 6$

9. SUBTRACT: $(2x^3 - 4x^2 - 7) - (-2x^2 + 2x - 3)$

A. $2x^3 - 2x^2 - 2x - 4$

B. $2x^3 - 6x^2 + 2x - 10$

C. $2x^3 - 2x^2 + 2x - 10$

D. $2x^3 - 6x^2 + 2x + 10$

10. SUBTRACT:
$$3x^2y - 3xy^2$$
$$7x^2y - 5xy^2$$

A. $15x^2y - 3xy^2$

B. $x^2y - 8xy^2$

C. $x^2y + 2xy^2$

D. None of the above

11. What is the additive inverse of $3x^2 + 2x - 3$?

A. $-3x^2 + 2x - 3$ C. $3x^2 - 2x + 3$

B. $-3x^2 - 2x + 3$ D. $-3x^2 - 2x - 3$

12. Which of the following "laws" are incorrect?

A. $a^m \cdot a^n = a^{m+n}$, m and n are positive integers.

B. $(a^m)^n = a^{mn}$, m and n are positive integers.

C. $(ab)^m = a^m b^m$, m is a positive integer.

D. None of the above.

13. SIMPLIFY: $x^5 \cdot x^2 =$

A. x^7

B. x^{10}

C. x^{25}

D. None of the above

14. $(a^5)^3 =$

A. a^8

B. a^{125}

C. a^{15}

15. $b^{25} \div b^5 =$

A. b^{20}

B. b^5

C. b^{30}

16. $\dfrac{d^9}{d^6} =$

A. d^3

B. d^{15}

C. $d^{3/2}$

17. $(xy)^4 =$

A. xy^4

B. $x^4 y^4$

C. $x^4 y$

D. None of the above

18. $(3x^2y)^2 =$

    A. $3x^4y$

    B. $9x^4y^2$

    C. $9x^4y$

19. $(3a^2)(4a^7) =$

    A. $7a^9$

    B. $7a^{14}$

    C. $12a^{14}$

    D. $12a^9$

20. $(-5g^2)^2 =$

    A. $25g^4$

    B. $(-5)^2g^4$

    C.   None of the above

    D.   Both A and B

21. $(4x^2yz^3)(-2xy^3z^2) =$

    A. $-8x^2y^3z^6$

    B. $-3x^3y^4z^5$

    C. $-8x^5y^4z^5$

22. $(3st^2v)^2(-2s^2tv^3)^2 =$

    A. $36s^6t^6v^8$

    B. $-36s^6t^6v^8$

    C. $36s^6t^6v^6$

    D. $-36s^6t^6v^6$

23. MULTIPLY: $3x^2(3+3x-5x^2)$

    A. $9x^2 + 9x^3 + 15x^4$

    B. $9x^2 + 3x^3 - 15x^2$

    C. $9x^2 + 9x^3 - 15x^4$

B-69

24. MULTIPLY: $5y^2 - 3y + 2$
   $\underline{\qquad 3y - 5}$

   A. $15y^3 + 16y^2 + 21y - 10$
   B. $15y^3 - 34y^2 + 21y - 10$
   C. $15y^3 - 16y^2 + 21y - 10$

25. MULTIPLY: $(4x-3)(6x+1)$
   A. $24x^2 - 22x + 4$
   B. $24x^2 - 22x - 3$
   C. $24x^2 - 24x - 3$
   D. $24x^2 - 14x - 3$

26. MULTIPLY: $(x-3)^2$
   A. $x^2 + 9$
   B. $x^2 - 9$
   C. $x^2 + 6x + 9$
   D. $x^2 - 6x + 9$

27. MULTIPLY: $(2x-3)^2$
   A. $4x^2 - 6x + 9$
   B. $4x^2 - 12x + 9$
   C. $4x^2 + 9$
   D. $4x^2 - 9$

28. DIVIDE: $5x \overline{)25x^4 + 15x^3 - 15x^2 + 25x}$

   A. $5x^3 + 3x - 5$
   B. $5x^3 - 3x + 5 + \dfrac{3}{5x}$
   C. $5x^3 + 3x^2 - 3x + 5$
   D. $5x^4 + 3x^3 - 3x^2 + 5x$

29. DIVIDE: $x-7 \overline{)x^2-10x+21}$

    A. $x-3$

    B. $x+3$

    C. $x-2+\dfrac{2}{x-7}$

    D. Can't be done

30. DIVIDE: $2x-5 \overline{)2x^3-11x^2+17x-5}$

    A. $x^2 + 3x + 1$

    B. $x^2 - 3x + 16 + \dfrac{75}{2x-5}$

    C. $x^2-3x + 1$

    D. None of the above

31. DIVIDE: $6x^2-3 \overline{)12x^5-12x^3+3x}$

    A. $2x^3-x$

    B. $2x^3 - 3x$

    C. $2x^3 - x + \dfrac{-6x}{6x^2-3}$

    D. $2x^3 - 3x + \dfrac{-6x}{6x^2-3}$

32. COMPLETION: $a^1 = $ _____

33. COMPLETION: $a^0 = $ _____

34. Twenty-one more than six times a number is 177. Determine the number.

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

1. Which expressions in the following list are not polynomials? Place the letter preceding the correct answer or answers on the answer sheet.

A. $3x$

B. 8

C. $\frac{1}{2}x^4 - 2x^2 + 7$

D. $y^3 - 7y^2 + 6y - 5$

E. $(x+4)(x-1)$

F. $5a^2b - 2ab^2 + 6b - 3$

G. $\dfrac{y^2+5y+2}{y-3}$

H. $7R^2 + 3R + 3 - \dfrac{2}{R}$

2. Which expression in the following list is a trinomial? Place the letter or letters preceding the correct answer or answers on the answer sheet.

A. $y^3 - y + 4$

B. $3x$

C. $5B^2 + C$

D. $R^4 + 3R^2 - R + 2$

3. What is the degree of $5x^4 - 3x^2 + 7x - 1$?

4. What is the degree of $4a^2b - 6ab^2 + 2a - 3b + 1$?

Write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order:

$$6A^3 + 1 + 3A^2 - A$$

A. $1 - A + 3A^2 + 6A^3$

B. $A + 1 + 3A^2 + 6A^3$

C. $6A^3 + 3A^2 - A + 1$

D. None of the above

6. ADD: $(4a-3b+5c) + (8a +5b-9c)$

A. $12a + 2b - 4c$

B. $12a + 8b - 14c$

C. $12a - 8b + 14c$

D. $4a + 2b - 4c$

7. ADD: $3x^3 - 2x^2 + 4x - 3$

    $\underline{8x^3 + 2x^2 + 7x + 9}$

    A. $11x^3 - 4x^2 + 11x - 12$ C. $11x^3 + 11x + 6$

    B. $5x^3 - 4x^2 - 3x - 12$ D. $-5x^3 - 3x - 12$

8. SUBTRACT: $(2a+b-c) - (a-b+c)$

    A. $3a$ C. $a + 2b - 2c$

    B. $3a + 2b - 2c$ D. $a + 2b + 2c$

9. SUBTRACT: $(7x^2-3xy^2) - (3x^2-3xy^2)$

    A. $11x^2 - 6xy^2$ C. $4x^2 - 6xy^2$

    B. $4x^2 + 6xy^2$ D. $4x^2$

10. SUBTRACT: $15x^2 - 3x + 9$

    $\underline{2x^2 + x - 3}$

    A. $13x^2 - 4x + 12$ C. $17x^2 - 2x + 6$

    B. $13x^2 - 2x + 6$ D. $17x^2 - 4x + 12$

11. What is the additive inverse of $5x^2 - x + 5$?

    A. $-5x^2 - x - 5$ C. $-5x^2 + x - 5$

    B. $5x^2 + x - 5$ D. $5x^2 + x + 5$

12. Which of the following "laws" are incorrect?

    A. $b^m \cdot b^n = b^{m+n}$, m and n are positive integers.

    B. $(b^m)^n = b^{mn}$, m and n are positive integers.

    C. $(bx)^m = b^m x$, m is a positive integer.

Perform the indicated operations in problems 13 through 31.

13. $x^5 \cdot x^2$

    A. x^3

    B. x^{10}

    C. None of these.

14. $(a^3)^2$

    A. a^5 C. a^6

    B. a D. None of these.

15. $b^{18} \div b^7$

    A. b^{25} C. b^{126}

    B. b^{11} D. None of these.

16. $\dfrac{R^9}{R^3}$

    A. R^{12} C. R^3

    B. R^6 D. None of these.

17. $(ab)^7$

    A. $a^7 b$ C. ab^7

    B. $a^7 b^7$ D. None of these.

18. $(3xy^2)^2$

    A. $6x^2 y^4$ C. $3xy^4$

    B. $3x^2 y^4$ D. None of these.

19. $(3x^2)(4x^7)$

    A. $7x^9$ C. $7x^5$

    B. $12x^{14}$ D. $12x^9$

20. $(-6S^2)^3$

    A. $-216S^5$ C. $216S^6$

    B. $-216S^6$ D. $36S^5$

21. $(3x^2 yz^3)(-2xy^3 z^2)$

    A. $-6x^3 y^4 z^5$ C. $6xy^4 z^5$

    B. $-6xy^2 z$ D. $6x^3 y^4 z^5$

22. $(2st^2v)(-3s^2tv^3)^2$

    A. $-66s^3t^3v^4$ C. $-12s^3t^3v^4$

    B. $36s^6t^6v^8$ D. None of these.

23. MULTIPLY: $3x^2(4+x-7x^2)$

    A. $12x^2 + 3x^3 + 21x^2$ C. $7x^2 + 3x - 4x^2$

    B. $12x^2 + 3x^3 - 21x^4$ D. None of these.

24. MULTIPLY: $7y^2 - y + 2$

$$\underline{\qquad 2y - 9 \qquad}$$

    A. $14y^3 - 58y^2 - 13y - 18$ C. $14y^3 - 61y^2 + 13y - 18$

    B. $14y^3 - 54y^2 + 13y - 18$ D. None of these.

25. MULTIPLY: $(2x-3)(5x+1)$

    A. $10x^2 - 17x + 3$ C. $7x^2 - 17x - 3$

    B. $10x^2 - 17x - 3$ D. $10x^2 - 13x - 3$

26. MULTIPLY: $(y-3)^2$

    A. $y^2 + 9$ C. $y^2 - 6y + 9$

    B. $y^2 - 9$ D. $y^2 + 6y + 9$

27. MULTIPLY: $(2x + 3)^2$

    A. $4x^2 + 9$ C. $4x^2 + 12x + 9$

    B. $4x^2 + 6x + 9$ D. $4x^2 + 6$

28. DIVIDE: $5M \overline{\left) 10M^4 - 15M^3 + 5M^2 \right.}$

    A. $2M^3 - 3M^2 + M^2$ C. $2M^2 + 3M^2 + M$

    B. $2M^3 - 3M^2 + M$ D. None of these.

29. DIVIDE: $x-7 \overline{\smash{\big)}\ x^2 - 15x+56}$

    A. $x - 8$ C. $x - 22 + \dfrac{210}{x-7}$

    B. $x + 8$ D. None of these.

30. DIVIDE: $2n-3 \overline{\smash{\big)}\ 2n^3 - 5n^2 + 21n-14}$

    A. $n^2 + 4n + 14$ C. $n^2 - n + 12 - \dfrac{22}{2n-3}$

    B. $n^2 - n + 12 + \dfrac{22}{2n-3}$ D. None of these.

31. DIVIDE: $x^2-1 \overline{\smash{\big)}\ x^3+4-x-4x^2}$

    A. $x^2 + 4x + 4$ C. $x + 4$

    B. $x^2 + 4x - 4$ D. $x - 4$

32. COMPLETION: $x^0 = $ _____ , $x = 0$

33. COMPLETION: $x^1 = $ _____

34. If the sum of three times a number and twice the number is decreased by 15, the result is 165. Find the number.

DIRECTIONS: Do <u>not</u> write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place all your answers on the answer sheet. Do not spend too much time on any single problem.

1. Which expression in the following list are not polynomials? Place the letter preceeding the correct answer or answers on the answer sheet.

A. $3x$ E. 7

B. $4x^2 - 2x + 5 - \dfrac{3}{x}$ F. $(x-7)(x+2)$

C. $3x^2y + 2xy^2 - 6y + 4$ G. $\dfrac{x^2 + 7x - 3}{x + 1}$

D. $\dfrac{1}{5}x^2 - 2x + 4$ H. $x^4 - 3x^3 + 7x - 1$

2. Which expression in the following list is a trinomial? Place the letter or letters preceeding the correct answer or answers on the answer sheet.

A. $4x^3 + 7x + 3$

B. $2x$

C. $7y^2 + 6$

D. $9x^3 + 7x^2 - 3x + 9$

3. What is the degree of $3x^5 - 2x^4 + 7x - 3$?

4. What is the degree of $4x^3y + 6x^2y - 3xy + 9x$?

In problems 5-31, write the letter of the correct answer on the answer sheet.

5. Arrange the following polynomial in descending order:

$$4x^2 + 4x^3 + 5x - 3$$

A. $4x^3 - 3 + 4x^2 + 5x$

B. $-3 + 5x + 4x^2 + 4x^3$

C. $4x^3 + 4x^2 + 5x - 3$

6. ADD: $(5x^2-6x+9) + (7x-4)$

A. $5x^2 - 13x - 13$

B. $5x^2 + x + 5$

C. $6x^3 + 5$

D. None of the above

7. ADD: $8x^3 - 2x^2 + 5x - 3$

   $\underline{3x^3 + 2x^2 + 7x + 9}$

A. $11x^3 + 12x + 6$

B. $11x^3 - 4x^2 + 12x + 6$

C. $5x^3 - 2x - 12$

D. $5x^3 + 12x + 6$

8. SUBTRACT: $(4x^2-3x-2) - (2x^2-7x+3)$

A. $6x^2 - 10x + 1$

B. $6x^2 + 4x, - 5$

C. $2x^2 - 10x + 1$

D. $2x^2 + 4x - 5$

9. SUBTRACT: $(2x^3-4x^2-7) - (2x^2-2x+3)$

A. $2x^3 - 2x^2 - 2x - 4$

B. $2x^3 - 6x^2 + 2x - 10$

C. $-4x^2 - 2x - 10$

D. $-4x^2 + 2x - 4$

10. SUBTRACT: $7x^2y - 3xy^2$

    $\underline{3x^2y - 3xy^2}$

A. $10x^2y - 6xy^2$

B. $4x^2y - 6xy^2$

C. $4x^2y$

D. None of the above

B-78

11. What is the additive inverse of $3x^2 - 2x + 4$?

    A. $-3x^2 + 2x - 4$

    B. $-3x^2 + 2x + 4$

    C. $3x^2 + 2x - 4$

    D. $3x^2 - 2x + 4$

12. Which of the following "laws" are incorrect?

    A. $a^m \cdot a^n = a^{m+n}$, where m and n are positive integers.

    B. $(ab)^m = ab^m$, m is a positive integer.

    C. $(a^m)^n = a^{mn}$, m and n are positive integers.

13. SIMPLIFY: $x^3 \cdot x^2 =$

    A. x^6

    B. x^9

    C. x^5

14. $(a^5)^2$

    A. a^{10}

    B. a^7

    C. a^{25}

15. $b^{15} \div b^3 =$

    A. b^5

    B. b^{18}

    C. b^{12}

16. $\dfrac{d^9}{d^3} =$

    A. d^{12}

    B. d^6

    C. d^3

17. $(xy)^5 =$

   A. xy^5

   B. x^5y^5

   C. x^5y

   D. None of the above.

18. $(5x^2y)^2 =$

   A. $5x^4y^2$

   B. $5x^4y$

   C. $25x^4y^2$

   D. $25x^4y$

19. $(3a^2)(2a^9) =$

   A. $5a^{11}$

   B. $5a^{18}$

   C. $6a^{18}$

   D. $6a^{11}$

20. $(-5g^2)^3 =$

   A. $-125g^6$

   B. $-125g^8$

   C. $-125g^5$

   D. $125g^5$

21. $(4x^2yz^3)(-2xy^3z^2)$

   A. $8x^2y^3z^6$

   B. $-8x^3y^4z^5$

   C. $-8x^3y^4z^6$

   D. $8x^3y^4z^5$

22. $(3xt^2v)^2(-3x^2tv^3)^2$

   A. $-81x^6t^6v^6$

   B. $81s^8t^8v^8$

   C. $81s^6t^6v^6$

   D. None of the above

23. MULTIPLY: $3x^2(5-2x+7x^2)$

    A. $15x^2 - 6x + 21x^4$

    B. $15x^2 - 6x^3 + 21x^4$

    C. $5x^2 - 6x^3 + 21x^4$

24. MULTIPLY: $5y^2 - 3y + 2$

$$\underline{\qquad\qquad 3y - 4}$$

    A. $15y^3 - 11y^2 + 18y - 8$

    B. $15y^3 + 29y^2 + 18y - 8$

    C. $15y^3 - 29y^2 + 18y - 8$

25. MULTIPLY: $(4x-3)(5x+1)$

    A. $20x^2 + 19x - 3$

    B. $20x^2 - 19x - 3$

    C. $20x^2 + 11x - 3$

    D. $20x^2 - 11x - 3$

26. MULTIPLY: $(x-4)^2$

    A. $x^2 + 8x + 16$

    B. $x^2 - 8x + 16$

    C. $x^2 - 16$

    D. $x^2 + 16$

27. MULTIPLY: $(2x+1)^2$

    A. $4x^2 + 4x + 1$

    B. $2x^2 + 4x + 1$

    C. $4x^2 + 1$

    D. $2x^2 + 1$

28. DIVIDE: $5x \overline{\smash{\big)}\,10x^4 + 5x^3 - 5x^2 + 5x}$

    A. $2x^4 + x^3 + 5x$

    B. $2x^3 + x^2 + 5$

    C. $2x^3 + x^2 - x + 1$

    D. $2x^4 + x^3 - x^2 + 5x$

29. DIVIDE: $x-7\sqrt{x^2 - 9x + 14}$

    A. $x + 2$

    B. $x - 2$

    C. $x + 16 + \dfrac{-98}{x-7}$

    D. $x - 16 + \dfrac{126}{x-7}$

30. DIVIDE: $2x-5\sqrt{6x^3 + x^2 - 18x - 33}$

    A. $3x^2 + 8x + 11 + \dfrac{22}{2x-5}$

    B. $3x^2 - 7x + 9 + \dfrac{-23}{2x-5}$

    C. $3x^2 + 8x + 11$

    D. None of the above

31. DIVIDE: $6x^2-3\sqrt{12x^5 - 12x^3 + 3x}$

    A. $2x^3 - 3x + \dfrac{-6x}{6x^2-3}$

    B. $2x^3 - x + \dfrac{-6x}{6x^2-3}$

    C. $2x^3 - 3x$

    D. $2x^3 - x$

32. COMPLETION: $a^1 = $ _____

33. COMPLETION: $a^0 = $ _____, $a = 0$

34. The sum of 3 consecutive integers is 48. Determine the numbers.

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1.	_____	18.	_____
2.	_____	19.	_____
3.	_____	20.	_____
4.	_____	21.	_____
5.	_____	22.	_____
6.	_____	23.	_____
7.	_____	24.	_____
8.	_____	25.	_____
9.	_____	26.	_____
10.	_____	27.	_____
11.	_____	28.	_____
12.	_____	29.	_____
13.	_____	30.	_____
14.	_____	31.	_____
15.	_____	32.	_____
16.	_____	33.	_____
17.	_____	34.	_____

B-33

DIRECTIONS: Do not write on this test paper. Do all scratch work on the
paper provided to you for this purpose. Place your answers on the answer
sheet. Do not spend too much time on any one problem.

1.   Which of the following numbers is prime? Write the letter preceding
      the number of the correct answer or answers on your answer sheet

      A.   1   C.   2

      B.   9   D.   15

2.   Factor 72 completely into powers of primes.

3.   Give the second factor: $18x^2y^4 = 9xy (\quad)$

4.   Find the GCF of 12 and 18.

5.   Find the GCF of $2x^2y^2$ and $6x^6yz$.

Factor completely all polynomials from number 6 through number 16.

6. $36x + 12y - 24$

7. $25x^3 - 15x^2 - 5x$

8. $x^2 - 16$

9. $a^2 + 8a + 16$

10. $b^2 + 4b - 12$

11. $6c^2 - c - 2$

12. $x^3 - 3x^2 + 7x - 21$

13. $25x^2 - 81y^2$

14. $2a^3 + 20a^2 + 50a$

15. $2x^2 - 8$

16. $-x^2 + 2x - 1$

17. Name the additive inverse of $4x^2 - 5x - 7$

18. COMPLETION: If a and b are numbers and $(a)(b) = 0$ but $a \neq 0$, then $b =$ _____ .

19. MULTIPLY: $-1 (x^2 - 3x + 2) =$ _____ .

Solve each of the equations from number 20 through number 29. Write the solutions to them on your answer sheet.

20. $(x - 2)(x + 1) = 0$

21. $y(y - 2) = 0$

22. $(2a + 1)(a - 3) = 0$

23. $y^2 - 25 = 0$

24. $y^2 - 6y + 9 = 0$

25. $x^2 + 3x = 10$

26. $0(a - 2) = 0$

27. $0(x - 7) = 1$

28. A man traveled 4 hours at x miles per hour, then at $(20 + x)$ miles per hour for 3 hours. Represent the total distance traveled.

B-85

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided for this purpose. Place all answers on the answer sheet. Do not spend too much time on any one problem.

1.   Which of the following numbers is not prime? Write the letter of the correct answer or answers on your answer sheet.

   A.   3   C.   2

   B.   15   D.   5

2.   Factor 68 completely into powers of primes.

3.   Give the second factor: $45x^2y^5 = 9xy$ (   )

4.   Find the GCF of 24 and 18.

5.   Find the GCF of $3x^3y^4$ and $6x^4y^4z$.

Factor completely all polynomials from number 6 thru number 16.

6. $9x - 18y + 27$

7. $x^2 - 25$

8. $3x^3 - 15x^2 - 42x$

9. $a^2 + 12a + 36$

10. $b^2 + b - 12$

11. $6d^2 + 3d - 3$

12. $x^3 - 7x^2 + 3x - 21$

13. $9x^2 - 64y^2$

14. $3a^3 + 21a^2 - 48a$

15. $3x^2 - 27$

16. $-x^2 + x + 6$

17. COMPLETION: If a and b are numbers and ab = 0 and b ≠ 0, then
     a = _____ .

18. MULTIPLY: $-1 (2x^2 - 5x - 2)$

19. Name the additive inverse of $-6x^2 + 5x + 4$.

Solve each of the equations from number 20 through 27. Write the solutions
on your answer sheet.

20. $(a - 3) (a + 4) = 0$

21. $(2a - 1) (a - 4) = 0$

22. $t(t - 3) = 0$

23. $x^2 - 16 = 0$

24. $x^2 - 10x + 25 = 0$

25. $a^2 + 5a = -6$

26. $0(t + 3) = 0$

27. $0(a - 3) = 1$

28. The sum of 3 consecutive integers is 39. Determine the three integers.

DIRECTIONS: Do not write on this test paper. Do all scratch work on the paper provided to you for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1.   Which of the following numbers is prime? Write the letter preceding the number of the correct answer or answers on your answer sheet.

   A.   6   C.   1

   B.   5   D.   9

2.   Factor 84 completely into powers of primes.

3.   Give the second factor: $16a^2b^4 = 8ab (\quad)$

4.   Find the GCF of 12 and 15.

5.   Find the GCF of $3a^2b^2$ and $6a^6bc$

Factor completely all polynomials from number 6 through 16.

6. $18x + 12y - 24$

7. $20x^3 - 15x^2 + 5x$

8. $x^2 - 81$

9. $y^2 + 11y + 16$

10. $r^2 + 7r - 30$

11. $15y^2 - y - 2$

12. $a^3 - 3a^2 + 5a - 15$

13. $36r^2 - 81s^2$

14. $x^3 - 2x^2 + x$

15. $4c^2 - 16$

16. $-a^2 + 2a - 1$

17. Name the additive inverse of $6a^2 - 3a - 1$.

18. COMPLETION: If a and b are numbers and (a)(b) = 0, but b ≠ 0, then a = _____.

19. MULTIPLY: $-1(y^2 - 5y + 3)$

Solve each of the equations from number 20 through number 29. Write the solutions to them on your answer sheet.

20. $(a + 1)(a - 3) = 0$

21. $x(x - 10) = 0$

22. $(2a + 3)(a - 1) = 0$

23. $x^2 - 81 = 0$

24. $y^2 - 5x - 6 = 0$

25. $r^2 + 5r = 6$

26. $0(x + 5) = 0$

27. $0(a - 8) = 1$

28. Two jet transports start at the same time from the same airport. One flies due east at 620 miles per hour. The other flies directly west at 560 miles per hour. In how many hours will they be 3540 miles apart.

DIRECTIONS: Do <u>not</u> write on this test paper. Do all scratch work on the paper provided to you. Place your answers on the answer sheet. Do not spend too much time on any one problem.

1.   Which of the following numbers is prime?   Write the letter of the correct answer or answers on your answer sheet.

   A.   7   C.   4

   B.   5   D.   6

2.   Factor 56 completely into powers of primes.

3.   Give the second factor: $28x^2y^5 = 7xy (\quad)$

4.   Find the GCF of 16 and 24.

5.   Find the GCF of $3x^2y^3$ and $12x^5y^2z$.

Factor <u>completely</u> all polynomials from number 6 through number 16.

6. $25x + 5y - 10z$

7. $36x^3 + 24x^2 + 12x$

8. $x^2 - 36$

9. $y^2 + 6y + 9$

10. $b^2 + 5b - 14$

11. $6c^2 + c - 2$

12. $x^3 - 5x^2 + 2x - 10$

13. $49x^2 - 81y^2$

14. $4a^3 + 40a^2 + 100a$

15. $3x^2 - 27$

16. $-x^2 - 2x - 1$

17. Name the additive inverse of $-9x^2 + 3x - 6$.

18. MULTIPLY: $-1(x^2 + 6x - 7) = $ _____

19. COMPLETION: If x and y are numbers and $(x)(y) = 0$ but $x \neq 0$, then
    y = _____.

Solve each of the equations from number 20 through number 27. Write the
solutions to them on your answer sheet.

20. $(x + 6)(x - 7) = 0$

21. $y(y - 3) = 0$

22. $(3a + 2)(a - 3) = 0$

23. $y^2 - 81 = 0$

24. $y^2 + 10y + 25 = 0$

25. $x^2 - 5x = 36$

26. $0(a + 7) = 1$

27. $0(a - 8) = 0$

28. A number increased by three is equal to twice that, same number
    decreased by 1. Determine the number.

UNIT VII   Special Products and Factoring   Test A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   15. _____

2. _____   16. _____

3. _____   17. _____

4. _____   18. _____

5. _____   19. _____

6. _____   20. _____

7. _____   21. _____

8. _____   22. _____

9. _____   23. _____

10. _____   24. _____

11. _____   25. _____

12. _____   26. _____

13. _____   27. _____

14. _____   28. _____

DIRECTIONS: Do <u>not</u> write on this test paper. Do all work on the scratch paper provided to you. Place all answers on the answer sheet. Do not spend too much time on any one problem.

In problems 1 through 5, determine the values of the variable for which the fraction is not defined. If there are no exclusions, write "none".

1. $\dfrac{5}{x}$

2. $\dfrac{7}{x-3}$

3. $\dfrac{2x+1}{x+2}$

4. $\dfrac{7x-2}{4}$

5. $\dfrac{x^2+2}{x^2-4}$

6. COMPLETION: An algebraic fraction is the indicated _____ of two real numbers, polynomials, or combinations of these.

7. COMPLETION: In the fraction $\dfrac{3}{4}$, 3 is called the _____ (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms. If the fraction is already in simplest form, write "done" on your answer sheet.

8. $\dfrac{36}{42}$

9. $\dfrac{20a^2b}{25ab^2}$

10. $\dfrac{80x^2yz}{15xy^2z}$

11. $\dfrac{x+3}{x^2-9}$

12. $\dfrac{x^2 + 2x + 1}{x^2 - x - 2}$

13. $\dfrac{ab}{a + b}$

In problems 14 through 18, give the products reduced to lowest terms.

14. $\dfrac{x^2}{3} \cdot \dfrac{6}{xy} =$ _____

15. $(7xy) \left(\dfrac{15x}{14y}\right) =$ _____

16. $\dfrac{7(x - y)}{5} \cdot \dfrac{8x}{y - x} =$ _____

17. $\dfrac{a^2 - b^2}{m + n} \cdot \dfrac{m^2 - n^2}{a + b} =$ _____

18. $\dfrac{a^2 + 5a + 4}{a + 4} \cdot \dfrac{a + 5}{a^2 + 6a + 5} =$ _____

In problems 19 through 24 give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\dfrac{5}{6} \div \dfrac{-3}{4} =$ _____

20. $\dfrac{15x}{16y} \div 5x =$ _____

21. $7x^2y \div \dfrac{5x}{2y} =$ _____

22. $\dfrac{15a^2}{7b} \div \dfrac{25a^3}{14b^2} =$ _____

23. $\dfrac{3x + 6}{x^2 - y^2} \div \dfrac{x^2 + 5x + 6}{x + y} =$ _____

24. $\dfrac{3a}{3a + 2} \cdot \dfrac{6a + 4}{4a} \div \dfrac{a + 2}{2} =$ _____

25. Jim and Joe earned a total of $36. Joe earned $3 more than one-half of what Jim earned. How much did each earn?

DIRECTIONS: Do not write on the test paper.   Do all work on scrap paper
and place final answers on the answer sheet.   Do NOT spend too much time
on any one problem.

In problems 1 through 5, determine the values of the variable for which the
fraction is not defined.   If there are no exclusions, write "none".

1. $\dfrac{1}{x + 1}$

2. $\dfrac{3}{x - 2}$

3. $\dfrac{2x + 1}{x}$

4. $\dfrac{x^2 + 4}{x^2 - 25}$

5. $\dfrac{3x - 7}{9}$

6.   Completion: An algebraic fraction is the indicated _____
     of two real numbers, polynomials or combinations of the same.

7.   Completion: In the fraction $\dfrac{3}{4}$, 4 is called the _____
     (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms.   If the
fraction is already in simplest form, write "done" on your answer sheet.

8. $\dfrac{64}{72}$

9. $\dfrac{15ab^2}{20a^2b}$

10. $\dfrac{90xy^2z^2}{20xyz}$

11. $\dfrac{x+5}{x^2 - 25}$

12. $\dfrac{x^2 + 4x + 4}{x^2 - x - 6}$

13. $\dfrac{2a}{2 + b}$

In problems 14 through 18, give the product or quotient reduced to lowest terms.

14. $\dfrac{xy}{6} \cdot \dfrac{3}{x^2}$

15. $(3xy)\left(\dfrac{4x}{9y}\right)$

16. $\dfrac{3(a - b)}{8} \cdot \dfrac{8x}{9(b - a)}$

17. $\dfrac{x - y}{a^2 - b^2} \circ \dfrac{a - b}{x^2 - y^2}$

18. $\dfrac{c^2 + 3c + 2}{c + 1} \cdot \dfrac{c + 1}{c^2 + 5c + 4}$

In problems 19 through 24, give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\dfrac{5}{9} \div \dfrac{-3}{5}$

20. $\dfrac{18x}{21y} \div 6x$

21. $7x^2 y \div \dfrac{5x}{2y}$

22. $\dfrac{21a^2}{9b} \div \dfrac{7a^3}{3b^2}$

23. $\dfrac{4x + 20}{x^2 - 4y^2} \div \dfrac{x + 5}{x - 2y}$

24. $\dfrac{x^2 - 1}{x^2} \cdot \dfrac{x}{x - 1} \div \dfrac{x + 1}{5}$

25. A rectangle is 2 yards longer than it is wide. The area of the rectangle is 99 square yards. Find its dimensions.

DIRECTIONS: Do not write on this test paper.   Do all work on the scratch
paper provided to you.   Place all answers on the answer sheet.   Do not spend
too much time on any one problem.

In problems 1 through 5, determine the value of the variable for which the
fraction is not defined.   If there are no exclusions, write "none".

1. $\dfrac{8}{x - 2}$

2. $\dfrac{3x + 1}{x + 4}$

3. $\dfrac{5}{x}$

4. $\dfrac{x^2 + 5}{x^2 - 9}$

5. $\dfrac{7y + 1}{4}$

6.   Completion: In the fraction $\dfrac{7}{9}$, 7 is the _____ (numerator,
     denominator).

7.   True or False: An algebraic fraction is the indicated quotient of two
     real numbers, polynomials or combinations of these.

Reduce the fractions in problems 8 through 13 to lowest terms.   If the
fraction is already in simple form, write "done".

8. $\dfrac{38}{50}$

9. $\dfrac{36a^2 b^3}{16ab^2}$

10. $\dfrac{15x^4 y^2 z}{45x^6 yz^3}$

11. $\dfrac{7ab}{14a + b}$

12. $\dfrac{x - 7}{x^2 - 49}$

13. $\dfrac{c^2 + 6c + 9}{c^2 - 9}$

In problems 14 through 18, give the products reduced to lowest terms. Assume that there are no divisions by zero.

14. $(8 \times y) \cdot (\dfrac{3y}{4x})$

15. $\dfrac{a^3}{4} \cdot \dfrac{12}{ab}$

16. $\dfrac{9(a - b)}{4} \cdot \dfrac{5}{b - a}$

17. $\dfrac{a^2 + a}{2} \cdot \dfrac{6}{a^2 - 1}$

18. $\dfrac{x^2 - 5x + 6}{x - 2} \cdot \dfrac{x + 3}{x^2 - 9}$

In problems 19 through 24 give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\dfrac{3}{7} \div \dfrac{-12}{5}$

20. $\dfrac{21x}{16y} \div 3z$

21. $18x^3 y \div \dfrac{4x}{3y}$

22. $\dfrac{24a^3}{7b} \div \dfrac{8a^2}{21b^3}$

23. $\dfrac{x^2 + 4x + 3}{x + 2} \div \dfrac{x^2 + x - 6}{x + 2}$

24. $\dfrac{x^2 + 10x + 25}{x + 10} \cdot \dfrac{10}{x^2 + 15x + 50} \div \dfrac{x + 5}{x + 10}$

25. An object is thrown from a plane at an altitude of 20,000 feet. If the object falls at a rate of 52 feet per second, how long will it take for the object to reach the ground?

Unit VIII   FRACTIONS   Part I
                                                          Test D

DIRECTIONS: Do not write on this test paper. Do all work on the scratch
paper provided to you.   Place all answers on the answer sheet.   Do not
spend too much time on any one problem.

In problems 1 through 5, determine the values of the variable for which
the fraction is not defined.   If there are no exclusions, write "none".

1. $\dfrac{10}{x}$

2. $\dfrac{5}{y - 3}$

3. $\dfrac{3x + 1}{x + 2}$

4. $\dfrac{5x - 3}{5}$

5. $\dfrac{x^2 + 1}{x^2 - 4}$

6. Completion: An algebraic fraction is the indicated _____
    of two real numbers, polynomials, or combination of these.

7. Completion: In the fraction $\dfrac{5}{12}$, 12 is called _____
    (numerator, denominator).

Reduce the fractions in problems 8 through 13 to lowest terms.   If the
fraction is already in simplest form, write "done" on your answer sheet.

8. $\dfrac{24}{42}$

9. $\dfrac{10x^2 y}{15xy^2}$

10. $\dfrac{60a^2bc}{25abc^2}$

11. $\dfrac{x + 2}{x^2 - 4}$

B-100

12. $\dfrac{p^2 - 4p + 3}{p^2 + 3p - 4}$

13. $\dfrac{xy}{x - y}$

In problems 14 through 18, give the products reduced to lowest terms.

14. $\dfrac{y^2}{2} \cdot \dfrac{8}{xy}$

15. $(6 \text{ x } z) \left(\dfrac{15z}{12x}\right)$

16. $\dfrac{5(a - b)}{7} \cdot \dfrac{8a}{b - a}$

17. $\dfrac{x^2 - y^2}{w + v} \cdot \dfrac{w^2 - v^2}{x + y}$

18. $\dfrac{a^2 - 12a + 32}{a + 4} \cdot \dfrac{a^2 - 16}{a - 8}$

In problems 19 through 23, give the quotient reduced to lowest terms. Assume that there are no divisions by zero.

19. $\dfrac{5}{8} \div \dfrac{-3}{4}$

20. $\dfrac{12x}{14y} \div 6x$

21. $8x^2 y \div \dfrac{5x}{4y}$

22. $\dfrac{15z^2}{7w} \div \dfrac{14w^2}{25z^3}$

23. $\dfrac{3a + 6}{a^2 - b^2} \div \dfrac{a^2 + 5a + 6}{a + b}$

24. $\dfrac{x^2 + 2x + 1}{3x} \cdot \dfrac{2x + 6}{6x^3} \div \dfrac{x + 1}{12x^3}$

25. A rectangle is 8 feet longer than it is wide. Its area is 105 square feet. Find its dimensions.

UNIT VIII   Fractions   PART I   A   B   C   D

NAME_____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   17. _____

2. _____   18. _____

3. _____   19. _____

4. _____   20. _____

5. _____   21. _____

6. _____   22. _____

7. _____   23. _____

8. _____   24. _____

9. _____   25. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

DIRECTIONS: Do <u>not</u> write on this test paper. Place all answers on the
answer sheet. Do not spend too much time on any one problem.

In Problems 1 through 10, give the sum or difference reduced to lowest terms.
Assume that there are no divisions by zero.

1. $\dfrac{5}{9} + \dfrac{2}{9} =$ _____

2. $\dfrac{x}{5} - \dfrac{3}{5} =$ _____

3. $\dfrac{a}{b} - \dfrac{2 - 3a}{b} =$ _____

4. $\dfrac{5}{7} + \dfrac{3}{4} =$ _____

5. $\dfrac{2a}{5} + \dfrac{3a}{4} =$ _____

6. $\dfrac{a^2}{a - 2} - \dfrac{4}{a - 2} =$ _____

7. $\dfrac{10x}{x + 5} + \dfrac{x^2 + 25}{x + 5} =$ _____

8. $\dfrac{7}{a^2 b} - \dfrac{3}{ab^2} =$ _____

9. $\dfrac{x}{x^2 - 81} + \dfrac{4}{x + 9} =$ _____

10. $\dfrac{x - 1}{x^2 - 2x - 8} + \dfrac{x + 2}{x^2 + x - 2}$

11.   SIMPLIFY: $\dfrac{\frac{5x}{6}}{\frac{10x}{12y}}$

B-103

12. SIMPLIFY: $\dfrac{\dfrac{a}{b} + 1}{\dfrac{a}{b} - 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\dfrac{x}{5} + \dfrac{x}{4} = \dfrac{3}{4}$

15. $\dfrac{2m - 1}{5} - \dfrac{2 - m}{5} = 1$

16. $\dfrac{x}{4} = \dfrac{x - 2}{5}$

17. $\dfrac{2c}{3} + 1 < \dfrac{3c}{4}$

18. $\dfrac{3y}{5} - \dfrac{2 - 3y}{2} > 5$

19. $\dfrac{5}{x} + \dfrac{3}{4} = \dfrac{7}{x}$

20. $\dfrac{9}{a + 2} = \dfrac{6}{a + 2}$

21. $\dfrac{60}{a^2 - 36} + 1 = \dfrac{5}{a - 6}$

DIRECTIONS: Do not write on this test paper.   Place all answers on the
answer sheet.   Do not spend too much time on any one problem.

In Problems 1 to 10, give the sum or difference reduced to lowest terms?
Assume that there are no divisions by zero.

1. $\dfrac{4}{7} + \dfrac{2}{7}$

2. $\dfrac{x}{8} - \dfrac{5}{8}$

3. $\dfrac{b}{c} - \dfrac{3 - 2b}{c}$

4. $\dfrac{4}{9} + \dfrac{2}{5}$

5. $\dfrac{3a}{5} + \dfrac{5a}{6}$

6. $\dfrac{x^2}{x - 3} - \dfrac{9}{x - 3}$

7. $\dfrac{12x}{x + 6} + \dfrac{x^2 + 36}{x + 6}$

8. $\dfrac{5}{a^2 b} + \dfrac{2}{a^2 b}$

9. $\dfrac{x}{x^2 - 49} + \dfrac{3}{x + 7}$

10. $\dfrac{x - 2}{x^2 - 3x - 4} + \dfrac{x + 2}{x^2 - x - 2}$

11. SIMPLIFY: $\dfrac{\dfrac{4x}{5}}{\dfrac{8x}{10y}}$

12. SIMPLIFY: $\dfrac{\dfrac{A}{B} - 1}{\dfrac{A}{B} + 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\dfrac{x}{4} + \dfrac{x}{5} = \dfrac{3}{4}$

15. $\dfrac{3m - 2}{5} - \dfrac{3 - m}{5} = 1$

16. $\dfrac{x}{5} = \dfrac{x - 3}{6}$

17. $\dfrac{3c}{5} + 1 < \dfrac{3}{4} c$

18. $\dfrac{8y}{5} - \dfrac{6 - 5y}{2} > 8$

19. $\dfrac{6}{x} + \dfrac{4}{5} = \dfrac{5}{x}$

20. $\dfrac{8}{a - 3} = \dfrac{5}{a - 3}$

21. $\dfrac{40}{a^2 - 16} + 1 = \dfrac{5}{a - 4}$

B-106

DIRECTIONS: Do not write on this test paper.   Place all answers on the
answer sheet.   Do <u>not</u> spend too much time on any one problem.

In Problems 1 through 10, give the sum or difference reduced to lowest terms.
Assume that there are no divisions by zero.

1. $\dfrac{5}{9} + \dfrac{2}{9}$

2. $\dfrac{x}{8} - \dfrac{5}{8}$

3. $\dfrac{a}{b} - \dfrac{2 - 3a}{b}$

4. $\dfrac{4}{9} + \dfrac{2}{5}$

5. $\dfrac{2a}{5} + \dfrac{3a}{4}$

6. $\dfrac{x^2}{x - 3} - \dfrac{9}{x - 3}$

7. $\dfrac{10x}{x + 5} + \dfrac{x^2 + 25}{x + 5}$

8. $\dfrac{5}{a^2 b} + \dfrac{2}{a^2 b}$

9. $\dfrac{x}{x^2 - 81} + \dfrac{4}{x + 9}$

10. $\dfrac{x - 2}{x^2 - 3x - 4} + \dfrac{x + 2}{x^2 - x - 2}$

11.   SIMPLIFY: $\dfrac{\dfrac{5x}{6}}{\dfrac{10x}{12y}}$

B-107

12. SIMPLIFY: $\dfrac{\dfrac{A}{B} - 1}{\dfrac{A}{B} + 1}$

13. What is the ratio in lowest terms of 6 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\dfrac{x}{4} + \dfrac{x}{5} = \dfrac{3}{4}$

15. $\dfrac{2y - 1}{5} - \dfrac{2 - y}{5} = 1$

16. $\dfrac{z}{5} = \dfrac{z - 3}{6}$

17. $\dfrac{2d}{3} + 1 < \dfrac{3d}{4}$

18. $\dfrac{8x}{5} - \dfrac{6 - 5x}{2} > 8$

19. $\dfrac{5}{x} + \dfrac{3}{4} = \dfrac{7}{x}$

20. $\dfrac{8}{a + 3} = \dfrac{5}{a + 3}$

21. $\dfrac{60}{a^2 - 36} + 1 = \dfrac{5}{a - 6}$

DIRECTIONS: Do not write on this test paper. Place all answers on the
answer sheet. Do **not** spend too much time on any one problem.

In Problems 1 to 10, give the sum or difference reduced to lowest terms.
Assume that there are no divisions by zero.

1. $\dfrac{4}{7} + \dfrac{2}{7}$

2. $\dfrac{x}{5} - \dfrac{3}{5}$

3. $\dfrac{b}{c} - \dfrac{3 - 2b}{c}$

4. $\dfrac{5}{7} + \dfrac{3}{4}$

5. $\dfrac{3a}{5} + \dfrac{5a}{6}$

6. $\dfrac{a^2}{a - 2} - \dfrac{4}{a - 2}$

7. $\dfrac{12x}{x + 6} + \dfrac{x^2 + 36}{x + 6}$

8. $\dfrac{7}{a^2 b} - \dfrac{3}{ab^2}$

9. $\dfrac{x}{x^2 - 49} + \dfrac{3}{x + 7}$

10. $\dfrac{x - 1}{x^2 - 2x - 8} + \dfrac{x + 2}{x^2 + x - 2}$

11. SIMPLIFY: $\dfrac{\dfrac{4x}{5}}{\dfrac{8x}{10y}}$

12. SIMPLIFY: $\dfrac{\dfrac{m}{n} + 1}{\dfrac{m}{n} - 1}$

13. What is the ratio in lowest terms of 4 feet to 4 yards?

In Problems 14 through 21, solve each equation or inequality and write the solution on the answer sheet.

14. $\dfrac{x}{5} + \dfrac{x}{4} = \dfrac{3}{4}$

15. $\dfrac{3m - 2}{5} - \dfrac{3 - m}{5} = 1$

16. $\dfrac{x}{4} = \dfrac{x - 2}{5}$

17. $\dfrac{3c}{5} + 1 < \dfrac{3}{4} c$

18. $\dfrac{3y}{5} - \dfrac{2 - 3y}{2} > 5$

19. $\dfrac{6}{x} + \dfrac{4}{5} = \dfrac{5}{x}$

20. $\dfrac{9}{a - 2} = \dfrac{6}{a - 2}$

21. $\dfrac{40}{a^2 - 16} + 1 = \dfrac{5}{a - 4}$

UNIT VIII   Fractions   PART II
                                                          Test A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   12. _____

2. _____   13. _____

3. _____   14. _____

4. _____   15. _____

5. _____   16. _____

6. _____   17. _____

7. _____   18. _____

8. _____   19. _____

9. _____   20. _____

10. _____   21. _____

11. _____

DIRECTIONS: Do **not** write on this test booklet. Do all scratch work on
the paper provided for this purpose. Place your answers on the answer sheet.
Do not spend too much time on any one problem.

Fill in each numbered blank with the letter preceding the word from the following
list that makes each sentence correct.

A.	coordinate axes	F.	origin
B.	quadrant	G.	abscissa
C.	ordered pair	H.	line
D.	coordinates	I.	point
E.	ordinate	J.	variable

The major horizontal and vertical lines in a Cartesian Axis System are
called _____(1)_____. The point where they intersect is called the
_____(2)_____ of the system. Each point in the plane is located
by attaching two numbers to it called the _____(3)_____ of the
point. These two numbers are usually written so that the order is important.
Hence, the pair is called a(n) _____(4)_____. The first number of the
pair is called the _____(5)_____ of the point, and the second number is
called the _____(6)_____ of the point. The plane is divided into four
principal regions by the major lines. Each of these regions is called
a(n) _____(7)_____.

8.   Write the letter of the correct answer on the answer sheet. The point
      A(-7, 3) lies in quadrant:

      A.   I   D.   IV

      B.   II   E.   None

      C.   III

9.   Write the letter of the correct answer on the answer sheet. The point
      B(-7, 0) lies in quadrant:

      A.   I   D.   IV

      B.   II   E.   None

      C.   III

10   TRUE or FALSE: The point $C(5, 0)$ lies on the x-axis

11   TRUE or FALSE: The point $I(0, 0)$ lies in the y-axis.

12   TRUE or FALSE: The point $P(2, a)$ lies in quadrant IV if $a < 0$.

13   COMPLETION: Consider the expression $x_2{}^3$. The number

_____ is the subscript

Solve each of the equations in numbers 14 through 16 for y in terms of x

14   $2y = 3x - 1$

15. $2x - 2y + 1 = 0$

16   $7x + 3y - 4 = 0$

17   Consider the equation $5x - 3y + 2 = 0$ If $x = 4$, then $y =$ _____

18.   Graph the following points and label them properly. Use the Cartesian System given on your answer sheet. All must be plotted properly

A $A(-3, 2)$ C. $C(0, -2)$

B. $B(4, 0)$ D. $D(-2, -3)$

19.   Using the Cartesian System given on your answer sheet, graph the equation:

$$x - 2y + 1 = 0$$

Use the chart method. Complete the chart that appears on your answer sheet

20   Examine the graph given below. What is the y-intercept of the line?
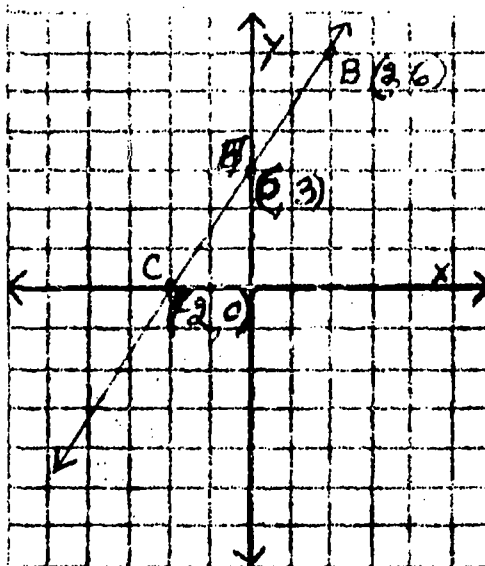
21. What is the y-intercept of the graph of the line whose equation is
$3x - 4y + 6 = 0$?

22. Graph the line whose equation is $x = -2$ in the given Cartesian System.

23. Graph the line whose equation is $y = 2$ on the given Cartesian System.

24. COMPLETION: _____ is the equation of the x-axis.

25. Which one or ones of the following equations is (are) linear. Write the
letter preceding the correct answer(s) on the answer sheet.

A. $y = 3x - 2$ D. $2x - 3y + 6 = 0$

B. $y = 2x^2$ E. None of these.

C. $y = 5x^2 - 4x + 3$

26. What is the slope of the line given by the graph below?

27. What is the slope of the line $\overleftrightarrow{AB}$ if A has the coordinates $(-3, -2)$ and
B has the coordinates $(5, 7)$?

28. Which of the lines defined by the equations below have no slope defined
for it? Write the letter of the correct answer on your answer sheet.

A. $x = 4$ C. $2x - 3y + 5 = 0$

B. $y = 2$ D. All of the above have
                       slopes defined.

B-114

DIRECTIONS: Do not write on this test booklet. Do all scratch work on
the paper provided for this purpose. Place your answers on the answer sheet.
Do not spend too much time on any one problem.

Fill in each numbered blank with the number preceding the word from the
following list that makes each sentence correct.

A.   Ordinate   F.   Variable

B.   Coordinate axes   G.   Origin

C.   Coordinates   H.   Point

D.   Line   I.   Quadrant

E.   Ordered pairs   J.   Abscissa

The major horizontal and vertical lines in the Cartesian Axis system are
called _____(1)_____ . The point where they intersect is called the
_____(2)_____ . Each point in the plane is located by attaching two
numbers to it called the _____(3)_____ of the point. These two numbers
are usually written so that the order is important. Hence, the pair is called
a(n) _____(4)_____ . The first number of the pair is called the ____(5)____
of the point, and the second number is called the _____(6)_____ of the point.
The plane is divided into four principal regions by the major lines. Each of
these regions is called a(n) _____(7)_____ .

8.   Write the letter of the correct answer on the answer sheet. The point
     (7, -3) lies in quadrant:

     A.   I   D.   IV

     B.   II   E.   None

     C.   III

9.   Write the letter of the correct answer on the answer sheet. The point
     (6, 0) lies in quadrant:

     A.   I   D.   IV

     B.   II   E.   None

     C.   III

B-115

10. TRUE or FALSE: The point (5, 0) lies on the y-axis.

11. TRUE or FALSE: The point I(0, 0) lies on the x-axis.

12. TRUE or FALSE: The point $P(a, 1)$ lies in quadrant II if $a < 0$.

13. COMPLETION: In $x_1{}^3$ the number _____ is the subscript.

Solve each of the equations in numbers 14-16 for y in terms of x.

14. $4y = 3x - 1$

15. $3x + 2y = 0$

16. $8x + 3y = 0$

17. Consider the equation $5x - 3y + 2 = 0$. If $x = 2$, then $y =$ _____.

18. Graph the following points and label them properly. Use the Cartesian System on your answer sheet. ALL must be plotted correctly.

    A. $A(3, -2)$ C. $C(0, -3)$
   B. $B(6, 0)$ D. $D(-2, -3)$

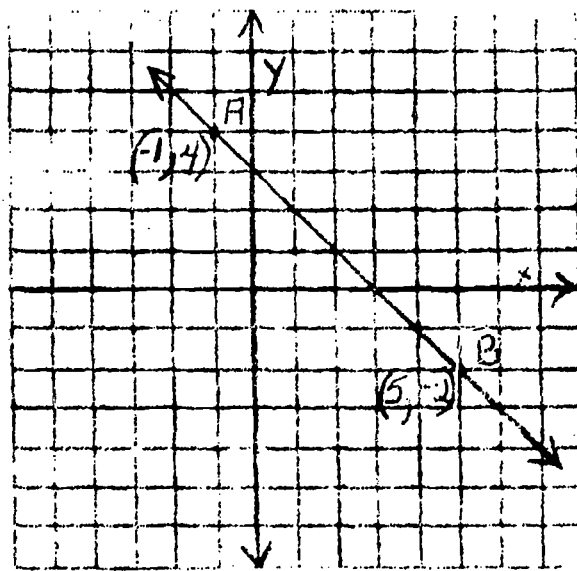19. Using the Cartesian System given on your answer sheet, graph the the equation $2x + y + 3 = 0$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the x-intercept of the line?
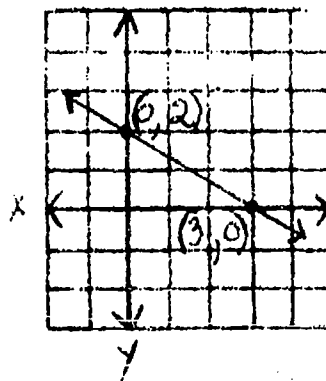
21. What is the y-intercept of the graph of the line whose equation is $2x + 7y + 14 = 0$?

22. Graph the line whose equation is $x = -3$ in the given system.

23. Graph the line whose equation is $y = 4$ on the given Cartesian System.

24. COMPLETION: _____ is the equation of the
    y-axis.

25. Which of the following are linear? Write the letter preceding the correct answer on the answer sheet.

    A. $y = 4x + 2$ D. $3x - 4y + 6 = 0$

    B. $y = 5x^2$ E.   None of these.

    C. $y = 6x^2 + 4x + 3$

26. What is the slope of the line given by the graph below?
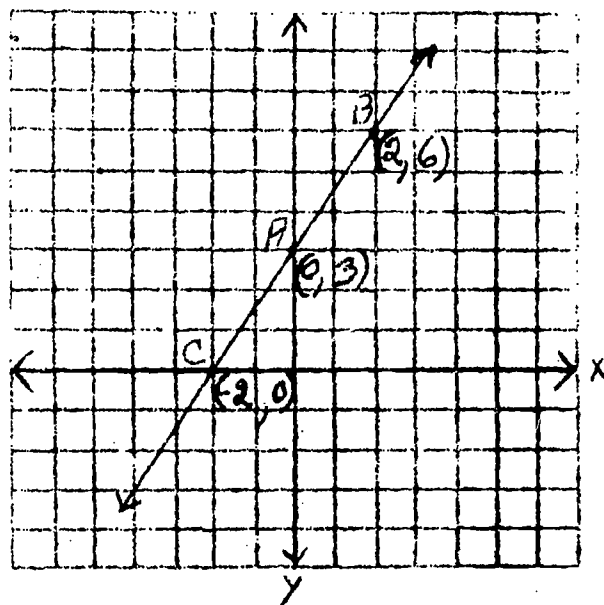
27. What is the slope of line $\overleftrightarrow{AB}$ if A has the coordinates $(3, -2)$ and B has the coordinates $(5, -7)$?

28. Which of the lines defined by the equations below have no slope defined for it? Write the letter of the correct answer on the answer sheet.

    A. $x = 6$ C. $3x - 7 + 5 = 0$

    B. $y = 5$ D.   All of the above have
                                       slopes defined.

DIRECTIONS: Do not write on this test booklet. Do all scratch work on the
paper provided for this purpose. Place your answers on the answer sheet. Do
not spend too much time on any one problem.

Fill in each numbered blank with the letter preceding the word from the
following list that makes each sentence correct.

A.   ordered pair   F.   abscissa

B.   quadrant   G.   variable

C.   coordinate axes   H.   point

D.   coordinates   I.   ordinate

E.   origin   J.   line

The major horizontal and vertical lines in a Cartesian Axis System are
called _____(1)_____ .   The point where they intersect is called the
_____(2)_____ of the system. Each point in the plane is located by
attaching two numbers to it called the _____(3)_____ of the point. These
two numbers are usually written so that the order is important. Hence, the
pair is called a(n) _____(4)_____ .   The first number of the pair is called
the _____(5)_____ of the point and the second number is called the
_____(6)_____ of the point. The plane is divided into four principal
regions by the major lines. Each of these regions is called a(n) ____(7)_____ .

8.   Write the letter of the correct answer on the answer sheet. The point
     A(8,-2) lies in quadrant:

     A.   I   D.   IV

     B.   II   E.   None

     C.   III

9.   Write the letter of the correct answer on the answer sheet. The point
     B(0,-5) lies in quadrant:

     A.   I   D.   IV

   B.   II   E.   None

     C.   III

10.   TRUE or FALSE: The point C(-3,0) lies on the x-axis.

11. TRUE or FALSE: The point $I(0, 0)$ lies in the x-axis.

12. TRUE or FALSE: The point $P(-3, a)$ lies in quadrant II if $a < 0$.

13. COMPLETION: Consider the expression $x_3{}^2$. The number _____ is the subscript.

Solve each of the equations in numbers 14 through 16 for y in terms of x.

14. $3y = 2x + 1$

15. $3x - 3y + 1 = 0$

16. $10x + 3y - 4 = 0$

17. Consider the equation $5x - 3y + 2 = 0$. If $x = 5$, then $y =$ _____.

18. Graph the following points and label them properly. Use the Cartesian System given on your answer sheet. <u>All</u> must be plotted properly.

A. $A(-5, 1)$ C. $C(0, -3)$

B. $B(3, 0)$ D. $D(-1, -2)$

19. Using the Cartesian System given on your answer sheet, graph the equation $2x - y - 1 = 0$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the y-intercept of the line?
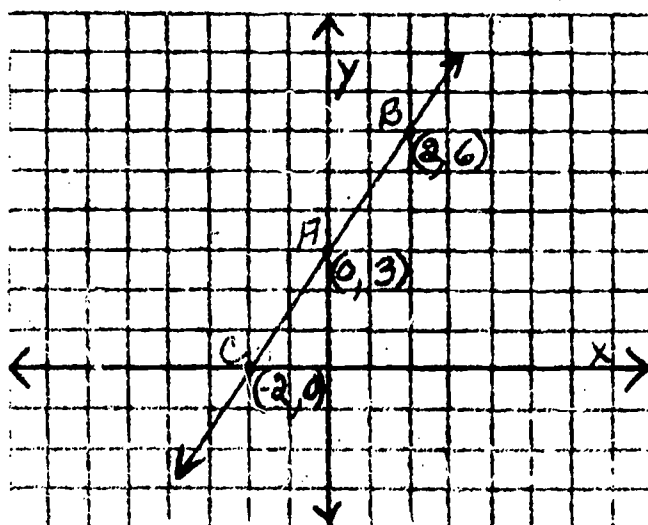
21. What is the y-intercept of the graph of the line whose equation is $2x - 3y + 5 = 0$?

B-119

22. Graph the line whose equation is y = -3 in the given system.

23. Graph the line whose equation is x = 3 on the given Cartesian System.

24. COMPLETION: _____ is the equation of the
    y-axis.

25. Which one or ones of the following equations is (are) linear? Write
    the letter preceding the correct answer(s) on the answer sheet.

    A. $y = 2x + 1$ C. $2x - 3y + 4 = 0$

    B. $y = 5x^2 - 4x + 3$ D. $y = 6x^2$

26. What is the slope of the line given by the graph below?
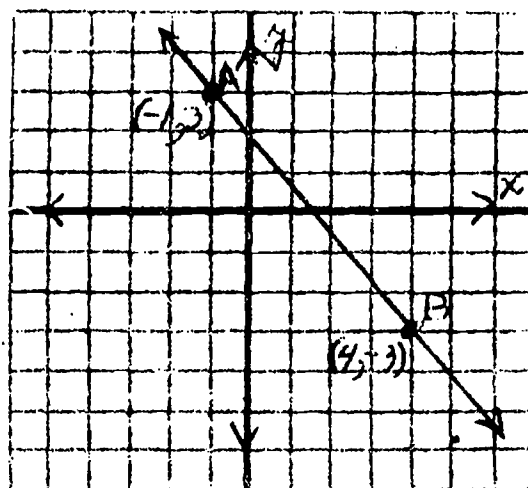
27. What is the slope of the line $\overline{AB}$ if A has the coordinates (-4, -2) and
    B(5, 8) ?

28. Which of lines defined by the equations below has no slope defined for
    it? Write the letter of the correct answer on your answer sheet.

    A. $y = 2$ C. $x = 4$

    B. $2x - 3y + 5 = 0$ D. All of the above have
                                          slopes.

DIRECTIONS: Do <u>not</u> write on this test booklet. Do all scratch work on the paper provided for this purpose. Place your answers on the answer sheet. Do not spend too much time on any one problem.

Fill in each numbered blank with the <u>letter</u> preceding the word from the following list that makes each sentence correct.

A.	origin	F.	point
B.	coordinate axes	G.	quadrant
C.	variable	H.	ordinate
D.	ordered pair	I.	line
E.	abscissa	J.	coordinates

The major horizontal and vertical lines in a Cartesian Axis System are called _____(1)_____ . The point where they intersect is called the _____(2)_____ of the system. Each point in the plane is located by attaching two numbers to it called the _____(3)_____ of the point. These two numbers are usually written so that the order is important. Hence, the pair is called a(n) _____(4)_____ . The first number of the pair is called the _____(5)_____ of the point, and the second number is called the _____(6)_____ of the point. The plane is divided into four principal regions by the major lines. Each of these regions is called a(n) _____(7)_____ .

8.   Write the letter of the correct answer on the answer sheet. The point B(3, 0) lies in quadrant:

     A.   I   D.   IV

     B.   II   E.   None

     C.   III

9.   Write the letter of the correct answer on the answer sheet. The point A(-3, -5) lies in quadrant:

     A.   I   D.   IV

     B.   II   E.   None

     C.   III

10. TRUE or FALSE: The point $C(0, 3)$ lies on the x-axis.

11. TRUE or FALSE: The point $A(0, 0)$ lies on the y-axis.

12. TRUE or FALSE: The point $P(5, a)$ lies in quadrant II if $a < 0$.

13. COMPLETION: Consider the expression x_4^7. The number _____ is the subscript.

In Problems 14-16, solve each of the equations for y in terms of x.

14. $5y = 6x - 1$

15. $3x - 2y + 5 = 0$

16. $9x + 4y - 9 = 0$

17. Consider the equation $7x - 2y + 5 = 0$. If $x = 3$, then $y =$ _____.

18. Graph the following points and label them properly. Use the Cartesian System given on your answer sheet. All must be plotted properly.

   A. $A(-6, -5)$ C. $C(0, 2)$

   B. $B(-3, 4)$ D. $D(-5, 0)$

19. Using the Cartesian System given on your answer sheet, graph the equation $x + 2y = 3$. Use the chart method. Complete the chart that appears on your answer sheet.

20. Examine the graph given below. What is the y-intercept of the line?
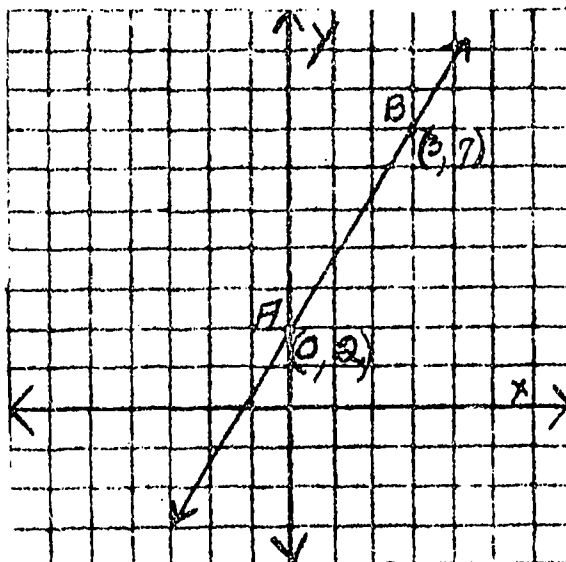
21. What is the y-intercept of the graph of the line whose equation is
$7x - 5y + 4 = 0$?

22. Graph the line whose equation is $y = -3$ on the given Cartesian System.

23. Graph the line whose equation is $x = 2$ on the given Cartesian System.

24. TRUE or FALSE: $x = 0$ is the equation of the y-axis.

25. Which one or ones of the following equations is (are) linear? Write the letter of the correct answer(s) on the answer sheet.

A. $y = 4x + 2$ C. $2y + 3x = 1$

B. $y = 3x^2 - 1$ D. None of these.

26. What is the slope of the line given by the graph below?
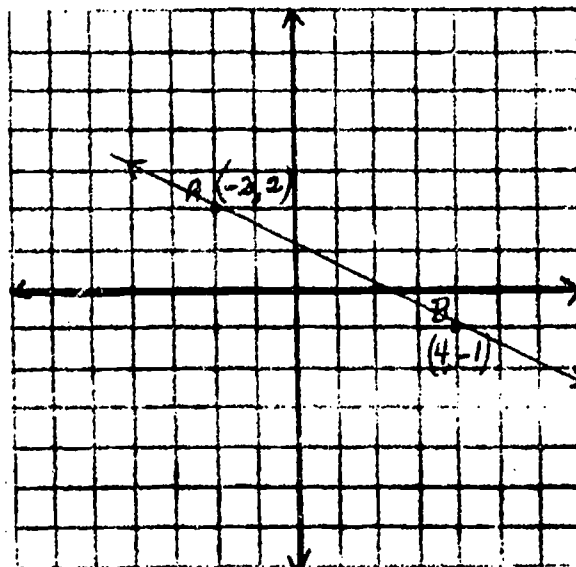
27. What is the slope of the line $\overleftrightarrow{AB}$ if A has the coordinates A(4, -2) and B has the coordinates (6, 8) ?

28. Which of the lines defined by the equations below have no slope defined for it? Write the letter(s) of the correct answer(s) on your answer sheet.

A. $y = 5$ C. $x = -2$

B. $3x + 2y = 7$ D. All of the above have slopes.

B-123

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

16. _____

17. _____

18.

19.

x		-3	-1	+3
y				

B-124

20. _____

21. _____

22.

23.
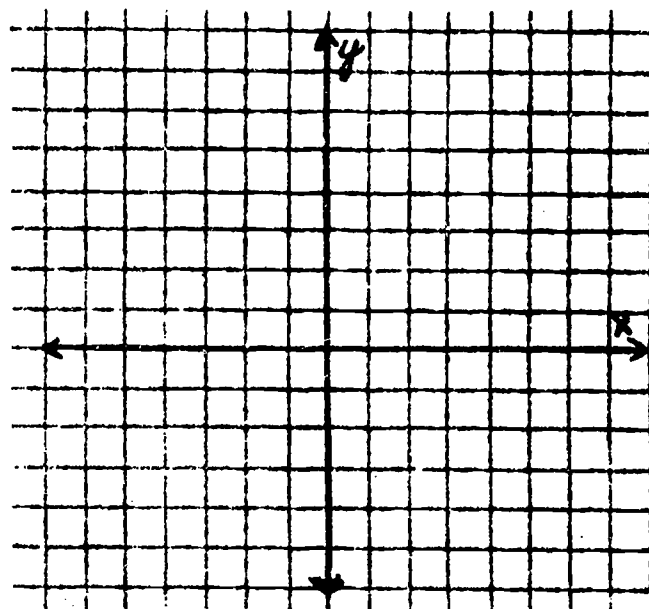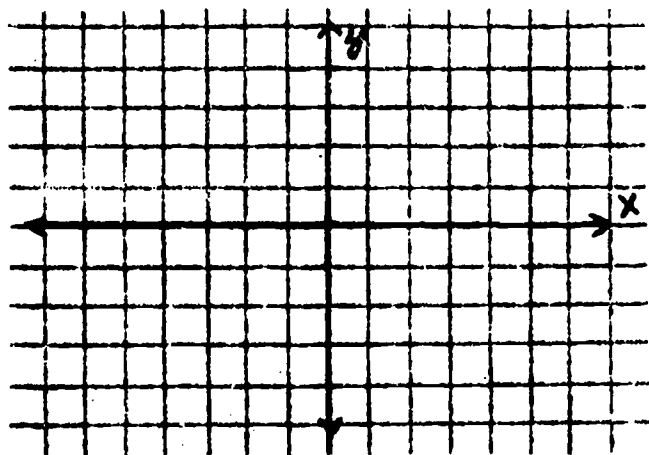
24. _____

25. _____

26. _____

27. _____

28. _____

DIRECTIONS: Place all answers on the answer sheet provided to you. Do
not write on this test booklet. Do all scratch work on the paper provided for
this purpose. Do not spend too much time on any one problem.

1.   COMPLETION: If a line runs downhill from left to right, its slope
                    is _____ (negative, positive).

2.   Plot the line determined by the points C(-3, 2) and D(2, 0) on the given
     system.

3.   What is the slope of the line whose equation is $y = 3x - 1$?

4.   What is the slope of the line whose equation is $3x + 2y - 6 = 0$?

5.   Plot the line through the point A(2, -1) with slope $m = \frac{2}{3}$ on the given
     system.

6.   Plot the line whose y-intercept is -2 and whose slope is -1 on the
     given system.

7.   Plot the line whose equation is $y = 3x - 2$ on the given system.

8.   Plot the line whose equation is $2x - 3y + 6 = 0$ on the given system.

9.   A line has a slope of -2 and a y-intercept of +1. Write its equation.

10. A line has a slope of +3 and goes through A(2, 1). Write its equation.

11. A line is determined by the two points A(-3, 2) and B(2, -3). Write
     its equation.

12. Graph the inequality $x \geq 2$ on the given system.

13. Graph the inequality $y \leq 1$ on the given system.

14. Graph the inequality $x - y < 1$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same given
     set of axes and determine the common solution, if one exists.

         $5x - y - 9 = 0$

         $x + y - 3 = 0$

B-126

17. Consider the system of equations:

$$y = -2x + 1 \quad \text{and} \quad 5x + 3y = 5$$

Find the common solution to the system, if one exists.

18. Find the common solution to the following system of equations, if one exists.

$$2x - 5y = 4$$

$$3x + 4y = -17$$

19. EVALUATE: $\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -2 & 3 \\ -1 & 5 \end{vmatrix}$

21. Consider the system:
$$5x - 2y + 3 = 0$$
$$2x - 7y + 9 = 0$$

The expression:
$$\frac{\begin{vmatrix} 5 & -3 \\ 2 & -9 \end{vmatrix}}{\begin{vmatrix} 5 & -2 \\ 2 & -7 \end{vmatrix}}$$

gives the_____(x or y) value of the common solution.

DIRECTIONS: Place all answers on the answer sheet provided to you. Do **not** write on this test booklet. Do all scratchwork on the paper provided for this purpose. Do not spend too much time on any one problem.

1.   COMPLETION: If a line runs uphill from left to right, its slope is _____ (positive, negative).

2.   Plot the line determined by the points C(-3, 1) and D(3, 0) on the given system.

3.   What is the slope of the line whose equation is $y = 5x - 1$?

4.   What is the slope of the line whose equation is $4x + 3y - 6 = 0$?

5.   Plot the line through the point A(3, -1) with slope $m = \frac{3}{4}$ on the given system.

6.   Plot the line whose y-intercept is -3 and whose slope is -1.

7.   Plot the line whose equation is $y = 2x - 3$.

8.   Plot the line whose equation is $2x - 3y + 6 = 0$.

9.   A line has a slope of -2 and a y-intercept of 2. Write its equation.

10.   A line has a slope of 3 and goes through the point C(3, 1). Write its equation.

11.   A line is determined by the two points A(-3, 2) and B(2, -3). Write its equation.

12.   Graph the inequality $x \geq 3$ on the given system.

13.   Graph the inequality $y \leq -1$ on the given system.

14.   Graph the inequality $x - y < 1$ on the given system.

15.   Graph $y = x^2$ on the given system.

16.   Plot both of the lines whose equations are given below on the same given set of axes and determine the common solution if one exists.

        $5x - y - 9 = 0$

        $2x + y - 5 = 0$

17. Consider the system of equations $y = -2x + 7$ and $2x + 3y = 13$.
    Find the common solution if one exists.

18. Find the common solution to the following system if one exists.

    $2x - 5y = 4$

    $3x + 4y = -17$

19. EVALUATE: $\begin{vmatrix} 7 & 4 \\ 2 & 8 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -3 & 3 \\ -1 & 4 \end{vmatrix}$

21. Consider the system: $7x + 2y + 3 = 0$

                                  $2x + 7y + 9 = 0$

    The expression: $\dfrac{\begin{vmatrix} 7 & -3 \\ 2 & -9 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 7 \end{vmatrix}}$

    gives the _____ (x or y) value of the common solution.

DIRECTIONS: Place all answers on the answer sheet provided to you. Do
not write on this test booklet. Do all scratch work on the paper provided for
this purpose. Do not spend too much time on any one problem.

1.   COMPLETION: If a line runs downhill from left to right, its slope is
     _____ (negative, positive).

2.   Plot the line determined by the points C(-1, 3) and D(2, -2) on the given
     system.

3.   What is the slope of the line whose equation is $y = -2x + 5$?

4.   What is the slope of the line whose equation is $5x + 3y + 9 = 0$?

5.   Plot the line through the point B(-2, 3) with a slope of $\frac{1}{3}$ on the
     given system.

6.   Plot the line whose y-intercept is 2 and whose slope is -2 on the given
     system.

7.   Plot the line whose equation is $y = 2x + 4$ on the given system.

8.   Plot the line whose equation is $3x - 4y + 8 = 0$ on the given system.

9.   A line has a slope of 4 and a y-intercept of -3. Write its equation.

10. A line has a slope of -2 and goes through C(1, 3). Write its equation.

11. A line is determined by the two points C(0, -2) and D(3, 4). Write its
     equation.

12. Graph the inequality $y < -1$ on the given system.

13. Graph the inequality $x \geq 3$ on the given system.

14. Graph the inequality $2x - y \geq 2$ on the given system.

15. Graph $y = x^2$ on the given system.

16. Plot both of the lines whose equations are given below on the same given
     set of axes and determine the common solution, if one exists.

          $2x + y - 1 = 0$

          $x + y - 3 = 0$

B-130

17. Consider the system of equations: $2x - 3y = 1$ and
                                          $4y = 3x - 7$

    Find the common solution to the system, if one exists.

18. Find the common solution to the following system of equations, if one exists.

    $3x + 2y = 5$ and

    $x - y = 5$

19. EVALUATE: $\begin{vmatrix} 4 & -2 \\ 0 & 3 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -6 & -1 \\ 4 & 3 \end{vmatrix}$

21. Consider the system: $2x + y - 1 = 0$ and
                            $5x + 3y - 5 = 0$

    The expression: $$\dfrac{\begin{vmatrix} 1 & 1 \\ 5 & 3 \end{vmatrix}}{\begin{vmatrix} 2 & 1 \\ 5 & 3 \end{vmatrix}}$$

    gives the _____ (x or y) value of the common solution.

DIRECTIONS: Do not write on this test booklet. Do all scratch work on
the paper provided for this purpose. Place your answers on the answer
sheet. Do not spend too much time on any one problem.

1.   COMPLETION: If a line runs uphill from left to right, its slope is
                              _____ (positive, negative).

2.   Plot the line determined by the points C(-3, 4) and D(4, 0) on the given
      system.

3.   What is the slope of the line whose equation is $y = 7x - 1$?

4.   What is the slope of the line whose equation is $3x + 5y - 8 = 0$?

5.   Plot the line through the point A(3, -1) with slope $m = \frac{4}{3}$ on the given
      system.

6.   Plot the line whose y-intercept is -2 and whose slope is -2.

7.   Plot the line whose equation is $y = 4x - 2$.

8.   Plot the line whose equation is $4x - 3y + 9 = 0$.

9.   A line has slope $m = -3$ and y-intercept, -5. Write its equation.

10.   A line has slope $m = 5$ and contains the point A(4, 1). Write its equation.

11.   A line is determined by the two points A(-5, 2) and B(-2, 0).
      Write its equation.

12.   Graph the inequality $x \geq 1$ on the given system.

13.   Graph the inequality $y \leq 3$ on the given system.

14.   Graph the inequality $x - y < 3$ on the given system.

15.   Graph $y = x^2$ on the given system.

16.   Plot both of the lines whose equations are given below on the same set
      of axes and determine the common solution if one exists.

            $2x + y - 5 = 0$

            $5x - y - 2 = 0$

B-132

17. Consider the system of equations $y = -2x + 9$ and $2x + 3y = 19$. Find the common solution if one exists.

18. Find the common solution to the following system if one exists.

    $2x - 5y = 6$

    $3x - 4y = 9$

19. EVALUATE: $\begin{vmatrix} 7 & 8 \\ 3 & 5 \end{vmatrix}$

20. EVALUATE: $\begin{vmatrix} -4 & 4 \\ 2 & -3 \end{vmatrix}$

21. Consider the system: $7x + 2y + 3 = 0$

                                   $2x + 7y + 9 = 0$

    The expression $\dfrac{\begin{vmatrix} -3 & 2 \\ -9 & 7 \end{vmatrix}}{\begin{vmatrix} 7 & 2 \\ 2 & 7 \end{vmatrix}}$

    gives the _____ (x or y) value of the common solution.

B-133

NAME _____   SECTION _____

TEACHER _____   DATE _____

SCORE _____   PERIOD _____

1. _____

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10. _____

11. _____

12.

15.

16.
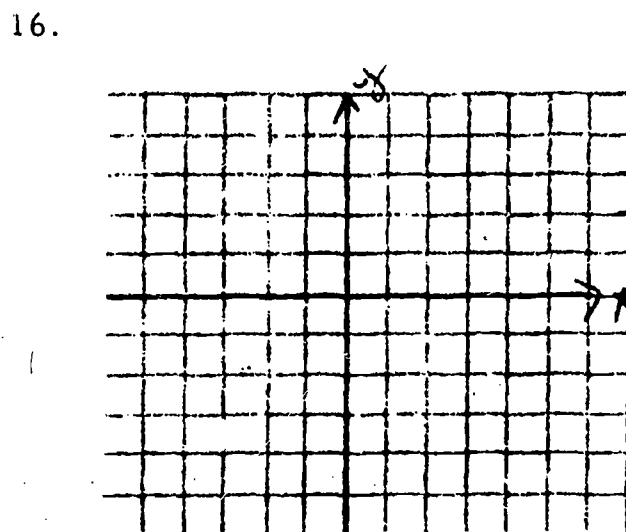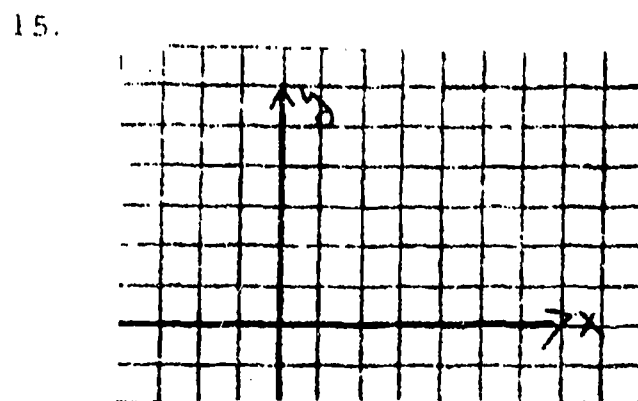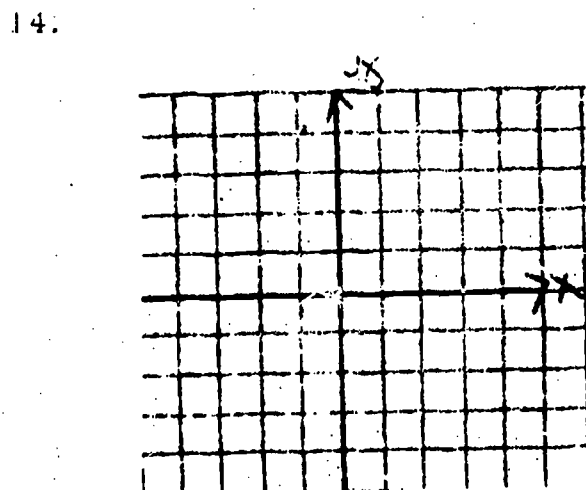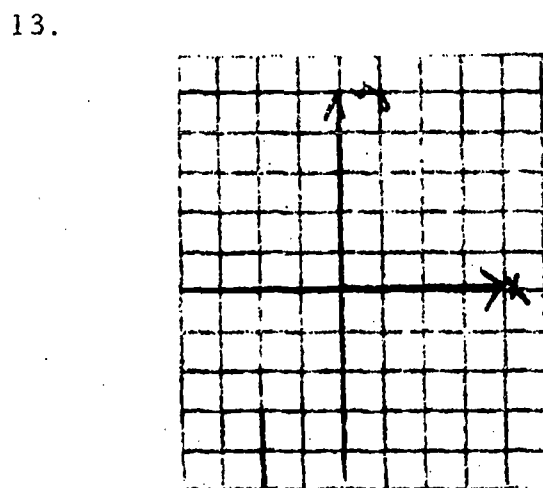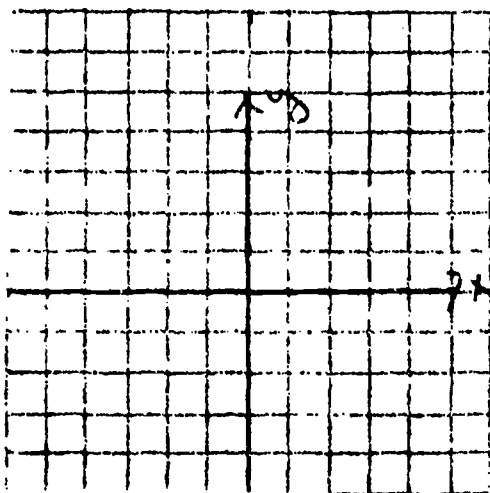
```
_____ COMMON
                 SOLUTION
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17. _____

18. _____

19. _____

20. _____

21. _____

DIRECTIONS: Do not write on this test booklet.   Place all answers on the
answer sheet provided to you.   Do not spend too much time on any one
problem.

1. Which of the following are not rational numbers?   Write the letter(s) of
   the correct answer(s) on the answer sheet.

   A.   3   F. $.\overline{63}$

   B. $\frac{2}{5}$ G. $\sqrt{13}$

   C. $-\frac{3}{7}$ H. $\sqrt{.8}$

   D. $\sqrt{9}$ I. $\sqrt{27}$

   E. $.76$

2. Arrange the following numbers in ascending order.

   $\frac{3}{5}$ $\frac{4}{7}$

3. Find a number between $\frac{1}{8}$ and $\frac{1}{9}$ by the average method.

4. Which of the following numbers are periodic?

   A.   1.414   C. $.666667$

   B. $1.833333\overline{3}$ D. $.7575...$

5. Express as a fraction in lowest terms $.\overline{47}$.

6. TRUE or FALSE: All rational numbers are also whole numbers.

7. COMPLETION: A rational number is the _____ of
                     two integers.

8. COMPLETION: .45 written as a rational number in simplest
                     form is _____.

9. Write the letter of the correct answer on the answer sheet.   If a and b
   are real numbers, then exactly one of the following is true: a > b,
   a < b, or a = b.   This is a statement of the:

   A.   Trichotomy Principle   C.   Reflexive Property

   B.   Density Property   D.   Distributive Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{97}$ names a number which when squared gives _____.

12. COMPLETION: In $\sqrt[7]{5}$, 7 is called the _____.

13. Which of the following do NOT name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

   A. $\sqrt{16}$ C. $\sqrt{5}$

   B. $\sqrt{-1}$

Simplify Problems 14-33.

14. $(\sqrt{5})^2$

15. $(\sqrt{7d})^2$, where $d \geq 0$.

16. $(\sqrt{3})(\sqrt{7})$

17. $(5\sqrt{31})(7\sqrt{2})$

18. $\dfrac{\sqrt{6}}{\sqrt{2}}$

19. $\sqrt{100z^2}$

20. $\dfrac{1}{3}\sqrt{27}$

21. $\sqrt{49x^2y^2}$

22. $\sqrt{20}$

23. $5\sqrt{96}$

24. $\sqrt{\dfrac{5}{9}}$

25. $\sqrt{\dfrac{2}{7}}$

26. $\dfrac{2}{\sqrt{7}}$

27. $\sqrt{A}\ \sqrt{8A}$

28. $(5\sqrt{B})^2$

29. $\sqrt{7a^2}$

30. $\sqrt{\dfrac{6a}{7}}$

31. $\sqrt{(7ab)^2}$

32. $\sqrt{\dfrac{3x^2}{2}}$

33. $\dfrac{\sqrt{x}}{\sqrt{y}}$

DIRECTIONS: Do not write on this test booklet. Place all answers on the
answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are rational numbers? Write the letter(s) of the
    correct answer(s) on the answer sheet.

    A.   3   F. $\sqrt{13}$

    B. $\frac{2}{5}$ G. $\sqrt{8}$

                                         H. $\sqrt{27}$

    C. $-\frac{3}{7}$ I.   .76

    D. $\sqrt{9}$

    E. $.6\overline{3}$

2. Arrange the following numbers in ascending order. $\frac{3}{7}$, $\frac{4}{9}$

3. Find a number between $\frac{1}{7}$ and $\frac{1}{6}$ by the average method.

4. Which of the following numbers are periodic? Write the letter(s) of the
    correct answer(s) on the answer sheet.

    A.   .77773   C.   6.363

    B.   .626262...   D. $1.67\overline{77}$

5. Express as a fraction in lowest terms $.\overline{7}$.

6. COMPLETION: A rational number is the _____ of two
                   integers.

7. COMPLETION: .67 written as a rational number in simplest form
                   is _____ .

8. TRUE or FALSE: All whole numbers are rational numbers.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: a > b, a < b, or a = b. This is a statement of the:

  A. Density Property   C. Distributive Property

  B. Reflexive Property   D. Trichotomy Principle

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{57}$ names a number which when squared gives _____ .

12. COMPLETION: In $\sqrt[7]{5}$, the index is _____ .

13. Which of the following do <u>not</u> name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

  A. $\sqrt{-1}$ C. $\sqrt{7}$

  B. $\sqrt{25}$

Simplify Problems 14-33.

14. $(\sqrt{7})^2$

15. $(\sqrt{6d})^2$, where $d \geq 0$

16. $(\sqrt{5})(\sqrt{7})$

17. $(3\sqrt{21})(2\sqrt{2})$

18. $\dfrac{\sqrt{10}}{\sqrt{2}}$

19. $\sqrt{144a^2}$

20. $\dfrac{1}{5}\sqrt{75}$

21. $\sqrt{64a^2x^2}$

22. $\sqrt{18}$

B-140

23. $4\sqrt{48}$

24. $\sqrt{\dfrac{7}{25}}$

25. $\sqrt{\dfrac{3}{5}}$

26. $\dfrac{3}{\sqrt{5}}$

27. $(\sqrt{B})(\sqrt{8B})$

28. $(3\sqrt{y})^2$

29. $\sqrt{5b^2}$

30. $\sqrt{\dfrac{5a}{3}}$

31. $\sqrt{(5xy)^2}$

32. $\sqrt{\dfrac{7a^2}{3}}$

33. $\dfrac{\sqrt{y}}{\sqrt{x}}$

DIRECTIONS: Do **not** write on this test booklet.   Place all answers on the
answer sheet provided to you.   Do not spend too much time on any one problem.

1.   Which of the following are not rational numbers?   Write the letter(s)
     of the correct answer(s) on the answer sheet.

     A.   4   F. $\sqrt{7}$

     B. $\frac{3}{7}$ G. $\sqrt{27}$

     C. $-\frac{5}{9}$ H. $\sqrt{5}$

     D. $\sqrt{49}$ I.   .62

     E. $.\overline{74}$

2.   Arrange the following numbers in ascending order. $\frac{2}{7}$, $\frac{3}{8}$

3.   Find a number between $\frac{1}{5}$ and $\frac{1}{4}$ by the average method.

4.   Which of the following numbers are not periodic?   Write the letter(s)
     of t' correct answer(s) on the answer sheet.

     A.   .7773   C.   6.363

     B.   .626262...   D. $1.6\overline{777}$

5.   Express as a fraction in lowest terms $.\overline{45}$.

6.   COMPLETION: .65 written as a rational number in simplest form
                    is _____.

7.   COMPLETION: A rational number is the _____ of two
                    integers.

8.   TRUE or FALSE: All rational numbers are also whole numbers.

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: $a > b$, $a < b$ or $a = b$. This is a statement of the:

A. Distributive Property C. Reflexive Property

B. Trichotomy Principle D. Density Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: $\sqrt{73}$ names a number which when squared gives _____.

12. COMPLETION: In $\sqrt[5]{8}$, the radicand is _____.

13. Which of the following do not name a real number? Write the letter(s) of the correct answer(s) on the answer sheet.

A. $\sqrt{36}$ C. $\sqrt{-1}$

B. $\sqrt{2}$ D. All of the above are real numbers.

Simplify Problems 14-33.

14. $(\sqrt{3})^2$

15. $(\sqrt{7x})^2$, where $x \geq 0$

16. $(\sqrt{3})(\sqrt{5})$

17. $(4\sqrt{15})(2\sqrt{2})$

18. $\dfrac{\sqrt{20}}{\sqrt{4}}$

19. $\sqrt{81a^2}$

20. $\dfrac{1}{4}\sqrt{48}$

21. $\sqrt{49y^2x^2}$

22. $\sqrt{12}$

B-143

23. $3\sqrt{24}$

24. $\sqrt{\dfrac{13}{36}}$

25. $\sqrt{\dfrac{2}{3}}$

26. $\dfrac{2}{\sqrt{3}}$

27. $(\sqrt{c})(\sqrt{12c})$

28. $(4\sqrt{y})^2$

29. $\sqrt{11a^2}$

30. $\sqrt{\dfrac{7a}{2}}$

31. $\sqrt{(7ab)^2}$

32. $\sqrt{\dfrac{5a^2}{3}}$

33. $\dfrac{\sqrt{a}}{\sqrt{b}}$

B-144

DIRECTIONS: Do <u>not</u> write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1. Which of the following are rational numbers? Write the letter(s) of the correct answer(s) on the answer sheet.

  A. 4   F. $\sqrt{7}$

  B. $\frac{3}{7}$ G. $\sqrt{27}$

  C. $-\frac{5}{9}$ H. $\sqrt{5}$

  D. $\sqrt{49}$ I. .62

  E. $.\overline{74}$

2. Arrange the following numbers in ascending order. $\frac{3}{5}$, $\frac{2}{3}$

3. Find a number between $\frac{1}{6}$ and $\frac{1}{7}$ by the average method.

4. Which of the following numbers are periodic? Write the letter(s) of the correct answer(s) on the answer sheet.

  A. .773   C. $1.33\overline{3}$

  B. .727272...   D. 7.272

5. Express as a fraction in lowest terms $.\overline{5}$.

6. COMPLETION: .37 written as a rational number in simplest form is _____.

7. COMPLETION: A rational number is the _____ of two integers.

8. TRUE or FALSE: All whole numbers are also rational numbers.

B-145

9. Write the letter of the correct answer on the answer sheet. If a and b are real numbers, then exactly one of the following is true: a > b, a < b or a = b. This is a statement of the:

A. Density Property   C. Trichotomy Principle

B. Distributive Property   D. Reflexive Property

10. TRUE or FALSE: Every rational number can be written as a finite decimal.

11. COMPLETION: In $\sqrt[4]{19}$, 19 is the _____.

12. COMPLETION: $\sqrt{52}$ names a number which when squared gives _____.

13. Which of the following does not name a real number? Write the letter(s) of this correct answer(s) on the answer sheet.

A. $\sqrt{-3}$ C. $\sqrt{5}$

B. $\sqrt{49}$ D. All of the above are real numbers.

Simplify Problems 14-33.

14. $(\sqrt{5})^2$

15. $(\sqrt{3a})^2$, where a $\geq$ 0

16. $(\sqrt{2})(\sqrt{5})$

17. $(3\sqrt{7})(7\sqrt{3})$

18. $\dfrac{\sqrt{14}}{\sqrt{7}}$

19. $\sqrt{64a^2}$

20. $\dfrac{1}{2}\sqrt{12}$

21. $\sqrt{81a^2b^2}$

22. $\sqrt{45}$

23. $4\sqrt{90}$

24. $\sqrt{\dfrac{3}{7}}$

25. $\dfrac{3}{\sqrt{7}}$

26. $\sqrt{\dfrac{17}{81}}$

27. $(\sqrt{B})(\sqrt{45B})$

28. $(3\sqrt{a})^2$

29. $\sqrt{13a^2}$

30. $\sqrt{\dfrac{3a}{11}}$

31. $\sqrt{(11ab)^2}$

32. $\sqrt{\dfrac{7a^2}{13}}$

33. $\dfrac{\sqrt{b}}{\sqrt{a}}$

UNIT X   The Real Numbers   PART I
                                                              Test A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

   1. _____   18. _____

   2. _____   19. _____

   3. _____   20. _____

   4. _____   21. _____

   5. _____   22. _____

   6. _____   23. _____

   7. _____   24. _____

   8. _____   25. _____

   9. _____   26. _____

  10. _____   27. _____

  11. _____   28. _____

  12. _____   29. _____

  13. _____   30. _____

  14. _____   31. _____

  15. _____   32. _____

  16. _____   33. _____

  17. _____

DIRECTIONS: Do <u>not</u> write on the test booklet.   Place all answers on the
paper provided.   Do not spend too much time on any one problem.

1.   Write the letter(s) of the correct answer(s) on the answer sheet.
      Which of the following terms are similar?

      A. $\sqrt{3}$ D. $7\sqrt{2}$

      B. $\sqrt{2}$ E. $2\sqrt{7}$

      C. $\sqrt[3]{3}$

Simplify Problems 2-8.

2. $4\sqrt{2} + 3\sqrt{2}$

3. $\sqrt{22} + 3\sqrt{11} - 8\sqrt{11}$

4. $5\sqrt{3} + 6\sqrt{3} - 2\sqrt{5}$

5. $5\sqrt{2} + 3\sqrt{8}$

6. $2\sqrt{12} - \sqrt{27}$

7. $(\sqrt{3} + \sqrt{5})(\sqrt{3} - \sqrt{5})$

8. $(1 - \sqrt{3})(2 - 3\sqrt{3})$

9.   Write the conjugate of $3 - \sqrt{13}$.

10.   Write the conjugate of $\sqrt{7} + \sqrt{5}$

11.   Simplify by rationalizing the denominator. $\dfrac{5}{1 + \sqrt{2}}$

12.   Simplify by rationalizing the denominator. $\dfrac{6}{\sqrt{3} + \sqrt{5}}$

B-149

Simplify Problems 13-19.

13. $(-2\sqrt{a})(6\sqrt{ab})$

14. $\sqrt{15a^2b}$

15. $\frac{1}{2}\sqrt{8a} \cdot \sqrt{12a}$

16. $\sqrt{\dfrac{5a^2}{3}}$

17. $\sqrt{\dfrac{7}{2a}}$

18. $\sqrt{\dfrac{9y^2}{3x}}$

19. $\dfrac{\sqrt{8x}}{\sqrt{2z}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{x} = 5$

21. $\sqrt{x} + 5 = 3$

22. $\sqrt{x} + 7 = 4$

B-150

DIRECTIONS: Do not write on the test booklet.   Place all answers on the
paper provided.   Do not spend too much time on any one problem.

1. On the answer sheet, write the letter(s) of the correct answer(s).
   Which of the following terms are similar?

   A. $\sqrt{5}$ D. $7\sqrt{5}$

   B. $\sqrt[3]{2}$ E. $5\sqrt{7}$

   C. $2\sqrt{3}$

Simplify Problems 2-8.

2. $7\sqrt{5} - 3\sqrt{5}$

3. $\sqrt{3} - 6\sqrt{3} + 2\sqrt{3}$

4. $4\sqrt{7} + 3\sqrt{7} + 10\sqrt{2}$

5. $12\sqrt{2} - 2\sqrt{18}$

6. $3\sqrt{50} + 7\sqrt{8}$

7. $(\sqrt{2} - \sqrt{7})(\sqrt{2} + \sqrt{7})$

8. $(2 - \sqrt{2})(3 - 3\sqrt{2})$

9. Write the conjugate of $9 + \sqrt{10}$.

10. Write the conjugate of $\sqrt{3} - \sqrt{5}$

11. Simplify by rationalizing the denominator. $\dfrac{6}{\sqrt{3} - 1}$

12. Simplify by rationalizing the denominator. $\dfrac{3}{\sqrt{2} - \sqrt{7}}$

Simplify Problems 13-19.

13. $(3\sqrt{c})(-5\sqrt{cd})$

14. $\sqrt{21m^2 n}$

15. $\frac{1}{3}\sqrt{18x} - \sqrt{2x}$

16. $\sqrt{\dfrac{7r^2}{2}}$

17. $\sqrt{\dfrac{5}{4t}}$

18. $\sqrt{\dfrac{8a^2}{4b}}$

19. $\dfrac{\sqrt{18g}}{\sqrt{2h}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{y} = 7$

21. $\sqrt{m} - 3 = 4$

22. $\sqrt{y} + 3 = 1$

DIRECTIONS: Do <u>not</u> write on the test booklet.   Place all answers on the paper provided.   Do not spend too much time on any one problem.

1.   On the answer sheet, write the letter(s) of the correct answer(s). Which of the following terms are similar?

A. $\sqrt{5}$ D. $7\sqrt{11}$

B. $\sqrt{3}$ E. $11\sqrt{7}$

C. $3\sqrt{5}$

Simplify Problems 2-8.

2. $5\sqrt{6} - 2\sqrt{6}$

3. $\sqrt{7} - 12\sqrt{7} + 9\sqrt{7}$

4. $3\sqrt{6} - 8\sqrt{2} + 5\sqrt{2}$

5. $6\sqrt{3} + 2\sqrt{27}$

6. $10\sqrt{20} + 3\sqrt{45}$

7. $(\sqrt{6} - \sqrt{2})(\sqrt{6} + \sqrt{2})$

8. $(3 + \sqrt{5})(4 + 2\sqrt{5})$

9.   Write the conjugate of $\sqrt{11} - 4$

10.   Write the conjugate of $\sqrt{2} + \sqrt{3}$

11.   Simplify by rationalizing the denominator. $\dfrac{2}{4 - \sqrt{2}}$

12.   Simplify by rationalizing the denominator $\dfrac{3}{\sqrt{2} - \sqrt{5}}$

Simplify Problems 13-19.

13. $(-4\sqrt{x})(3\sqrt{xy})$

14. $\sqrt{6m^2n}$

15. $\frac{1}{2}\sqrt{24r}\cdot\sqrt{2r}$

16. $\sqrt{\dfrac{7x^2}{2}}$

17. $\sqrt{\dfrac{5}{3m}}$

18. $\sqrt{\dfrac{16n^2}{8n}}$

19. $\dfrac{\sqrt{27y}}{\sqrt{3x}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{m} = 3$

21. $\sqrt{r} + 6 = 8$

22. $\sqrt{y} + 9 = 2$

DIRECTIONS:　　Do not write on the test booklet.　Place all answers on the paper provided.　Do not spend too much time on any one problem.

1.　On the answer sheet, write the letter(s) of the correct answer(s). Which of the following terms are similar?

　　A.　$\sqrt{11}$　　　　　　　　　　D.　$2\sqrt{3}$

　　B.　$\sqrt{7}$　　　　　　　　　　E.　$5\sqrt{3}$

　　C.　$3\sqrt{2}$

Simplify Problems 2-8.

2.　$8\sqrt{11} - 12\sqrt{11}$

3.　$4\sqrt{2} + 3\sqrt{2} - \sqrt{2}$

4.　$3\sqrt{7} - 7\sqrt{7} + 3\sqrt{3}$

5.　$12\sqrt{5} - 7\sqrt{20}$

6.　$10\sqrt{45} + 3\sqrt{125}$

7.　$(\sqrt{2} + \sqrt{7})(\sqrt{2} - \sqrt{7})$

8.　$(2\sqrt{5} - 3)(\sqrt{5} - 2)$

9.　Write the conjugate of $\sqrt{7} + 5$.

10.　Write the conjugate of $\sqrt{2} - \sqrt{11}$

11.　Simplify by rationalizing the denominator.　$\dfrac{2}{\sqrt{3} - 2}$

12.　Simplify by rationalizing the denominator.　$\dfrac{7}{\sqrt{11} - \sqrt{2}}$

B-155

Simplify Problems 13-19.

13. $(-4\sqrt{m})(3\sqrt{mn})$

14. $\sqrt{14xy^2}$

15. $\frac{1}{3}\sqrt{18a} \cdot \sqrt{3a}$

16. $\sqrt{\dfrac{7c^2}{3}}$

17. $\sqrt{\dfrac{5}{3x}}$

18. $\sqrt{\dfrac{25a}{5b^2}}$

19. $\dfrac{\sqrt{50a}}{\sqrt{2b}}$

Solve and check for extraneous roots in Problems 20-22.

20. $\sqrt{a} = 10$

21. $\sqrt{c} - 3 = 2$

22. $\sqrt{y} + 5 = 1$

UNIT X   The Real Numbers   PART II
                                                            Test A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   12. _____

2. _____   13. _____

3. _____   14. _____

4. _____   15. _____

5. _____   16. _____

6. _____   17. _____

7. _____   18. _____

8. _____   19. _____

9. _____   20. _____

10. _____   21. _____

11. _____   22. _____

B-157

233

DIRECTIONS: Do not write on this test booklet. Place all answers on the answer sheet provided to you. Do not spend too much time on any one problem.

1.   A _____ (relation, function) is a set of ordered pairs whose first coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	1	2	3	4
y	1	0	1	2

2.   What is the domain of this relation?

3.   What is the range of this relation?

4.   On the answer sheet, write the letter(s) of the following ordered pairs which are coordinates of points on the graph of this relation.

    A. $(0, 2)$ C. $(3, 2)$

    B. $(3, 1)$ D. $(2, 4)$

5.   Which one of the following is a formula for the relation? On your answer sheet write the letter of the correct answer.

    A. $y = |2 - x|$ C. $y = (x - 2)^2$

    B. $y = 2 - x$ D. $y = x - 2$

Questions 6-8 refer to the relation whose graph is shown below.
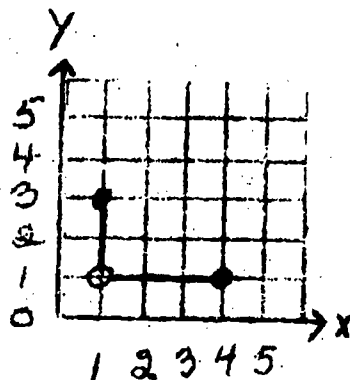
6. TRUE or FALSE: This relation is a function.

7. The domain of the relation is: (On your answer sheet write the letter of the correct answer.)

    A. {1}   C. {real numbers between 1 and 3 inclusive}

    B. {1, 4}   D. {real numbers between 1 and 4 inclusive}

8. The range of the relation is: (On your answer sheet write the letter of the correct answer.)

    A. {1}   C. {real numbers between 1 and 3 inclusive}

    B. {1, 3}   D. {real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: {(4, 9), (5, 8), (4, -6), (3, 8)} is a function?

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	{1, 3, 5}	?	$y = 2x - 3$
11.	?	{1, 3, 5}	$y = 2x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	2	4	8
y	6	12	24

13. Using the same roster as in number 12, what is the constant of proportionality?

14. If y varies directly as x, and y = 6 when x = 5, what is y when x = 6?

15. The elongation of a spring varies directly as the stretching force. If 10 pounds stretches a spring 8 inches, what force will stretch it 9 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, choose the appropriate answer in the right-hand column.

B-159

235

16. $\frac{a}{b}$ and $\frac{c}{d}$ A.   extremes

17. $\frac{a}{b} = \frac{c}{d}$ B.   means

18.   a and d   C.   proportion

19.   b and c   D.   ratios

20. The length of the shadow of an object varies directly as his height. If a 6 foot man casts a 4 foot shadow, how high is a building which casts a 120 foot shadow at the same hour?

21. Solve for X: $\dfrac{X + 1}{2X - 7} = \dfrac{2X + 7}{X - 1}$

Questions 22-24: For each statement in the left-hand column, write the letter of the correct formula in the right-hand column on your answer sheet.

22. y varies directly as $\frac{1}{x}$ A. $y = kx$

23. y varies inversely as x^2 B. $y = \dfrac{k}{x}$

24. xy varies directly as x^2 C. $y = \dfrac{k}{x^2}$

                                            D. $y = kx^2$

25. If y varies inversely as x and y = 6 when x = 7, what is y when x = 3?

26. TRUE or FALSE: The drawing below is the graph of a direct variation?
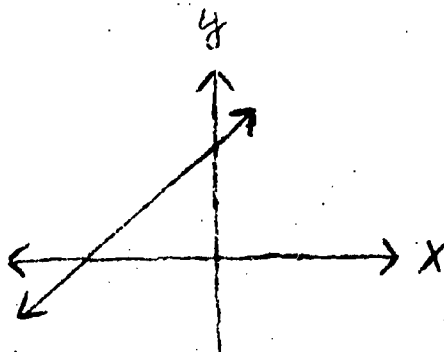
27.   If the table of values defines an inverse variation, then a = _____.

x	2	1	-3
y	4	3	a

DIRECTIONS: Do <u>not</u> write on this test booklet.   Place all answers on the answer sheet provided to you.   Do not spend too much time on any one problem.

1.   A function is a set of ordered pairs whose _____ (first, second) coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	1	2	3	4
y	1	0	1	4

2.   What is the domain of this relation?

3.   What is the range of this relation?

4.   Which of the following ordered pairs are coordinates of points on the graph of this relation?   Write the <u>letter(s)</u> of the correct answer(s) on your answer sheet.

A.   (2, 4)   C.   (3, 1)

B.   (3, 2)   D.   (0, 2)

5.   Which of the following is a formula for the relation?   Write the <u>letter</u> of the correct answer on your answer sheet.

A. $y = 2 - x$ C. $y = (2 - x)^2$

B. $y = 2 - x$ D. $y = x - 2$

Questions 6-8 refer to the relation whose graph is shown below.
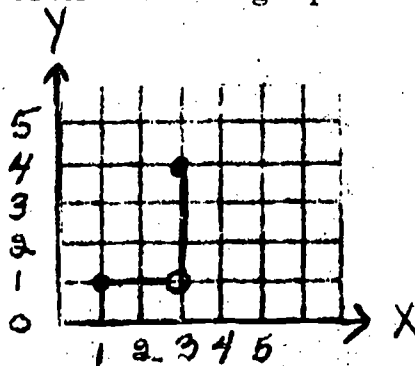
6. TRUE or FALSE: This relation is a function.

7. The domain of the relation is: (On your answer sheet write the _letter_ of the correct answer.)

    A. {1}   C. {real numbers between 1 and 3 including 1}

    B. {1,3}   D. {real numbers between 1 and 4 including 4}

8. The range of the relation is: (On your answer sheet write the _letter_ of of the correct answer.)

    A. {1}   C. {real numbers between 1 and 3 inclusive}

    B. {1,4}   D. {real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: {(4,9), (5,8), (3,6), (4,1)} is a function.

Give the missing information for each of the functions below.

Domain	Range	Formula
10. {1,3,5}	?	$y = 2x - 3$
11. ?	{1,3,5}	$y = 2x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x.

x	6	3	1
y	24	12	4

13. Using the same roster as in number 12, what is the constant of proportionality?

14. If y varies directly as x, and y = 6 when x = 7, what is y when x = 6?

15. The elongation of a spring varies directly as the stretching force. If 12 pounds stretches the spring 8 inches, what force will stretch it 9 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the _letter_ of the correct answer from the right-hand column of your answer sheet.

16. $\dfrac{a}{b}$ and $\dfrac{c}{d}$ A.   means

17. $\dfrac{a}{b}$ and $\dfrac{c}{d}$ B.   proportion

18. a and d   C.   ratios

19. b and c   D.   extremes

20. The length of the shadow of an object varies directly as his height. If a six foot man casts a 5 foot shadow, how high is a building which casts a 120 foot shadow at the same hour.

21. Solve for a: $\dfrac{a + 1}{2a - 7} = \dfrac{2a + 7}{a - 1}$

Questions 22-24: For each statement in the left hand column, write the <u>letter</u> of the correct formula in the right-hand column on your answer sheet.

22. y varies directly as x^2 A. $y = kx$

23. xy varies directly as x^2 B. $y = \dfrac{k}{x}$

24. y varies directly as $\dfrac{1}{x}$ C. $y = \dfrac{k}{x^2}$

                                            D. $y = kx^2$

25. If y varies inversely as x and y = 6 when x = 10, what is y when x = 3?

26. TRUE or FALSE: The drawing below is the graph of a direct variation.

27. If the table defines an inverse variation then a = _____.

x	3	$\frac{1}{2}$	-1

B-165

DIRECTIONS: Do not write on this test booklet.   Place all answers on the answer sheet provided to you.   Do not spend too much time on any one problem.

1.   A _____ (relation, function) is a set of ordered pairs whose first coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	0	1	2	3
y	2	1	0	1

2.   What is the domain of this relation?

3.   What is the range of this relation?

4.   Which of the following ordered pairs are coordinates of points on the graph of this relation?   Write the letter(s) of the correct answer(s) on your answer sheet.

    A.   (0, 2)   C.   (3, 2)

    B.   (3, 1)   D.   (2, 4)

5.   Which one of the following is a formula for the relation?   Write the letter of the correct answer on your answer sheet.

    A. $y = (x - 2)^2$ C. $y = 2 - x$

    B. $y = x - 2$ D. $y = |2 - x|$

Questions 6-8 refer to the relation whose graph is shown below.
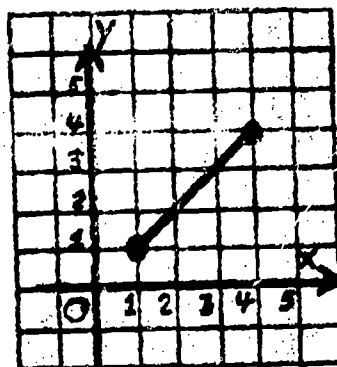
6. TRUE or FALSE: This relation is a function.

7. Write the letter of the correct answer on your answer sheet.
The domain of the relation is:

A.   {1}   C.   {real numbers between 1 and 4 inclusive}

B.   {1, 4}   D.   {real numbers between 1 and 3 inclusive}

8. Write the letter of the correct answer on your answer sheet.
The range of the relation is:

A.   {1}   C.   {real numbers between 1 and 3 inclusive}

B.   {1, 3}   D.   {real numbers between 1 and 4 inclusive}

9. TRUE or FALSE: The set $\{(4, 9)\ (5, 8)\ (4, -6)\ (5, 7)\}$ is a function.

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	{1, 3, 5}	?	$y = 3x - 2$
11.	?	{2, 5, 8}	$y = 3x - 1$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	2	6	10
y	1	3	5

13. Using the same roster as in Problem 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 5$, when $x = 4$, what is y where $x = 8$?

15. The elongation of a spring varies directly as a stretching force. If 5 pounds stretches a spring 4 inches, what force will stretch it 7 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the **letter** of the correct answer in the right-hand column on the answer sheet.

16. $\frac{a}{b}$ and $\frac{c}{d}$

A. proportion

17. $\frac{a}{b} = \frac{c}{d}$

B. ratios

18. a and d

C. means

19. b and c

D. extremes

20. The length of a shadow of an object varies directly as its height. If a 5 foot man casts a 3-1/2 foot shadow, how high is a building which casts a 120 foot shadow at the same hour?

21. Solve for y: $\frac{2y + 7}{y - 1} = \frac{y + 1}{2y - 7}$

In Problems 22-24, write the letter of the correct formula on your answer sheet.

22. y varies directly as $\frac{1}{x}$

A. $y = kx^2$

23. y varies inversely as x^2

B. $y = \frac{k}{x^2}$

24. xy varies directly as x^2

C. $y = \frac{k}{x}$

D. $y = kx$

25. If y varies inversely as y = 6 where x = 7, what is y when x = 2?

26. TRUE or FALSE: The drawing below is the graph of a direct variation.
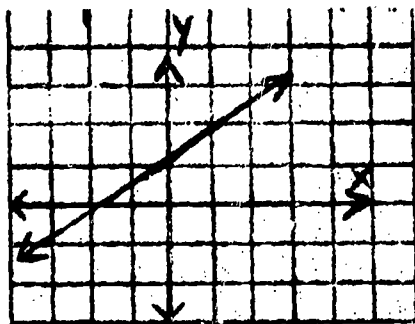
27. If the table of values defines an inverse variation, then a = _____.

x	2	1	a
y	4	8	-8

B-169

DIRECTIONS: Do not write on this test booklet. Place all answers on the paper provided. Do not spend too much time on any one problem.

1.   A function is a set of ordered pairs whose _____ (first, second) coordinates are all different.

Questions 2-5 refer to the relation whose table of values is given below.

x	-2	0	1	5
y	16	4	1	9

2.   What is the domain of this relation?

3.   What is the range of this relation?

4.   Which of the following ordered pairs are coordinates of points on the graph of this relation? Write the letter(s) of the correct answer(s) on your answer sheet.

A.   (5, 9)   C.   (1, 1)

B.   (4, 0)   D.   (0, 16)

5.   Which one of the following is a formula for the relation? Write the letter of the correct answer on your answer sheet.

A. $y = 2 - x$ C. $y = x - 2$

B. $y = (x - 2)^2$ D. $y = 2 - x$

Questions 6-8 refer to the relations whose graph is shown below.

B-170
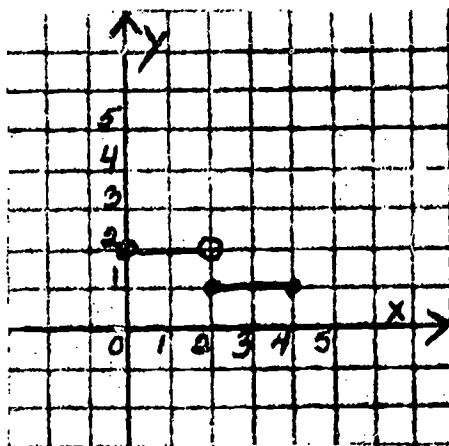
6. TRUE or FALSE: This relation is a funtion.

7. The domain of the relationship is: (Write the letter of the correct answer on your answer sheet.)

    A.   {0, 2, 3}   C.   {real numbers between 2 and 3 inclusive}

    B.   {2, 1}   D.   {real numbers between 0 and 3 inclusive}

8. The range of the relation is: (Write the letter of the correct answer on your answer sheet.)

    A.   {0, 2, 3}   C.   {real numbers between 2 and 3 inclusive}

    B.   {2, 1}   D.   {real numbers between 0 and 3 inclusive}

9. TRUE or FALSE: $\{(1, 3), (-2, 5), (0, 4), (3, 5)\}$ is a function.

Give the missing information for each of the functions below.

	Domain	Range	Formula
10.	$\{-1, 0, 1\}$	?	$y = 3x - 2$
11.	?	$\{-1, 3, 7\}$	$y = 2x + 3$

12. If y varies directly as x in the roster below, state a formula giving y in terms of x:

x	-2	?	3
y	4	-2	-6

13. Using the same roster as in Problem 12, what is the constant of proportionality?

14. If y varies directly as x, and $y = 12$ when $x = 5$, what is y when $x = 2$?

15. The compression of a spring varies directly as the force applied. If 5 pounds of pressure compresses the spring 2 inches, what force will compress it 5 inches?

Questions 16-19 refer to the sentence $\frac{a}{b} = \frac{c}{d}$. For each expression in the left-hand column, write the letter of the correct answer in the right-hand column on your answer sheet.

B-171

16.　a and d

A.　ratios

17　$\dfrac{a}{b}$ and $\dfrac{c}{d}$

B.　proportion

18.　b and c

C.　means

19.　$\dfrac{a}{b} = \dfrac{c}{d}$

D.　extremes

20.　The length of the shadow of an object varies directly as its height. If an 18 foot flag pole casts a shadow 12 feet long, what is the height of a man whose shadow is 4 feet long at the same time?

21.　Solve for k:　　$\dfrac{2k + 7}{k - 1} = \dfrac{k + 1}{2k - 7}$

Questions 22-24:　For each statement in the left-hand column, write the letter of the correct formula in the right-hand column on your answer sheet.

22.　y varies inversely as x^2

A.　$y = kx$

23.　xy varies directly as x^2

B.　$y = \dfrac{k}{x^2}$

24.　y varies directly as $\dfrac{1}{x}$

C.　$y = \dfrac{k}{x}$

D.　$y = kx^2$

25.　If y varies inversely as x and y = 9 and x = 2, what is x when $y = 3$?

26.　TRUE or FALSE:　　The drawing below is the graph of a direct variation.
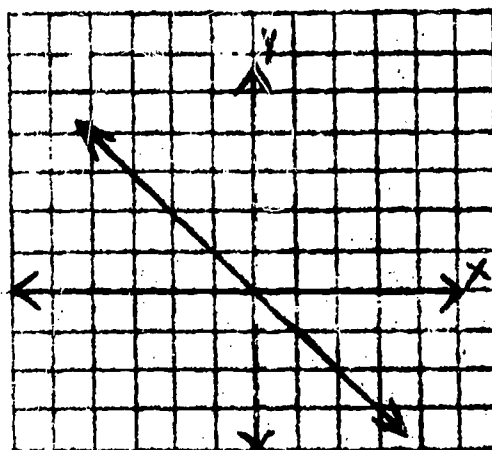
27. If the table of values defines an inverse variation, then a = _____ .

x	2	-1	a
y	-3	6	-2

B-173

UNIT XI   Relations, Functions and Variation   Test A B C D

NAME _____ SECTION _____

TEACHER _____ DATE _____

SCORE _____ PERIOD _____

1. _____   15. _____

2. _____   16. _____

3. _____   17. _____

4. _____   18. _____

5. _____   19. _____

6. _____   20. _____

7. _____   21. _____

8. _____   22. _____

9. _____   23. _____

10. _____   24. _____

11. _____   25. _____

12. _____   26. _____

13. _____   27. _____

14. _____

APPENDIX C

ANSWER KEYS AND CHECK LISTS

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

UNIT I TEACHER'S ANSWER KEY PART II
Test A

FIRST YEAR ALGEBRA

I. 1. A (5)
    2. A (5)
    3. B (5)
    4. B (5)
    5. B (5)
    6. C (5)
    7. B (5)

II. 1. True (3)
     2. False (3)
     3. False (3)
     4. True (3)
     5. False (3)

III. 1. B (6)
      2. $3\frac{1}{2}$ (6)
      3. 1 (6)

IV. 1. < B (4)
     2. = A (4)
     3. > C (4)
     4. > C (4)

V. 1. B (6)
    2. C (6)
    3. D (6)
    4. B (6)

VI. 1. 1 (7)
     2. 15 (7)
     3. 8 (7)
     4. 12 (7)
     5. 10 (7)

C-3

UNIT I	TEACHER'S ANSWER KEY	PART II Test B

FIRST YEAR ALGEBRA

I.	1.	A	(5)		V.	1.	B	(6)
	2.	A	(5)			2.	D	(6)
	3.	A	(5)			3.	D	(6)
	4.	B	(5)			4.	A	(6)
	5.	B	(5)					
	6.	C	(5)		VI.	1.	12	(7)
	7.	B	(5)			2.	18	(7)
						3.	16	(7)
II.	1.	False	(3)			4.	8	(7)
	2.	True	(3)			5.	5	(7)
	3.	False	(3)					
	4.	True	(3)					
	5.	True	(3)					

III.	1.	H	(6)
	2.	3	(6)
	3.	2	(6)

IV.	1.	> C	(4)
	2.	> C	(4)
	3.	= A	(4)
	4.	> C	(4)

C-4

UNIT II	TEACHER'S ANSWER KEY	Test A

FIRST YEAR ALGEBRA

1.	D	(8)		22.	No	(10)
2.	F	(8)		23.	No	(10)
3.	B	(9)		24.	$x + 5$	(10)
4.	G	(9)		25.	$a - 7$	(10)
5.	H	(9)		26.	$5 - n$	(10)
6.	I	(9)		27.	$7c$	(10)
7.	E	(8)		28.	$2d + 6$	(10)
8.	4	(8)		29.	$3f - 2$	(10)
9.	3	(9)		30.	$5(m + 2)$	(10)
10.	B	(8)		31.	$2w > 3$	(11)
11.	E	(8)		32.	$x + 7 = 15$	(11)
12.	18	(8, 9)		33.	b^3	(9)
13.	36	(8, 9)		34.	2^4	(9)
14.	7	(8, 9)		35.	$(6a)^2$	(9)
15.	25	(8, 9)		36.	0	(9)
16.	55	(8, 9)		37.	1	(9)
17.	Yes	(10)		38.	16	(9)
18.	Yes	(10)		39.	32	(9)
19.	No	(10)		40.	$8a^2$	(9)
20.	Yes	(10)		41.	$27a^3$	(9)
21.	Yes	(10)		42.	$81x^2$	(9)

UNIT II   TEACHER'S ANSWER KEY   Test B

FIRST YEAR ALGEBRA

1.	D	(8)		22.	No	(10)
2.	F	(8)		23.	No	(10)
3.	B	(9)		24.	$x + 9$	(10)
4.	G	(9)		25.	$a - 12$	(10)
5.	H	(9)		26.	$11 - n$	(10)
6.	I	(9)		27.	$8c$	(10)
7.	E	(9)		28.	$3d + 5$	(10)
8.	4	(8)		29.	$3f + 1$	(10)
9.	3	(9)		30.	$4(h + 3)$	(10)
10.	B	(8)		31.	$3w < 2$	(11)
11.	E	(8)		32.	$y - 10 = 26$	(11)
12.	16	(8,9)		33.	b^3	(9)
13.	64	(8,9)		34.	2^4	(9)
14.	5	(8,9)		35.	$(6a)^2$	(9)
15.	25	(8,9)		36.	0	(9)
16.	30	(8,9)		37.	1	(9)
17.	Yes	(10)		38.	16	(9)
18.	No	(10)		39.	32	(9)
19.	No	(10)		40.	$8a^2$	(9)
20.	Yes	(10)		41.	$27a^3$	(9)
21.	Yes	(10)		42.	$81x^2$	(9)

Acceptable Score $\frac{29}{42}$

UNIT II   TEACHER'S ANSWER KEY   Test C

FIRST YEAR ALGEBRA

1.	D	(8)		22.	No	(10)
2.	F	(8)		23.	No	(10)
3.	B	(9)		24.	$x + 2$	(10)
4.	G	(9)		25.	$n - 5$	(10)
5.	H	(9)		26.	$2 - x$	(10)
6.	I	(9)		27.	$17b$	(10)
7.	E	(8)		28.	$3y + 4$	(10)
8.	3	(8)		29.	$2s - 1$	(10)
9.	4	(9)		30.	$3(a + 5)$	(10)
10.	B	(8)		31.	$2n > 5$	(11)
11.	E	(8)		32.	$c + 5 = 15$	(11)
12.	20	(8, 9)		33.	x^3	(9)
13.	100	(8, 9)		34.	3^5	(9)
14.	8	(8, 9)		35.	$(5b)^2$	(9)
15.	49	(8, 9)		36.	0	(9)
16.	66	(8, 9)		37.	1	(9)
17.	Yes	(10)		38.	9	(9)
18.	Yes	(10)		39.	32	(9)
19.	Yes	(10)		40.	$12b^2$	(9)
20.	Yes	(10)		41.	$4b^2$	(9)
21.	No	(10)		42.	$125y^3$	(9)

UNIT II   TEACHER'S ANSWER KEY   Test D

FIRST YEAR ALGEBRA

1.	I	(8)		22.	No	(10)
2.	G	(8)		23.	Yes	(10)
3.	H	(9)		24.	$y + 6$	(10)
4.	E	(9)		25.	$m - 8$	(10)
5.	F	(9)		26.	$12 - y$	(10)
6.	D	(9)		27.	$7d$	(10)
7.	C	(8)		28.	$7x + 4$	(10)
8.	4	(8)		29.	$3y - 1$	(10)
9.	3	(9)		30.	$7(h + 4)$	(10)
10.	A	(8)		31.	$4v > 6$	(11)
11.	E	(8)		32.	$m + 21 = 43$	(11)
12.	12	(8, 9)		33.	b^4	(9)
13.	36	(8, 9)		34.	4^3	(9)
14.	6	(8, 9)		35.	$(7a)^2$	(9)
15.	64	(8, 9)		36.	1	(9)
16.	33	(8, 9)		37.	0	(9)
17.	Yes	(10)		38.	36	(9)
18.	No	(10)		39.	81	(9)
19.	Yes	(10)		40.	$12a^2$	(9)
20.	No	(10)		41.	$8a^3$	(9)
21.	No	(10)		42.	$49x^2$	(9)

251

UNIT III	TEACHER'S ANSWER KEY	Test A

FIRST YEAR ALGEBRA

1.	0	(15)	21.	C	(12)
2.	1	(15)	22.	B	(12)
3.	b = R	(12)	23.	E	(15)
4.	0	(15)	24.	A	(14)
5.	1		25.	D	(14)
6.	16	(15)	26.	B	(14)
7.	0	(15)	27.	A	(14)
8.	6	(15)	28.	B	(15)
9.	0	(15)	29.	A	(15)
10.	No meaning.	(15)	30.	D	(15)
11.	No meaning.	(15)	31.	C	(15)
12.	6y	(15)	32.	D	(15)
13.	6RS		33.	$\frac{8}{3}$	
14.	32xy				
15.	False	(13)	34.	$\frac{1}{2}$	
16.	True	(13)	35.	1	
17.	True	(13)	36.	B	(15)
18.	B	(12)	37.	12A	(15)
19.	D	(12)	38.	8q + 11	(15)
20.	A	(12)	39.	12v + 9w	(15)
			40.	6R + 2S - 1	(15)

UNIT III   TEACHER'S ANSWER KEY   Test B

FIRST YEAR ALGEBRA

1.	1	(15)	21.	B	(12)
2.	0	(15)	22.	A	(12)
3.	0	(15)	23.	A	(14)
4.	1		24.	B	(14)
5.	B = D	(12)	25.	A	(14)
6.	7	(15)	26.	E	(15)
7.	0	(15)	27.	D	(14)
8.	6	(15)	28.	C	(15)
9.	No meaning.	(15)	29.	D	(15)
10.	0	(15)	30.	D	(15)
11.	No meaning.	(15)	31.	A	(15)
12.	36a		32.	B	(15)
13.	5xy		33.	$\frac{7}{3}$	
14.	63xy		34.	$\frac{1}{9}$	
15.	True	(13)			
16.	False	(13)	35.	1	
17.	False	(13)	36.	D	(15)
18.	C	(12)	37.	156	(15)
19.	B	(12)	38.	11q + 12	(15)
20.	D	(12)	39.	16a + 7b	(15)
			40.	6a + 9b - 4	(15)

Acceptable Score $\frac{30}{40}$

| | UNIT III | | TEACHER'S ANSWER KEY | | Test C |

FIRST YEAR ALGEBRA

1.	0	(15)	22.	B	(12)
2.	1	(15)	23.	A	(14)
3.	a = Q	(12)	24.	D	(15)
4.	0	(15)	25.	E	(15)
5.	1		26.	A	(14)
6.	20	(15)	27.	C	(14)
7.	0	(15)	28.	D	(15)
8.	No meaning.	(15)	29.	D	(15)
9.	8	(15)	30.	B	(15)
10.	No meaning.	(15)	31.	A	(15)
11.	0	(15)	32.	C	(15)
12.	12w		33.	$\frac{7}{5}$	
13.	8RS				
14.	63xy		34.	$\frac{1}{6}$	
15.	True	(13)	35.	1	
16.	False	(13)	36.	D	(15)
17.	True	(13)	37.	10a	(15)
18.	B	(12)	38.	4w + 12	(15)
19.	A	(12)	39.	23q + 3r	(15)
20.	C	(12)	40.	7R + 3S - 1	(15)
21.	D	(12)			

C-11
260

UNIT III　　　　　　TEACHER'S ANSWER KEY　　　　　Test D

FIRST YEAR ALGEBRA

1.	N = B	(12)	21.	C	(12)
2.	0	(15)	22.	A	(12)
3.	1	(15)	23.	B	(14)
4.	1		24.	A	(14)
5.	0	(15)	25.	D	(14)
6.	15	(15)	26.	E	(15)
7.	5	(15)	27.	C	(14)
8.	No meaning.	(15)	28.	B	(15)
9.	0	(15)	29.	D	(15)
10.	No meaning.	(15)	30.	C	(15)
11.	0	(15)	31.	D	(15)
12.	15a		32.	A	(15)
13.	4xy		33.	1	
14.	15xy		34.	$\frac{1}{6}$	
15.	True	(13)			
16.	False	(13)	35.	$\frac{3}{7}$	
17.	True	(13)	36.	C	(15)
18.	D	(12)	37.	17a	(15)
19.	A	(12)	38.	10a - 5	(15)
20.	B	(12)	39.	16a - 6b	(15)
			40.	6x + 3y + 4	(15)

C-12

UNIT IV   TEACHER'S ANSWER KEY   PART I
                                               Test A

FIRST YEAR ALGEBRA

1.	5	(17)		20.	4	(20)
2.	-3	(17)		21.	0	(20)
3.	0	(17)		22.	True	(20)
4.	$\frac{7}{8}$	(17)		23.	32	(18)
				24.	4	(18)
5.	$\frac{1}{4}$	(17)		25.	-7	(18)
6.	False	(16)		26.	-8	(18)
7.	F	(16)		27.	-73	(18)
8.	A	(16)		28.	9	(18)
9.	-1 (D)	(16)		29.	36	(23)
10.	Add	(19)		30.	28	(23)
11.	False	(19)		31.	-51	(23)
12.	Reciprocal	(25)		32.	4	(25)
13.	Negative	(16)		33.	2	(25)
14.	-9	(19)		34.	-4	(25)
15.	4	(19)		35.	-5	(25)
16.	$\frac{1}{5}$	(19)		36.	-18	(26)
				37.	8	(19)
17.	Zero	(19)		38.	-20	(19)
18.	Zero	(19)		39.	+ 72	(19)
19.	20	(20)				

C-13

UNIT IV	TEACHER'S ANSWER KEY	PART I Test B

FIRST YEAR ALGEBRA

1.	4	(17)	20.	3	(20)
2.	-6	(17)	21.	0	(20)
3.	0	(17)	22.	True	(20)
4.	$\frac{5}{6}$	(17)	23.	33	(18)
			24.	4	(18)
5.	$\frac{1}{3}$	(17)	25.	-6	(18)
6.	False	(17)	26.	-1	(18)
7.	B	(16)	27.	-80	(18)
8.	E	(16)	28.	13	(18)
9.	C	(16)	29.	24	(23)
10.	False	(19)	30.	-30	(23)
11.	False	(19)	31.	-68	(23)
12.	Reciprocal	(25)	32.	9	(25)
13.	Positive	(16)	33.	4	(25)
14.	-7	(19)	34.	-2	(25)
15.	3	(19)	35.	-6	(25)
16.	$\frac{2}{3}$	(19)	36.	-6	(26)
			37.	17	(19)
17.	0	(19)	38.	-12	(19)
18.	True	(19)	39.	32	(19)
19.	16	(20)			

C-14

| UNIT IV | TEACHER'S ANSWER KEY | PART I |
| | | Test C |

FIRST YEAR ALGEBRA

1.	3	(17)		20.	9	(20)
2.	-2	(17)		21.	0	(20)
3.	0	(17)		22.	True	(20)
4.	$\frac{3}{8}$	(17)		23.	31	(18)
				24.	7	(18)
5.	$\frac{1}{3}$	(17)		25.	-3	(18)
6.	False	(16)		26.	-9	(18)
7.	I	(16)		27.	-89	(18)
8.	J	(16)		28.	9	(18)
9.	F	(16)		29.	120	(23)
10.	Add	(19)		30.	21	(23)
11.	False	(19)		31.	-34	(23)
12.	Reciprocal	(25)		32.	5	(23)
13.	Negative	(16)		33.	2	(25)
14.	-8	(19)		34.	-5	(25)
15.	7	(19)		35.	-5	(25)
16.	$\frac{1}{3}$	(19)		36.	-9	(26)
				37.	12	(19)
17.	0	(19)		38.	-19	(19)
18.	0	(19)		39.	90	(19)
19.	31	(20)				

C-15

UNIT IV   TEACHER'S ANSWER KEY   PART I
                                                                  Test D
                        FIRST YEAR ALGEBRA

1.	6	(17)		20.	4	(20)
2.	-2	(17)		21.	0	(20)
3.	0	(17)		22.	True	(20)
4.	$\frac{4}{5}$	(17)		23.	23	(18)
				24.	2	(18)
5.	$\frac{1}{5}$	(17)		25.	-7	(18)
6.	False	(16)		26.	-2	(18)
7.	G	(16)		27.	-58	(18)
8.	D	(16)		28.	11	(18)
9.	I	(16)		29.	36	(23)
10.	False	(19)		30.	-24	(23)
11.	Negative	(19)		31.	-45	(23)
12.	Reciprocal	(25)		32.	5	(23)
13.	True	(16)		33.	3	(25)
14.	-6	(19)		34.	-3	(25)
15.	2	(19)		35.	-7	(25)
16.	$\frac{5}{7}$	(19)		36.	-3	(26)
				37.	3	(19)
17.	0	(19)		38.	-22	(19)
18.	True	(19)		39.	27	(19)
19.	17	(20)				

C-16

| UNIT IV | TEACHER'S ANSWER KEY | PART II |
| | | Test A |

FIRST YEAR ALGEBRA

1. 1   (25)

2. $-\frac{1}{4}$ (25)

3. $\frac{5}{12}$ (25)

4. $\frac{4}{5}$ (25)

5. One   (25)

6. Zero   (25)

7. Positive   (23)

8. Negative   (23)

9. $-15xy$ (23)

10. $-8a^3$ (23)

11. $4a^2$ (23)

12. False   (13)

13. True   (13)

14. $5x$ (19)

15. $-10y$ (26)

16. $8x \div z$ (18)

17. $x + y$ (19)

18. $12a - b$ (26)

19. $-4y$ (19)

20. $+4$ (8, 9)

UNIT IV   TEACHER'S ANSWER KEY   PART II
Test B

FIRST YEAR ALGEBRA

1.   7   (25)

2. $-\frac{1}{8}$ (25)

3. $\frac{3}{4}$ (25)

4.   1   (25)

5.   One   (25)

6.   Zero   (25)

7.   Odd   (23)

8.   Even   (23)

9. $-245y$ (23)

10. $9a^2y$ (23)

11. $-27y^3$ (23)

12.   False   (13)

13.   True   (13)

14.   7x   (19)

15. $-12y$ (26)

16. $8x + z$ (18)

17. $-2x + 2y$ (19)

18. $6a + 2b$ (26)

19. $6x - 14y$ (19)

20.   1   (8, 9)

UNIT IV   TEACHER'S ANSWER KEY   PART II
                                                          Test C

FIRST YEAR ALGEBRA

1. $\frac{1}{3}$ (25)

2. $-\frac{1}{5}$ (25)

3. $\frac{13}{5}$ (25)

4. $\frac{5}{6}$ (25)

5. 1   (25)

6. 0   (25)

7. Positive   (23)

8. Negative   (23)

9. $-15xy$ (23)

10. $-8b^3$ (23)

11. $4c^2$ (23)

12. False   (13)

13. True   (13)

14. $7y$ (19)

15. $-8x$ (26)

16. $9x - z$ (18)

17. $x - y$ (19)

18. $13c - 2b$ (26)

19. y (19)

20. 1   (8,9)

Acceptable Score $\frac{15}{20}$

UNIT IV   TEACHER'S ANSWER KEY   PART II
                                                          Test D

FIRST YEAR ALGEBRA

1. $\frac{5}{2}$ (25)

2. $-\frac{1}{6}$ (25)

3. $\frac{7}{4}$ (25)

4. $\frac{1}{5}$ (25)

5. 0   (25)

6. 1   (25)

7. Positive   (23)

8. Negative   (23)

9. -6xy   (23)

10. $16a^2$ (23)

11. $-27a^3$ (23)

12. False   (13)

13. True   (13)

14. 7x   (19)

15. 3y   (26)

16. 11x   (18)
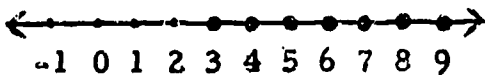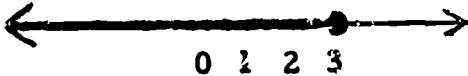
17. 6x + 2y   (19)

18. 10a - b   (26)

19. -4x - 3y   (19)

20. 1   (8,9)

C-20

UNIT V   TEACHER'S ANSWER KEY   Test A

FIRST YEAR ALGEBRA

1. A   (27)   18. $\{\frac{30}{7}\}$ (29)

2. F   (27)
                                           19. $\{\frac{43}{2}\}$ (30)
3. H   (27)

4. D   (27)   20. $\{\frac{11}{2}\}$ (30)

5. True   (27)
                                           21. $\{-2\}$ (30)
6. $\{3\}$ (28)

7. $\{-12\}$ (28)   22. $\{\frac{7}{2}\}$ (31)

8. $\{-7\}$ (28)   23. $\{\frac{8}{3}\}$ (30)

9. $\{-\frac{9}{2}\}$ (28)
                                           24. $\{-\frac{55}{24}\}$ (30)
10. $\{15\}$ (28)
                                           25. $\{24\}$ (31)
11. $\{3\}$ (29)
                                           26. $\{5\}$ (27)
12. $\{\frac{17}{5}\}$ (29)
                                           27.   (27)

13. $\{-\frac{10}{3}\}$ (29)
                                           28. $b \leq -\frac{13}{6}$ (33)
14. $\{-\frac{52}{15}\}$ (29)
                                           29. $d > 5$ (33)

15. $\{\frac{36}{7}\}$ (29)   30. $a \leq \frac{9}{10}$ (33)

16. $\{\frac{28}{3}\}$ (29)   31. $a < 12$ (33)

                                           32. $c \geq \frac{28}{3}$ (33)
17. $\{-12\}$ (29)

                                           33.   (33)

                             270   34. 9c
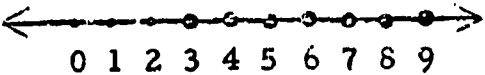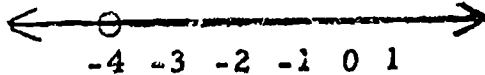
UNIT V   TEACHER'S ANSWER KEY   Test 3

FIRST YEAR ALGEBRA

1.	A	(27)	19.	$\{\frac{43}{3}\}$	(30)
2.	B	(27)	20.	$\{4\}$	(30)
3.	H	(27)	21.	$\{-2\}$	(30)
4.	G	(27)	22.	$\{\frac{7}{2}\}$	(31)
5.	True	(27)	23.	$\{2\}$	(30)
6.	$\{1\}$	(28)	24.	$\{-\frac{49}{20}\}$	(30)
7.	$\{-11\}$	(28)	25.	ϕ	(31)
8.	$\{-13\}$	(28)	26.	ϕ	(27)
9.	$\{\frac{7}{2}\}$	(28)			

27. (27)

0 1 2 3 4 5 6 7 8 9

10.	$\{14\}$	(28)			
11.	$\{4\}$	(29)	28.	$b \leq -2$	(33)
12.	$\{\frac{11}{5}\}$	(29)	29.	$d > 13$	(33)
13.	$\{-\frac{20}{3}\}$	(29)	30.	$a \leq -\frac{1}{10}$	(33)
14.	$\{-\frac{53}{15}\}$	(29)	31.	$a < 18$	(33)
15.	$\{-\frac{37}{8}\}$	(29)	32.	$c \leq 15$	(33)

33. (33)

-4 -3 -2 -1 0 1

16.	$\{-20\}$	(29)			
17.	$\{-16\}$	(29)	34.	\$3	
18.	$\{\frac{15}{4}\}$	(29)			

UNIT V   TEACHER'S ANSWER KEY   Test C

FIRST YEAR ALGEBRA

1. A   (27)

2. F   (27)

3. H   (27)

4. D   (27)

5. False   (27)

6. {2}   (28)

7. {-13}   (28)

8. {-8}   (28)

9. $\{-\frac{17}{2}\}$ (28)

10. {20}   (28)

11. {4}   (29)

12. $\{\frac{19}{4}\}$ (29)

13. $\{-\frac{18}{5}\}$ (29)

14. {-4}   (29)

15. $\{\frac{35}{6}\}$ (29)

16. $\{\frac{27}{2}\}$ (29)

17. {-35}   (29)

18. $\{\frac{40}{7}\}$ (29)

19. {26}   (30)

20. $\{\frac{13}{3}\}$ (30)

21. {-3}   (30)

22. {3}   (31)

23. $\{-\frac{1}{3}\}$ (30)

24. $\{-\frac{7}{2}\}$ (30)

25. $\{-\frac{13}{3}\}$ (31)

26. ϕ (27)

27. (27)

0 1 2 3 4 5 6 7 8 9

28. $a \le -\frac{12}{5}$ (33)

29. $b > 6$ (33)

30. $x \le \frac{11}{10}$ (33)

31. $x < 18$ (33)

32. $R \ge \frac{21}{2}$ (33)

33. (33)

5

34. 40

C-23

UNIT V   TEACHER'S ANSWER KEY   Test D

FIRST YEAR ALGEBRA

1.	B	(27)	20.	$\{11\}$	(30)
2.	D	(27)	21.	$\{-3\}$	(30)
3.	H	(27)	22.	$\{1\}$	(31)
4.	G	(27)	23.	$\{\frac{9}{4}\}$	(30)
5.	False	(27)	24.	$\{-\frac{41}{8}\}$	(30)
6.	$\{2\}$	(28)	25.	$\{12\}$	(31)
7.	$\{-7\}$	(28)	26.	ϕ	(27)
8.	$\{-14\}$	(28)	27.		(27)

27.


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<--•--•--•--◦--•--•--◦--•--•--•---->
  0 1 2 3 4 5 6 7 8 9
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9.	$\{\frac{17}{3}\}$	(28)			
10.	$\{-11\}$	(28)	28.	$y \leq -2$	(33)
11.	$\{4\}$	(29)	29.	$d > 12$	(33)
12.	$\{\frac{11}{7}\}$	(29)	30.	$a \leq -\frac{1}{8}$	(33)
13.	$\{\frac{17}{4}\}$	(29)	31.	$a < 42$	(33)
14.	$\{-\frac{56}{15}\}$	(29)	32.	$c \leq 16$	(33)
15.	$\{-\frac{61}{5}\}$	(29)	33.		(33)

33.


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            -2
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16.	$\{-24\}$	(29)	
17.	$\{-6\}$	(29)	34. 84
18.	$\{\frac{14}{3}\}$	(29)	
19.	$\{\frac{39}{2}\}$	(30)	

C-24

UNIT VI   TEACHER'S ANSWER KEY   Test A

FIRST YEAR ALGEBRA

1.	E, F, G	(34)		18.	D	(37)
2.	C	(34)		19.	C	(36)
3.	4	(34)		20.	C	(37)
4.	3	(34)		21.	D	(36)
5.	B	(34)		22.	D	(37)
6.	A	(34)		23.	B	(40)
7.	D	(34)		24.	C	(41)
8.	B	(34)		25.	A	(41)
9.	D	(35)		26.	D	(42)
10.	A	(35)		27.	C	(42)
11.	B			28.	A	(43)
12.	C	(36, 37)		29.	D	(44)
13.	B	(36)		30.	A	(44)
14.	B	(37)		31.	D	(44)
15.	C	(38)		32.	1	(39)
16.	A	(38)		33.	a	
17.	C	(37)		34.	36	

C-25

UNIT VI   TEACHER'S ANSWER KEY   Test B

FIRST YEAR ALGEBRA

1.	B,E,F,G,H	(34)		18.	B	(37)
2.	C	(34)		19.	D	(36)
3.	5	(34)		20.	A	(37)
4.	5	(34)		21.	B	(36)
5.	C	(34)		22.	A	(37)
6.	B	(34)		23.	C	(40)
7.	C	(34)		24.	B	(41)
8.	B	(34)		25.	C	(41)
9.	A	(35)		26.	D	(42)
10.	C	(35)		27.	B	(42)
11.	B			28.	C	(43)
12.	D	(36,37)		29.	A	(44)
13.	A	(36)		30.	C	(44)
14.	C	(37)		31.	A	(44)
15.	A	(38)		32.	a	
16.	A	(37)		33.	1	(39)
17.	B	(37)		34.	26	

| UNIT VI | | TEACHER'S ANSWER KEY | | Test C |

FIRST YEAR ALGEBRA

1.	E, G, H.	(34)	18.	D	(37)
2.	A	(34)	19.	D	(36)
3.	4	(34)	20.	B	(37)
4.	3	(34)	21.	A	(36)
5.	C	(34)	22.	B	(37)
6.	A	(34)	23.	D	(40)
7.	C	(34)	24.	D	(41)
8.	C	(34)	25.	D	(41)
9.	D	(35)	26.	C	(42)
10.	A	(35)	27.	C	(42)
11.	C		28.	B	(43)
12.	C	(36, 37)	29.	A	(44)
13.	C	(36)	30.	D	(44)
14.	C	(37)	31.	D	(44)
15.	B	(38)	32.	1	(39)
16.	B	(38)	33.	x	
17.	B	(37)	34.	36	

UNIT VI   TEACHER'S ANSWER KEY   Test D

FIRST YEAR ALGEBRA

1.	B, F, G	(34)		18.	C	(37)
2.	A	(34)		19.	D	(36)
3.	5	(34)		20.	A	(37)
4.	4	(34)		21.	B	(36)
5.	C	(34)		22.	D	(37)
6.	B	(34)		23.	B	(40)
7.	A	(34)		24.	C	(41)
8.	D	(34)		25.	D	(41)
9.	B	(35)		26.	B	(42)
10.	C	(35)		27.	A	(42)
11.	A			28.	C	(43)
12.	B	(36, 37)		29.	B	(44)
13.	C	(36)		30.	A	(44)
14.	A	(37)		31.	D	(44)
15.	C	(38)		32.	a	
16.	B	(38)		33.	1	(39)
17.	B	(37)		34.	15, 16, 17	(39)

UNIT VII   TEACHER'S ANSWER KEY   Test A

FIRST YEAR ALGEBRA

1.	A, C	(45)	15.	$2(x + 2)(x - 2)$	(54)
2.	$2^3 \cdot 3^2$	(45)	16.	$-1(x - 1)^2$	(54)
3.	$2xy^3$	(45)	17.	$-4x^2 \div 5x + 7$	(57)
4.	6	(45)	18.	0	(55)
5.	$2x^2y$	(45)	19.	$-x^2 + 3x - 1$	(57)
6.	$12(3x + y - 2)$	(46)	20.	$\{-1, 2\}$	(55)
7.	$5x(5x^2 - 3x - 1)$	(46)	21.	$\{0, 2\}$	(55)
8.	$(x - 4)(x + 4)$	(48)	22.	$\{-\frac{1}{2}, 3\}$	(55)
9.	$(a + 4)^2$	(51)	23.	$\{-5, 5\}$	(56)
10.	$(b + 6)(b - 2)$	(52)	24.	$\{3\}$	(56)
11.	$(3c - 2)(2c + 1)$	(53)	25.	$\{-5, 2\}$	(56)
12.	$(x^2 + 7)(x - 3)$	(46)	26.	$\{$any number$\}$	(55)
13.	$(5x - 9y)(5x + 9y)$	(48)	27.	$\{\ \}$	(55)
14.	$2a(a + 5)^2$	(54)	28.	$4x + 3(20 + x)$ or $7x + 60$	

C-29

UNIT VII   TEACHER'S ANSWER KEY   Test B

FIRST YEAR ALGEBRA

1.	B	(45)
2.	$2^2 \cdot 17$	(45)
3.	$5xy^4$	(45)
4.	6	(45)
5.	$3x^3 y^4$	(45)
6.	$9(x - 2y + 3)$	(46)
7.	$(x - 5)(x + 5)$	(48)
8.	$3x(x - 7)(x + 2)$	(46)
9.	$(a + 6)^2$	(51)
10.	$(b + 4)(b - 3)$	(52)
11.	$3(2d - 1)(d + 1)$	(54)
12.	$(x^2 + 3)(x - 7)$	(46)
13.	$(3x - 8y)(3x + 8y)$	(48)
14.	$3a(a^2 + 7a - 16)$	(46)

15.	$3(x + 3)(x - 3)$	(54)
16.	$-1(x - 3)(x + 2)$	(54)
17.	0	(55)
18.	$-2x^2 + 5x + 2$	(57)
19.	$6x^2 - 5x - 4$	(57)
20.	$\{-4, 3\}$	(55)
21.	$\{\frac{1}{2}, 4\}$	(55)
22.	$\{0, 3\}$	(55)
23.	$\{-4, 4\}$	(56)
24.	$\{5\}$	(56)
25.	$\{-3, -2\}$	(56)
26.	{any number}	(55)
27.	$\{\ \}$	(55)
28.	12, 13, 14	

UNIT VII   TEACHER'S ANSWER KEY   Test C

FIRST YEAR ALGEBRA

1.	B	(45)	15.	$4(c + 2)(c - 2)$	(54)
2.	$2^2 \cdot 3 \cdot 7$	(45)	16.	$-1(a - 1)^2$	(54)
3.	$2a^2b^3$	(45)	17.	$-6a^2 + 3a + 1$	(57)
4.	3	(45)	18.	0	(55)
5.	$3a^2b$	(45)	19.	$-y^2 + 5y - 3$	(57)
6.	$6(3x + 2y - 4)$	(46)	20.	$\{-1, 3\}$	(55)
7.	$5x(4x^2 - 3x + 1)$	(46)	21.	$\{0, 10\}$	(55)
8.	$(x - 9)(x + 9)$	(48)	22.	$\{-\frac{3}{2}, 1\}$	(55)
9.	Prime	(51)	23.	$\{-9, 9\}$	(56)
10.	$(r + 10)(r - 3)$	(52)	24.	$\{-1, 6\}$	(56)
11.	$(5y - 2)(3y + 1)$	(53)	25.	$\{-6, 1\}$	(56)
12.	$(a^2 + 5)(a - 3)$	(46)	26.	{any number}	(55)
13.	$9(2r - 3s)(2r + 3s)$	(48)	27.	$\{\ \}$	(55)
14.	$x(x - 1)^2$	(54)	28.	$t = 3$ hours	

C-31

UNIT VII   TEACHER'S ANSWER KEY   Test D

FIRST YEAR ALGEBRA

1.	A, B	(45)	15.	$3(x + 3)(x - 3)$	(54)	
2.	$2^3 \cdot 7$	(45)	16.	$-1(x + 1)^2$	(54)	
3.	$4xy^4$	(45)	17.	$9x^2 - 3x + 6$	(57)	
4.	8	(45)	18.	$-x^2 - 6x + 7$	(57)	
5.	$3x^2y^2$	(45)	19.	0	(55)	
6.	$5(5x + y - 2z)$	(46)	20.	$\{-6, 7\}$	(55)	
7.	$12x(3x^2 + 2x + 1)$	(46)	21.	$\{0, 3\}$	(55)	
8.	$(x - 6)(x + 6)$	(48)	22.	$\{-\frac{2}{3}, 3\}$	(55)	
9.	$(y + 3)^2$	(51)	23.	$\{-9, 9\}$	(56)	
10.	$(b + 7)(b - 2)$	(52)	24.	$\{-5\}$	(56)	
11.	$(3c + 2)(2c - 1)$	(53)	25.	$\{-4, 9\}$	(56)	
12.	$(x^2 + 2)(x - 5)$	(46)	26.	$\{ \ \}$	(55)	
13.	$(7x + 9y)(7x - 9y)$	(48)	27.	{any number}	(55)	
14.	$4a(a + 5)^2$	(54)	28.	4		

UNIT VIII TEACHER'S ANSWER KEY PART I
Test A

FIRST YEAR ALGEBRA

1. $\{0\}$ (58)

2. $\{3\}$ (58)

3. $\{-2\}$ (58)

4. None (58)

5. $\{2,-2\}$ (58)

6. Quotient (58)

7. Numerator (58)

8. $\frac{6}{7}$ (59)

9. $\frac{4a}{5b}$ (59)

10. $\frac{16x}{3y}$ (59)

11. $\frac{1}{x-3}$ (59)

12. $\frac{x+1}{x-2}$ (59)

13. done (59)

14. $\frac{2x}{y}$ (61)

15. $\frac{15x^2}{2}$ (61)

16. $\frac{56x}{-5}$ (61)

17. $(a-b)(m-n)$ (61)

18. 1 (61)

19. $-\frac{10}{9}$ (62)

20. $\frac{3}{16y}$ (62)

21. $\frac{14xy^2}{5}$ (62)

22. $\frac{6b}{5a}$ (62)

23. $\frac{3}{(x-y)(x+3)}$ (62)

24. $\frac{3}{a+2}$ (63)

25. \$22; \$14

C-33

UNIT VIII   TEACHER'S ANSWER KEY   PART I
                                                            Test B
                        FIRST YEAR ALGEBRA

1. $\{-1\}$ (58)   16. $\frac{x}{-3}$ (61)

2. $\{2\}$ (58)
                                            17. $\frac{1}{(x + y)(a + b)}$ (61)
3. $\{0\}$ (58)

4. $\{5, -5\}$ (58)   18. $\frac{c + 2}{c + 4}$ (61)

5. None   (58)
                                            19. $-\frac{25}{27}$ (62)
6. Quotient   (58)

7. Denominator   (58)   20. $\frac{1}{7y}$ (62)

8. $\frac{8}{9}$ (59)
                                            21. $\frac{14xy^2}{5}$ (62)
9. $\frac{3b}{4a}$ (59)

                                            22. $\frac{b}{a}$ (62)
10. $\frac{9yz}{2}$ (59)

                                            23. $\frac{4}{x + 2y}$ (62)
11. $\frac{1}{x - 5}$ (59)

                                            24. $\frac{5}{x}$ (63)
12. $\frac{x + 2}{x - 3}$ (59)

                                            25. 9, 11
13. Done   (59)

14. $\frac{y}{2x}$ (61)

15. $\frac{4x^2}{3}$ (61)

C-34

UNIT VIII	TEACHER'S ANSWER KEY	PART I
		Test C

FIRST YEAR ALGEBRA

1. $\{2\}$ (58)

2. $\{-4\}$ (58)

3. $\{0\}$ (58)

4. $\{3, -3\}$ (58)

5. None   (58)

6. Numerator   (58)

7. True   (58)

8. $\frac{19}{25}$ (59)

9. $\frac{9ab}{4}$ (59)

10. $\frac{y}{3x^2 z^2}$ (59)

11. Done   (59)

12. $\frac{1}{x + 7}$ (59)

13. $\frac{c + 3}{c - 3}$ (59)

14. $6y^2$ (61)

15. $\frac{3a^2}{b}$ (61)

16. $-\frac{45}{4}$ (61)

17. $\frac{3a}{a - 1}$ (61)

18. 1 (61)

19. $\frac{-5}{28}$ (62)

20. $\frac{7x}{16yz}$ (62)

21. $\frac{27x^2 y^2}{2}$ (62)

22. $9ab^2$ (62)

23. $\frac{x + 1}{x - 2}$ (62)

24. $\frac{10}{x + 10}$ (63)

25. 500 seconds

UNIT VIII 　　　　TEACHER'S ANSWER KEY 　　　　PART I
Test D

FIRST YEAR ALGEBRA

1. $\{0\}$ 　　　　(58)

2. $\{3\}$ 　　　　(58)

3. $\{-2\}$ 　　　　(58)

4. None 　　　　(58)

5. $\{2, -2\}$ 　　　　(58)

6. Quotient 　　　　(58)

7. Denominator 　　　　(58)

8. $\frac{4}{7}$ 　　　　(59)

9. $\frac{2x}{3y}$ 　　　　(59)

10. $\frac{12a}{5c}$ 　　　　(59)

11. $\frac{1}{x - 2}$ 　　　　(59)

12. $\frac{p - 3}{p + 4}$ 　　　　(59)

13. Done 　　　　(59)

14. $\frac{4y}{x}$ 　　　　(61)

15. $\frac{15z^2}{2}$ 　　　　(61)

16. $-\frac{40a}{7}$

17. $(x - y)(w - v)$ 　　　　(61)

18. $(a - 4)^2$ 　　　　(61)

19. $-\frac{5}{6}$ 　　　　(62)

20. $\frac{1}{7y}$ 　　　　(62)

21. $\frac{32xy^2}{5}$ 　　　　(62)

22. $\frac{375z^5}{98w^3}$ 　　　　(62)

23. $\frac{3}{(a - b)(a + 3)}$ 　　　　(62)

24. $\frac{4(x + 1)(x + 3)}{3x}$ 　　　　(63)

25. $w = 7$ 　　　 $1 = 15$

UNIT VIII   TEACHER'S ANSWER KEY   PART II

Test A

FIRST YEAR ALGEBRA

1. $\dfrac{7}{9}$ (64)

2. $\dfrac{x-3}{5}$ (64)

3. $\dfrac{4a-2}{b}$ (64)

4. $\dfrac{41}{28}$ (65)

5. $\dfrac{23a}{20}$ (65)

6. $a+2$ (65)

7. $x+5$ (65)

8. $\dfrac{7b-3a}{a^2b^2}$ (65)

9. $\dfrac{5x-36}{x^2-81}$ (65)

10. $\dfrac{2x^2-4x-7}{(x-4)(x+2)(x-1)}$ (65)

11. y (67)

12. $\dfrac{a+b}{a-b}$ (67)

13. $1:2$ (60)

14. $\left\{\dfrac{5}{3}\right\}$ (68)

15. $\left\{\dfrac{8}{3}\right\}$ (68)

16. $\{-8\}$ (63)

17. $\{c > 12\}$ (68)

18. $\left\{y > \dfrac{22}{7}\right\}$ (68)

19. $\left\{\dfrac{8}{3}\right\}$ (69)

20. ϕ (69)

21. $\{-1\}$ (69)

UNIT VIII TEACHER'S ANSWER KEY PART II
Test B

FIRST YEAR ALGEBRA

1. $\frac{6}{7}$ (64) 16. $\{-15\}$ (68)

2. $\frac{x-5}{8}$ (64) 17. $\{c > \frac{20}{3}\}$ (68)

3. $\frac{3b-3}{c}$ (64) 18. $\{y > \frac{110}{41}\}$ (68)

4. $\frac{38}{45}$ (65) 19. $\{-\frac{5}{4}\}$ (69)

5. $\frac{43a}{30}$ (65) 20. ϕ (69)

21. $\{1\}$ (69)

6. $x + 3$ (65)

7. $x + 6$ (65)

8. $\frac{5b + 2a}{a^2 b^2}$ (65)

9. $\frac{4x - 21}{x^2 - 49}$ (65)

10. $\frac{2x^2 - 6x - 4}{(x-4)(x+1)(x-2)}$ (65)

11. y

12. $\frac{A - B}{A + B}$ (67)

13. $1:2$ (60)

14. $\{\frac{5}{3}\}$ (68)

15. $\{\frac{5}{2}\}$ (68)

C-38

UNIT VIII	TEACHER'S ANSWER KEY	PART II
		Test C

FIRST YEAR ALGEBRA

1. $\frac{7}{9}$ (64)

2. $\frac{x-5}{8}$ (64)

3. $\frac{4a-2}{b}$ (64)

4. $\frac{38}{45}$ (65)

5. $\frac{23a}{20}$ (65)

6. $x \div 3$ (65)

7. $x + 5$ (65)

8. $\frac{5b + 2a}{a^2 b}$ (65)

9. $\frac{5x - 36}{x^2 - 81}$ (65)

10. $\frac{2x^2 - 6x - 4}{(x-4)(x+1)(x-2)}$ (65)

11. y (67)

12. $\frac{A - B}{A \div B}$ (67)

13. $1:2$ (60)

14. $\{ \frac{5}{3} \}$ (68)

15. $\{ \frac{8}{3} \}$ (68)

16. $\{-15\}$ (68)

17. $\{c > 12\}$ (68)

18. $\{x > \frac{110}{41}\}$ (63)

19. $\{ \frac{8}{3} \}$ (69)

20. ϕ (69)

21. $\{-1\}$ (69)

288

UNIT VIII	TEACHER'S ANSWER KEY	PART II Test D

FIRST YEAR ALGEBRA

1. $\dfrac{6}{7}$ (64)

2. $\dfrac{x-3}{5}$ (64)

3. $\dfrac{3b-3}{c}$ (64)

4. $\dfrac{41}{28}$ (65)

5. $\dfrac{43a}{30}$ (65)

6. $a+2$ (65)

7. $x+6$ (65)

8. $\dfrac{7b-3a}{a^2 b^2}$ (65)

9. $\dfrac{4x-21}{x^2-49}$ (65)

10. $\dfrac{2x^2-4x-7}{(x-4)(x+2)(x-1)}$ (65)

11. y (67)

12. $\dfrac{m+n}{m-n}$ (67)

13. $1:3$ (60)

14. $\left\{\dfrac{5}{3}\right\}$ (68)

15. $\left\{\dfrac{5}{2}\right\}$ (68)

16. $\{-8\}$ (68)

17. $\left\{c > \dfrac{20}{3}\right\}$ (68)

18. $\left\{y > \dfrac{20}{7}\right\}$ (68)

19. $\left\{-\dfrac{5}{4}\right\}$ (69)

20. ϕ (69)

21. $\{1\}$ (69)

C-40

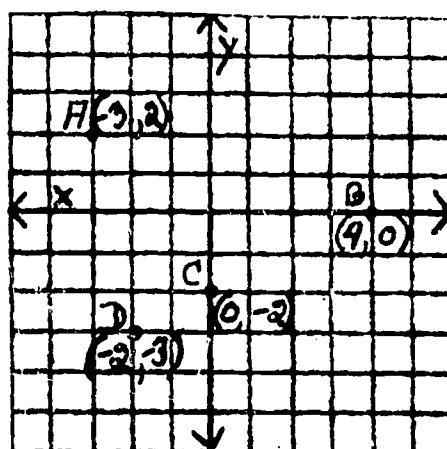UNIT IX   TEACHER'S ANSWER KEY   PART I
                                              Test A

FIRST YEAR ALGEBRA

1. A   (70,71)
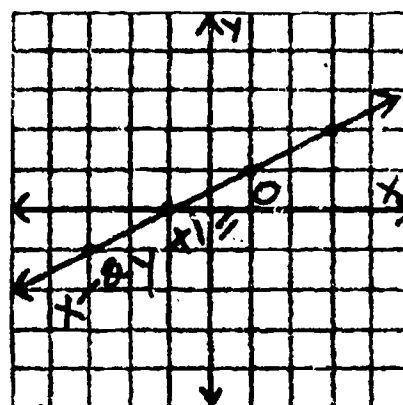
2. F   (70,71)

3. D   (70,71)

4. C   (70,71)

5. G   (70,71)

6. E   (70,71)

7. B   (70,71)

8. B   (71)

9. E   (71)

10. True   (71)

11. True   (71)

12. False   (71)

13. 2

14. $y = \frac{3}{2}x - \frac{1}{2}$ (72)

15. $y = x + \frac{1}{2}$ (72)

16. $y = -\frac{7}{3}x + \frac{4}{3}$ (72)

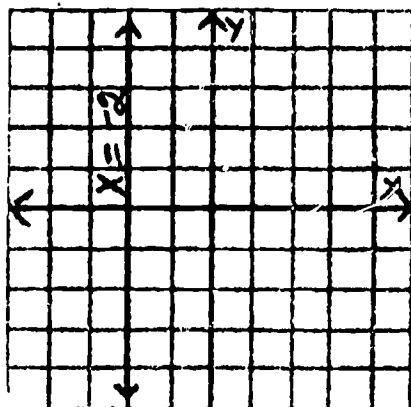17. $\frac{22}{3}$ (72)

18.   (72)

19.   (72)

x	-3	-1	+3
y	-1	0	2

20. 3   (74)

21. $\frac{3}{2}$ (74)

22.   (72)

The graph shows a vertical line labeled $X = -2$

23.   (72)

The graph shows a horizontal line labeled $Y = 2$
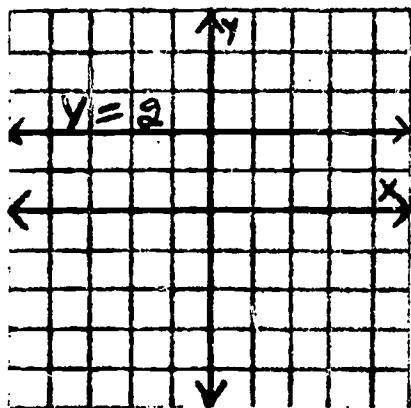
24. $y = 0$ (72)

25.   A, D   (72)

26. -1 (73)

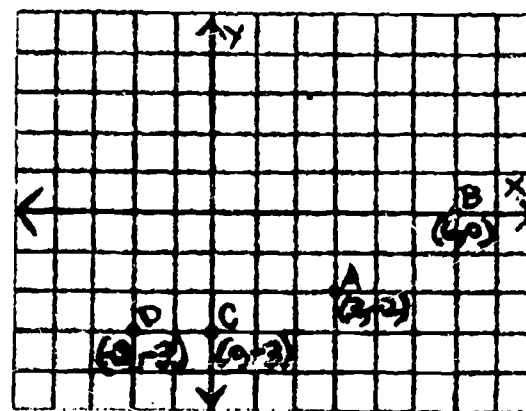27. $\dfrac{9}{8}$ (73)
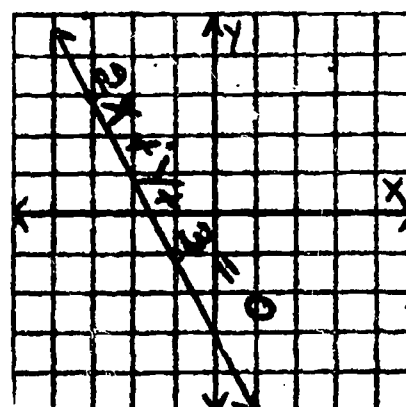
28.   A   (73)

UNIT IX   TEACHER'S ANSWER KEY   PART I
                                                          Test B

FIRST YEAR ALGEBRA

1. B   (70,71)   18.   (72)

2. G   (70,71)

3. C   (70,71)

4. E   (70,71)

5. J   (70,71)

6. A   (70,71)

7. I   (70,71)

8. D   (71)   19.   (72)

9. E   (71)

10. False   (71)

11. True   (71)

12. False   (71)

13. 1

14. $y = \frac{3}{4}x - \frac{1}{4}$ (72)

x	-3	-1	3
y	3	-1	-9

15. $y = -\frac{3}{2}x$ (72)

16. $y = -\frac{8}{3}x$ (72)   20. 2   (74)
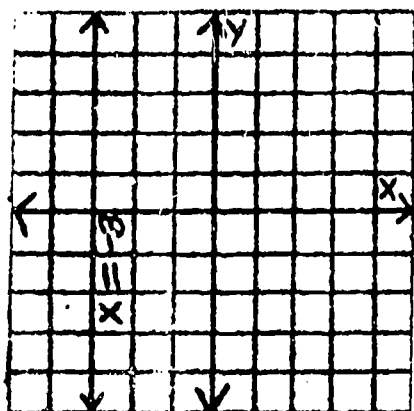
17. 4   (72)   22. -2   (74)

22. (72)
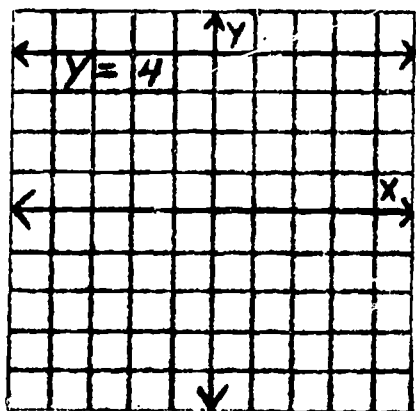

$x = 3$

23. (72)

$y = 4$

24. $x = 0$ (72)

25. A, D (72)

26. $\frac{3}{2}$ (73)

27. $-\frac{5}{2}$ (73)

28. A (73)

C-44

Acceptable Score $\frac{22}{28}$

UNIT IX TEACHER'S ANSWER KEY PART I
Test C

FIRST YEAR ALGEBRA

1. C (70,71)
2. E (70,71)
3. D (70,71)
4. A (70,71)
5. F (70,71)
6. I (70,71)
7. B (70,71)
8. D (71)
9. E (71)
10. True (71)
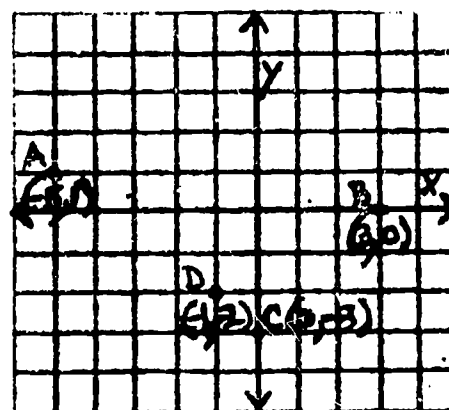11. True (71)
12. False (71)
13. 3
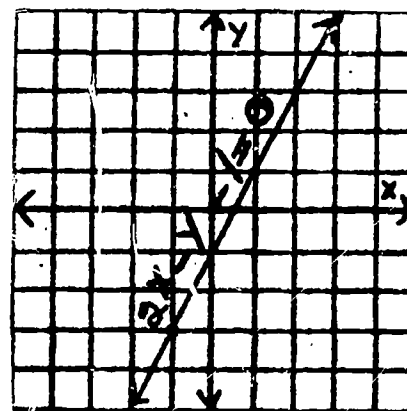14. $y = \frac{2}{3}x + \frac{1}{3}$ (72)
15. $y = x + \frac{1}{3}$, (72)
16. $y = -\frac{10}{3}x + \frac{4}{3}$ (72)
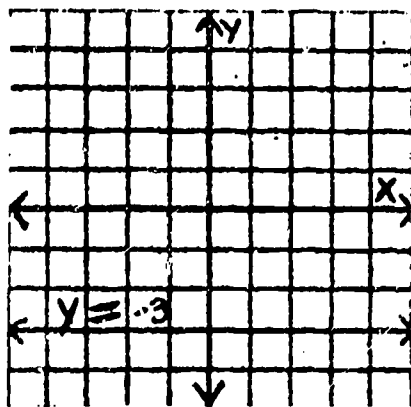17. 9 (72)

18. (72)

19. (72)

x	-3	-1	3
y	-7	-3	5

20. 3 (74)
21. $\frac{5}{3}$ (74)

C-45

22. (72)

23. (72)
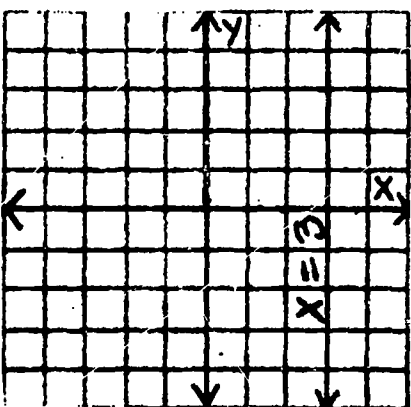
24. $x = 0$ (72)

25. A, C (72)

26. $-\dfrac{6}{5}$ (73)

27. $\dfrac{10}{9}$ (73)

28. C (73)

UNIT IX   TEACHER'S ANSWER KEY   PART I
                                                                  Test D

                            FIRST YEAR ALGEBRA

1. B   (70,71)   18.   (72)

2. A   (70,71)

3. J   (70,71)

4. D   (70,71)

5. E   (70,71)

6. H   (70,71)

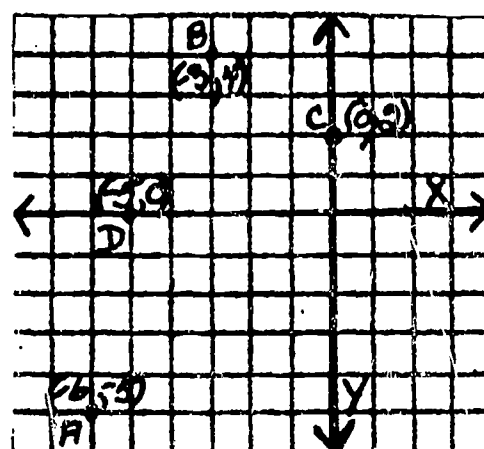7. G   (70,71)

8. E   (71)   19.   (72)

9. C   (71)

10. False   (71)

11. True   (71)

12. False   (71)

13. 4

14. $y = \frac{6}{5}x - \frac{1}{5}$ (72)

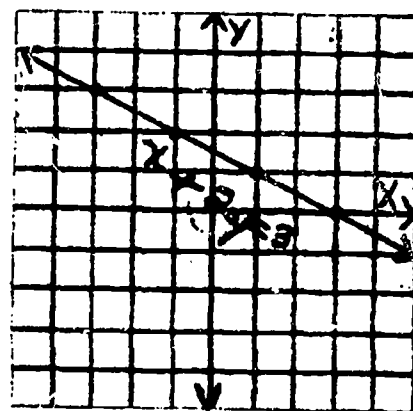15. $y = \frac{3}{2}x + \frac{5}{2}$ (72)

x	-3	-1	3
y	3	2	0

16. $y = -\frac{9}{4}x + \frac{9}{4}$ (72)   20. 2   (74)

17. 13   (72)   21. $\frac{4}{5}$ (74)

22. (72)

The graph shows a coordinate plane with x and y axes and a horizontal line labeled $y = -3$.

23. (72)
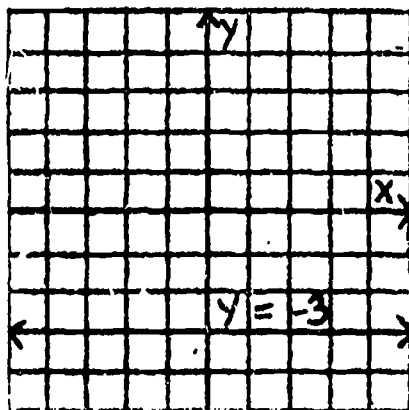
The graph shows a coordinate plane with x and y axes and a vertical line labeled $x = 2$.
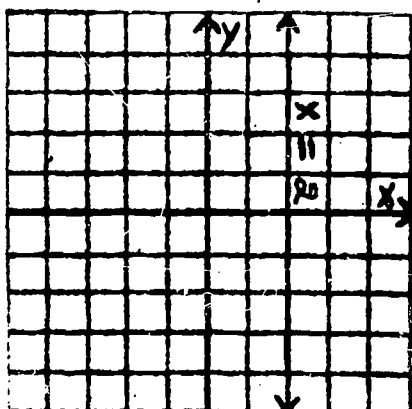
24.	True	(72)
25.	A, C	(72)
26.	$-\frac{1}{2}$	(73)
27.	5	(73)
28.	C	(73)

C-48

UNIT IX   TEACHER'S ANSWER KEY   PART II
                                                                Test A

FIRST YEAR ALGEBRA

1.   Negative   (73)   7.   (74)

2.   (72)

3.   m = 3   (74)

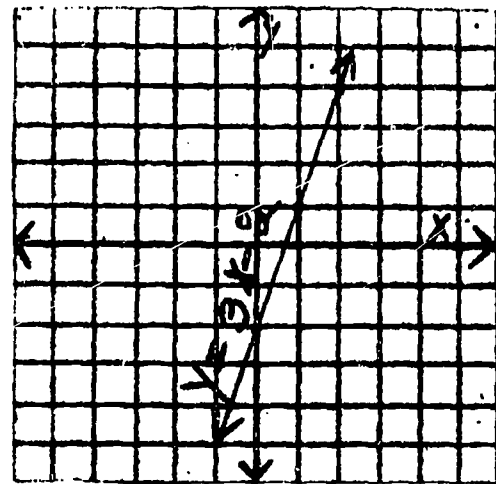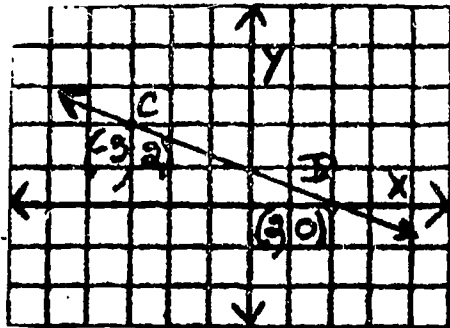4.   m = $-\frac{3}{2}$ (74)   8.   (74)

5.   (74)

                                               9.   y = -2x + 1   (75)

                                               10.   y = 3x - 5   (75)

6.   (74)   11.   y = -x - 1   (75)

298

12. (76)

X > -2

13. (76)

Y ≤ 1

14.

X - Y =

15. (76)

Y = X²

16. (77)

(2, 1)

{(2, 1)}

17. {(-2, 5)}   (78, 79, 80)

18. {(-3, -2)}   (78, 79, 80)

19. 22   (81)

20. -7   (81)

21. y   (81)

C-50

UNIT IX   TEACHER'S ANSWER KEY   PART II
                                                          Test B

FIRST YEAR ALGEBRA

1. Positive   (73)   7.   (74)

2.   (72)

3. m = 5   (74)

4. m = $-\frac{4}{3}$ (74)   8.   (74)

5.   (74)
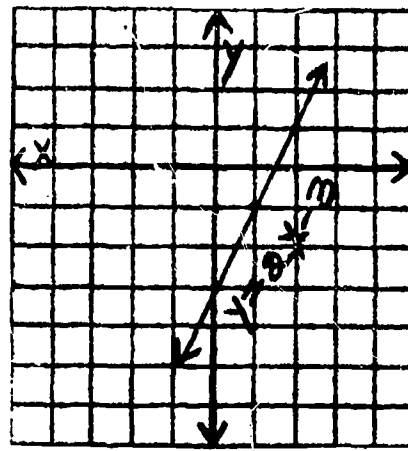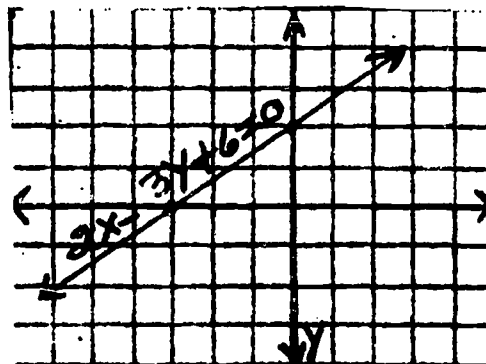
6.   (74)   9.   y = -2x + 2   (75)

                    10. y = 3x - 8   (75)

                                        11. y = -x - 1   (75)

12. (76)

13. (76)

14. (76)

15. (76)

16. (77)

$\{(2,1)\}$
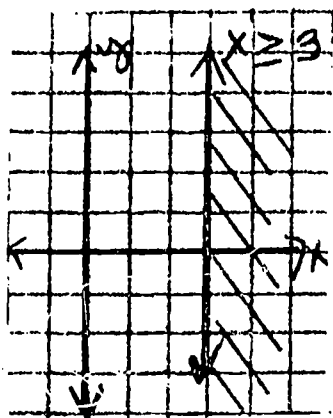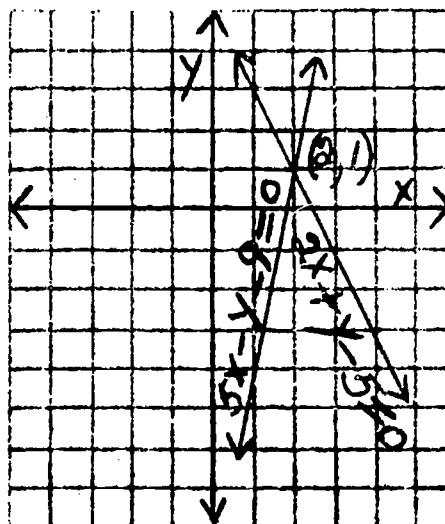
17. $\{(2,3)\}$ (78, 79, 80)

18. $\{(-3,-2)\}$ (78, 79, 80)

19. 48   (81)

20. -9   (81)

21. y   (81)

UNIT IX   TEACHER'S ANSWER KEY   PART II
                                                                  Test C

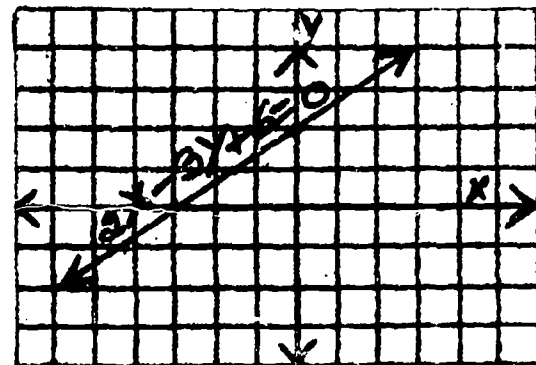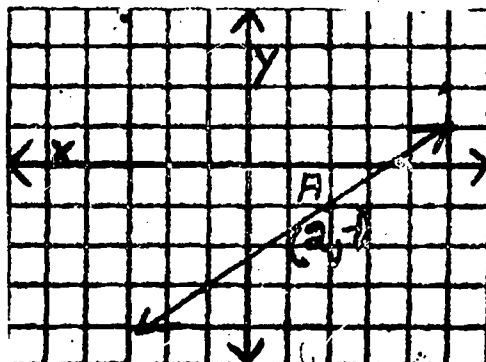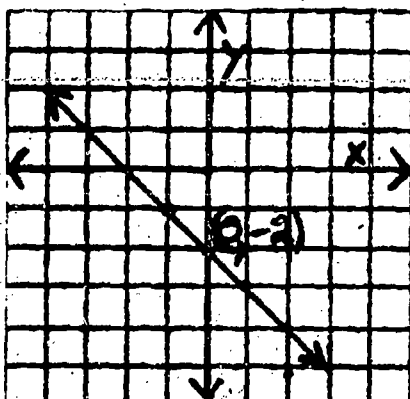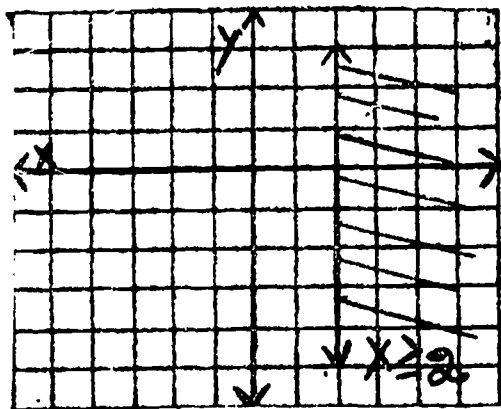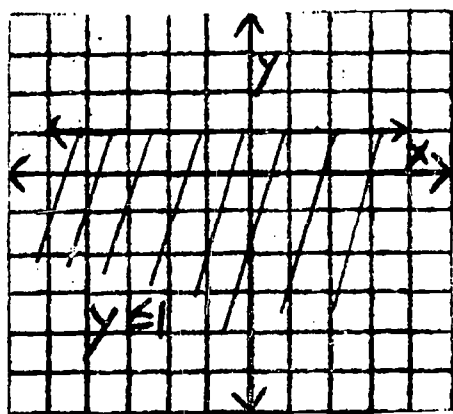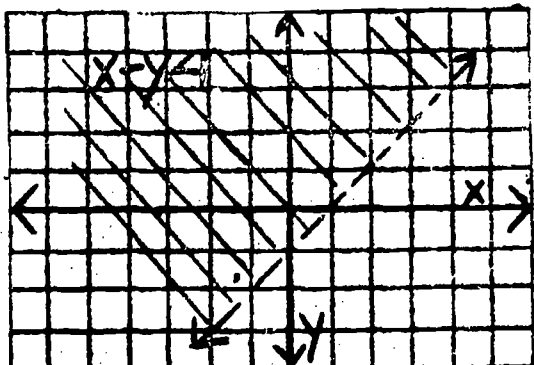FIRST YEAR ALGEBRA

1. Negative   (73)   7.   (74)

2.   (72)
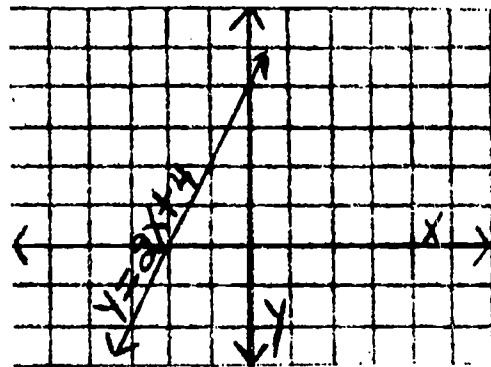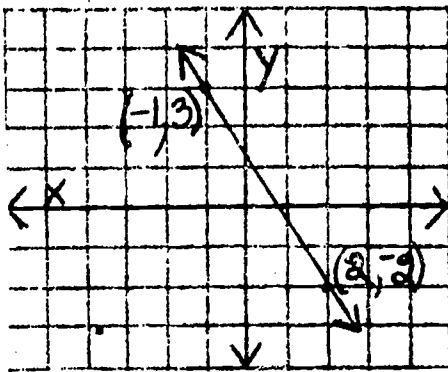
3. $m = -2$ (74)   8.   (74)

4. $m = -\frac{5}{3}$ (74)
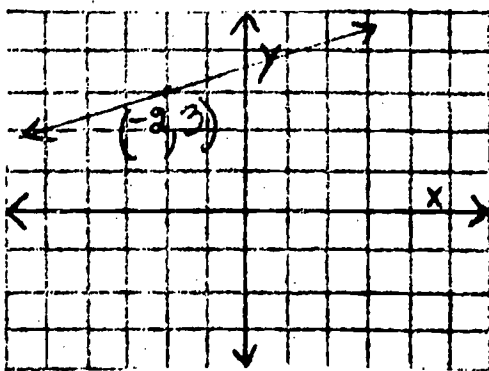
5.   (74)

                                              9. $y = 4x - 3$ (75)

                                              10. $y = -2x + 5$ (75)

6.   (74)   11. $y = 2x - 2$ (75)

12.   (76)

$y < -1$

13.   (76)

$x \geq 2$

14.   (76)

15.   (74)

$y = x^2$
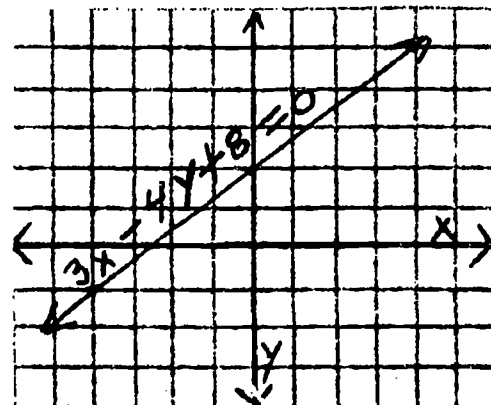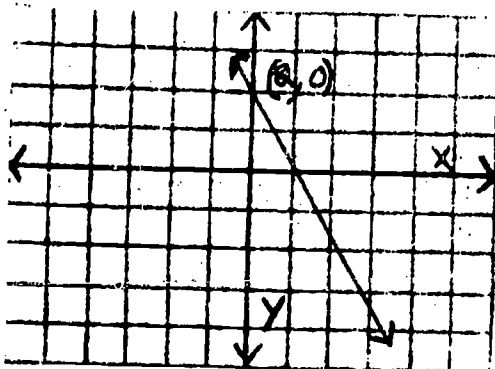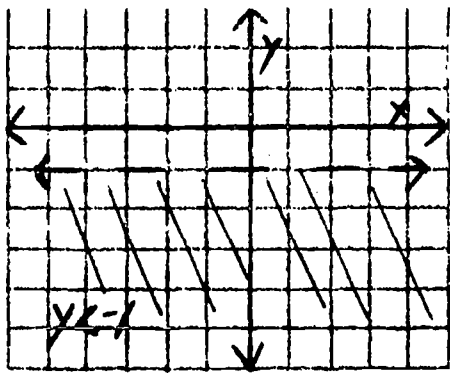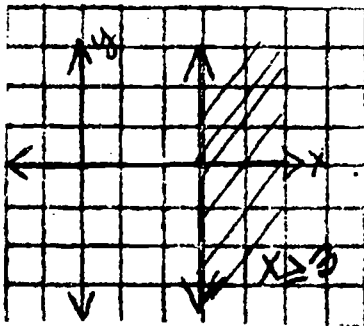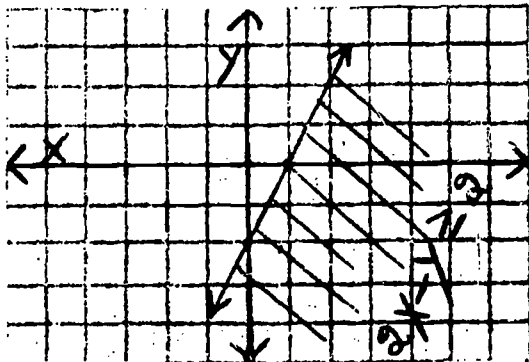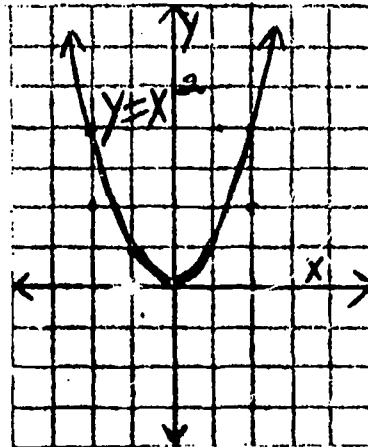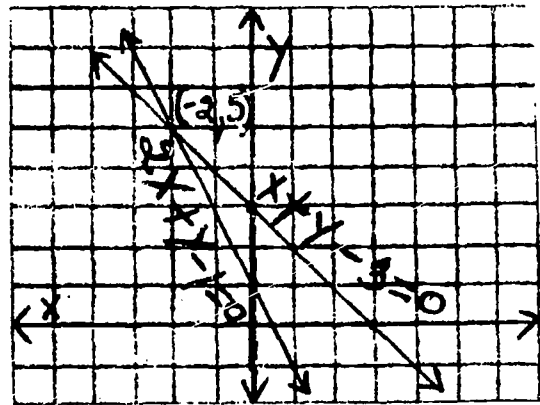
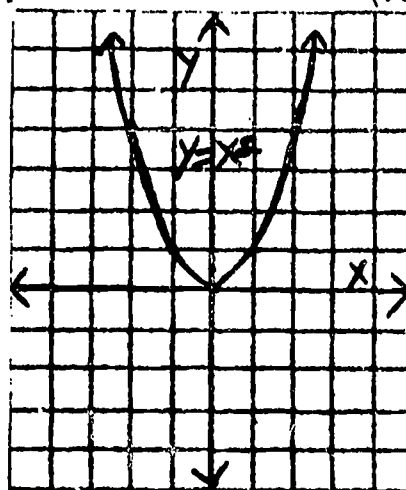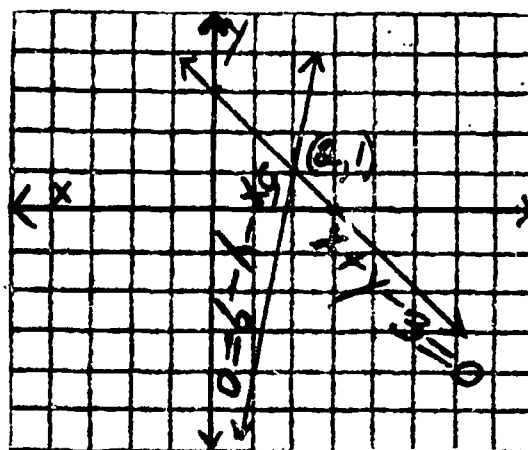16.   (77)

$\{(-2, 5)\}$

17. $\{(17, 11)\}$ (78, 79, 80)

18. $\{(3, -2)\}$ (78, 79, 80)

19.   12   (81)

20.   -14   (81)

21.   x   (81)

C-54

303

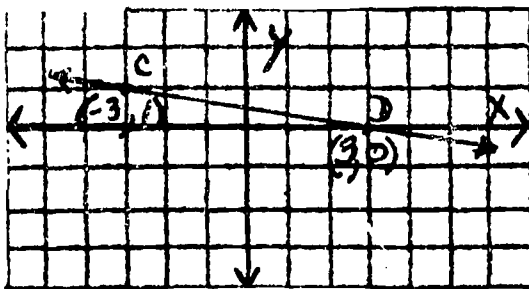UNIT IX   TEACHER'S ANSWER KEY   PART II
                                                                   Test D
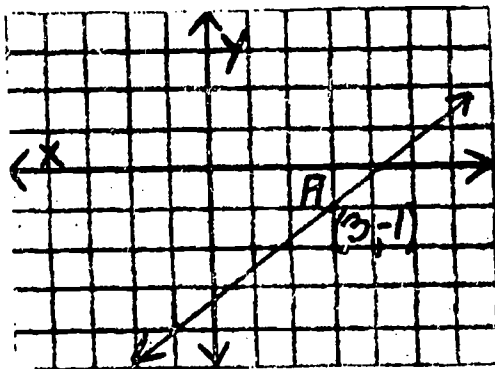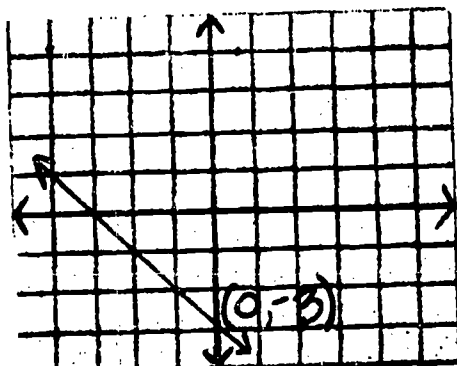
FIRST YEAR ALGEBRA

1. Positive   (73)   7.   (74)

2.   (72)
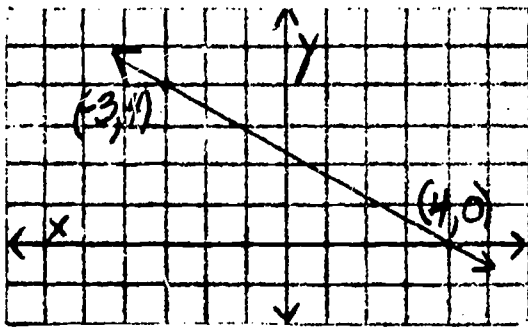
3. m = 7   (74)   8.   (74)

4. m = $-\frac{3}{5}$ (74)
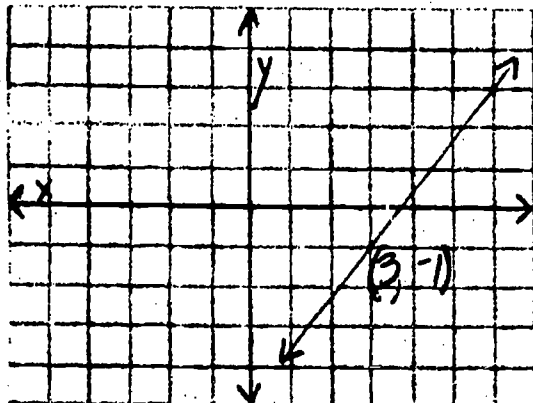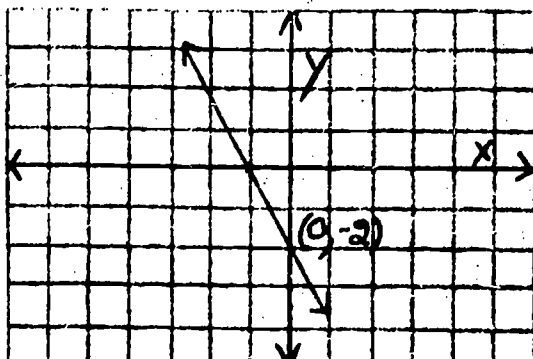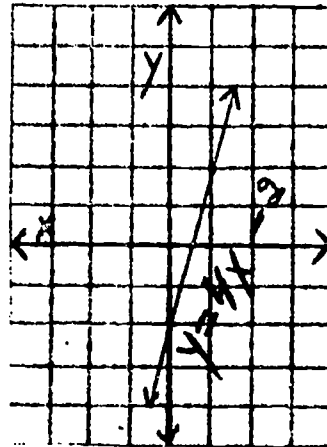
5.   (74)
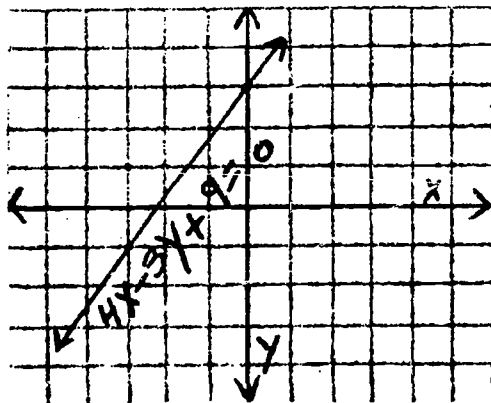
9.   y = -3x - 5   (75)

10. y = 5x - 19   (75)

11. 3y = -2x - 4   (75)

6.   (74)

12.   (76)
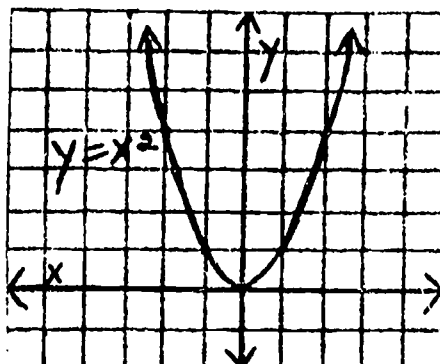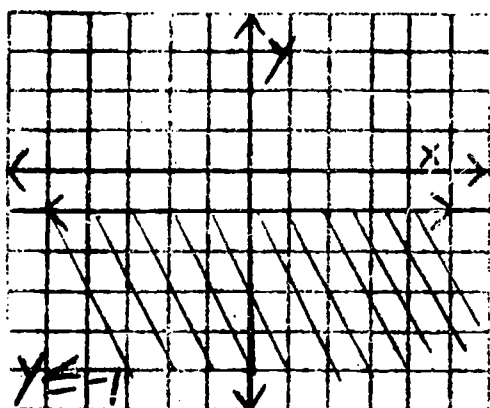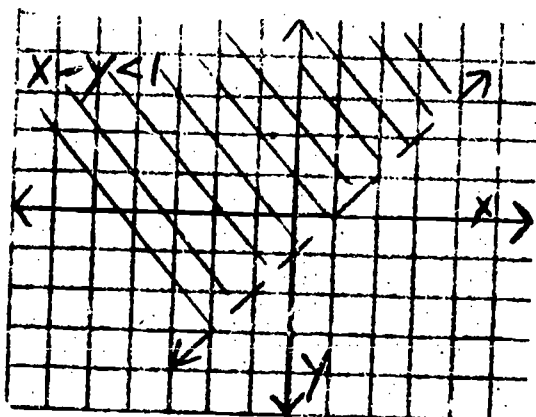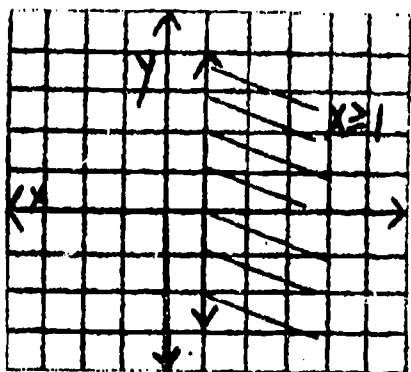

13.   (76)
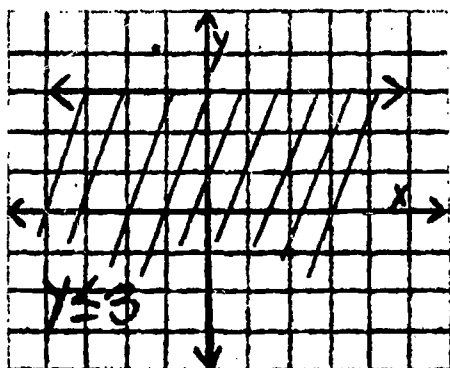
14.   (76)
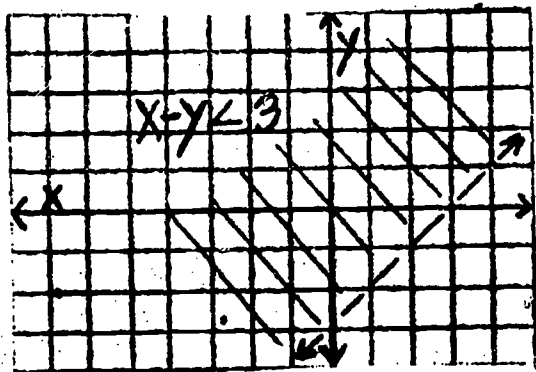
15.   (76)
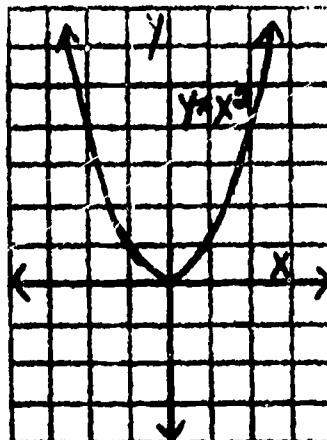
16.   (77)
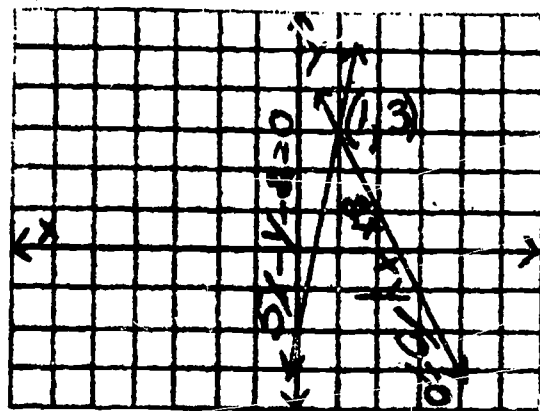
$\{(1,3)\}$

17. $\{(2,5)\}$ (78, 79, 80)

18. $\{(3,0)\}$ (78, 79, 80)

19.   11   (81)

20.   4   (81)

21.   x   (81)

C-56

305

UNIT X   TEACHER'S ANSWER KEY   PART I
                                                                 Test A

                          FIRST YEAR ALGEBRA

1.	G, H, I	(85)		19.	10z	(84)
2.	$\frac{4}{7}$, $\frac{3}{5}$	(82)		20.	$\sqrt{3}$	(86)
				21.	7xy	(84)
3.	$\frac{17}{144}$	(82)		22.	$2\sqrt{5}$	(86)
4.	B, D	(83)		23.	$20\sqrt{6}$	(86)
5.	$\frac{47}{99}$	(83)		24.	$\frac{\sqrt{5}}{3}$	(86)
6.	False	(83)		25.	$\frac{\sqrt{14}}{7}$	(86)
7.	Ratio	(82)				
8.	$\frac{9}{20}$	(83)		26.	$\frac{2\sqrt{7}}{7}$	(86)
				27.	$2A\sqrt{2}$	(86)
9.	A	(33)		28.	25B	(86)
10.	False	(83)		29.	$a\sqrt{7}$	(86)
11.	97	(84)				
12.	Index	(84)		30.	$\frac{\sqrt{42a}}{7}$	(86)
13.	B			31.	7ab	(84)
14.	5	(84)		32.	$\frac{x\sqrt{6}}{2}$	(86)
15.	7d	(84)				
16.	$\sqrt{21}$	(86)		33.	$\frac{\sqrt{xy}}{y}$	(86)
17.	$35\sqrt{62}$	(86)				
18.	$\sqrt{3}$	(86)				

UNIT X   TEACHER'S ANSWER KEY   PART I
                                                                  Test B

FIRST YEAR ALGEBRA

1.	A, B, C, D, E, I	(85)		19.	12a	(84)
2.	$\frac{3}{7}$, $\frac{4}{9}$	(82)		20.	$\sqrt{3}$	(86)
				21.	8ax	(84)
3.	$\frac{13}{84}$	(82)		22.	$3\sqrt{2}$	(86)
				23.	$16\sqrt{3}$	(86)
4.	B, D	(83)				
5.	$\frac{7}{9}$	(83)		24.	$\frac{\sqrt{7}}{5}$	(86)
6.	Ratio	(82)		25.	$\frac{\sqrt{15}}{5}$	(86)
7.	$\frac{67}{100}$	(83)		26.	$\frac{3\sqrt{5}}{5}$	(86)
8.	True	(83)				
				27.	$2B\sqrt{2}$	(86)
9.	D	(33)		28.	9y	(86)
10.	False	(83)		29.	$b\sqrt{5}$	(86)
11.	57	(84)				
12.	7	(84)		30.	$\frac{\sqrt{15a}}{3}$	(86)
13.	A			31.	5xy	(84)
14.	7	(84)		32.	$\frac{a\sqrt{21}}{3}$	(86)
15.	6d	(84)				
16.	$\sqrt{35}$	(86)		33.	$\frac{\sqrt{xy}}{x}$	(86)
17.	$6\sqrt{62}$	(86)				
18.	$\sqrt{5}$	(86)				

UNIT X		TEACHER'S ANSWER KEY	PART I
		FIRST YEAR ALGEBRA	Test C

1. F, G, H (85)
2. $\frac{2}{7}$, $\frac{3}{8}$ (82)
3. $\frac{9}{40}$ (83)
4. A, C (83)
5. $\frac{5}{11}$ (83)
6. $\frac{13}{20}$ (83)
7. Ratio (82)
8. False (83)
9. B (33)
10. False (84)
11. 73 (84)
12. 8 (84)
13. c
14. 3 (84)
15. 7x (84)
16. $\sqrt{15}$ (86)
17. $8\sqrt{30}$ (86)
18. $\sqrt{5}$ (86)

19. 9a (84)
20. $\sqrt{3}$ (86)
21. 7yz (84)
22. $2\sqrt{3}$ (86)
23. $6\sqrt{6}$ (86)
24. $\frac{\sqrt{13}}{6}$ (86)
25. $\frac{\sqrt{6}}{3}$ (86)
26. $\frac{2\sqrt{3}}{3}$ (86)
27. $2c\sqrt{3}$ (86)
28. 16y (86)
29. $a\sqrt{11}$ (86)
30. $\frac{\sqrt{14a}}{2}$ (86)
31. 7ab (84)
32. $\frac{a\sqrt{15}}{3}$ (86)
33. $\frac{\sqrt{ab}}{b}$ (86)

UNIT X   TEACHER'S ANSWER KEY   PART I
Test D

FIRST YEAR ALGEBRA

1.	A, B, C, D, E, I	(85)	19.	8a	(84)
2.	$\frac{2}{3}$, $\frac{3}{5}$	(82)	20.	$\sqrt{3}$	(86)
			21.	9ab	(84)
3.	$\frac{13}{84}$	(82)	22.	$3\sqrt{5}$	(86)
4.	B, C	(83)	23.	$12\sqrt{10}$	(86)
5.	$\frac{5}{9}$	(83)	24.	$\frac{\sqrt{21}}{7}$	(86)
6.	$\frac{37}{100}$	(83)	25.	$\frac{3\sqrt{7}}{7}$	(86)
7.	Ratio	(82)	26.	$\frac{\sqrt{17}}{9}$	(86)
8.	True	(83)			
9.	C	(33)	27.	$3B\sqrt{5}$	(86)
10.	False	(83)	28.	9a	(86)
11.	Radicand	(84)	29.	$a\sqrt{13}$	(86)
12.	52	(84)	30.	$\frac{\sqrt{33a}}{11}$	(86)
13.	A		31.	11ab	(84)
14.	5	(84)	32.	$\frac{a\sqrt{91}}{13}$	(86)
15.	3a	(84)			
16.	$\sqrt{10}$	(86)	33.	$\frac{\sqrt{ab}}{a}$	(86)
17.	$21\sqrt{21}$	(86)			
18.	$\sqrt{2}$				

UNIT X	TEACHER'S ANSWER KEY	PART II
		Test A

FIRST YEAR ALGEBRA

1. B, D (87)

2. $7\sqrt{2}$ (87)

3. $-4\sqrt{11}$ (87)

4. $11\sqrt{3} - 2\sqrt{5}$ (87)

5. $11\sqrt{2}$ (87)

6. $\sqrt{3}$ (87)

7. -2 (88)

8. $11 - 5\sqrt{3}$ (88)

9. $3 + \sqrt{13}$ (89)

10. $\sqrt{7} - \sqrt{5}$ (89)

11. $-5(1 - \sqrt{2})$ (89)

12. $-3(\sqrt{3} - \sqrt{5})$ (89)

13. $-12a\sqrt{b}$ (86)

14. $a\sqrt{15b}$ (86)

15. $2a\sqrt{6}$ (86)

16. $\dfrac{a\sqrt{15}}{3}$ (86)

17. $\dfrac{\sqrt{14a}}{2a}$ (86)

18. $\dfrac{y\sqrt{3x}}{x}$ (86)

19. $\dfrac{2\sqrt{xz}}{z}$ (86)

20. $\{25\}$ (90)

21. $\{4\}$ (90)

22. ϕ (90)

C-61

UNIT X   TEACHER'S ANSWER KEY   PART II
                                                                  Test B

FIRST YEAR ALGEBRA

1.	A, D	(87)	19.	$\dfrac{3\sqrt{gh}}{h}$	(86)
2.	$4\sqrt{5}$	(87)	20.	$\{49\}$	(90)
3.	$-3\sqrt{3}$	(87)	21.	$\{19\}$	(90)
4.	$7\sqrt{7} + 10\sqrt{2}$	(87)	22.	ϕ	(90)
5.	$6\sqrt{2}$	(87)			
6.	$29\sqrt{2}$	(87)			
7.	-5	(88)			
8.	$12 - 9\sqrt{2}$	(88)			
9.	$9 - \sqrt{10}$	(89)			
10.	$\sqrt{3} + \sqrt{5}$	(89)			
11.	$3(\sqrt{3} + 1)$	(89)			
12.	$\dfrac{3(\sqrt{2} + \sqrt{7})}{-5}$	(89)			
13.	$-15c\sqrt{d}$	(86)			
14.	$m\sqrt{21n}$	(86)			
15.	$2x$	(86)			
16.	$\dfrac{R\sqrt{14}}{2}$	(86)			
17.	$\dfrac{\sqrt{5t}}{2t}$	(86)			
18.	$\dfrac{a}{b}\sqrt{2b}$	(86)			

UNIT X		TEACHER'S ANSWER KEY		PART II Test C

FIRST YEAR ALGEBRA

1.	A, C	(87)	19.	$\frac{3\sqrt{xy}}{x}$	(86)
2.	$3\sqrt{6}$	(87)	20.	$\{9\}$	(90)
3.	$-2\sqrt{7}$	(87)	21.	$\{58\}$	(90)
4.	$3\sqrt{6} - 3\sqrt{2}$	(87)	22.	ϕ	(90)
5.	$12\sqrt{3}$	(87)			
6.	$29\sqrt{5}$	(87)			
7.	4	(88)			
8.	$22 + 10\sqrt{5}$	(88)			
9.	$\sqrt{11} + 4$	(89)			
10.	$\sqrt{2} - \sqrt{3}$	(89)			
11.	$\frac{4 + \sqrt{2}}{7}$	(89)			
12.	$-(\sqrt{2} + \sqrt{5})$	(89)			
13.	$-12x\sqrt{y}$	(86)			
14.	$m\sqrt{6n}$	(86)			
15.	$2R\sqrt{3}$	(86)			
16.	$\frac{x\sqrt{14}}{2}$	(86)			
17.	$\frac{\sqrt{15m}}{3m}$	(86)			
18.	$\frac{m\sqrt{2n}}{n}$	(86)			

UNIT X   TEACHER'S ANSWER KEY   PART II
Test D

FIRST YEAR ALGEBRA

1.	D, E	(87)	19.	$\frac{5\sqrt{ab}}{b}$	(86)
2.	$-4\sqrt{11}$	(87)	20.	$\{100\}$	(90)
3.	$6\sqrt{2}$	(87)	21.	$\{7\}$	(90)
4.	$-4\sqrt{7} + 3\sqrt{3}$	(87)	22.	ϕ	(90)
5.	$-2\sqrt{5}$	(87)			
6.	$45\sqrt{5}$	(87)			
7.	-5	(88)			
8.	$16 - 7\sqrt{5}$	(88)			
9.	$\sqrt{7} - 5$	(89)			
10.	$\sqrt{2} + \sqrt{11}$	(89)			
11.	$-2(\sqrt{3} + 2)$	(89)			
12.	$\frac{7(\sqrt{11} + \sqrt{2})}{9}$	(89)			
13.	$-12m\sqrt{n}$	(86)			
14.	$y\sqrt{14x}$	(86)			
15.	$a\sqrt{6}$	(86)			
16.	$\frac{c\sqrt{21}}{3}$	(86)			
17.	$\frac{\sqrt{15x}}{3x}$	(86)			
18.	$\frac{\sqrt{5a}}{b}$	(86)			

UNIT XI   TEACHER'S ANSWER KEY   Test A

FIRST YEAR ALGEBRA

1.	Function	(92)	19.	B	(93)
2.	{1, 2, 3, 4}	(91)	20.	180	(93)
3.	{0, 1, 2}	(91)	21.	{-4, 4}	(93)
4.	B	(91)	22.	B	(94)
5.	A	(91)	23.	C	(93)
6.	False	(92)	24.	A	(93)
7.	D	(92)	25.	14	(94)
8.	C	(92)	26.	False	(93)
9.	False	(92)	27.	-1	(94)
10.	{-1, 3, 7}	(92)			
11.	{1, 2, 3}	(92)			
12.	y = 3x	(93)			
13.	3	(93)			
14.	$\frac{36}{5}$	(93)			
15.	$\frac{45}{4}$	(93)			
16.	D	(93)			
17.	C	(93)			
18.	A	(93)			

UNIT XI		TEACHER'S ANSWER KEY		Test B

FIRST YEAR ALGEBRA

1.	First	(92)	19.	A	(93)
2.	$\{1, 2, 3, 4\}$	(91)	20.	144	(93)
3.	$\{0, 1, 4\}$	(91)	21.	$a = \pm 4$	(93)
4.	C	(91)	22.	D	(94)
5.	C	(91)	23.	A	(93)
6.	False	(92)	24.	B	(93)
7.	C	(92)	25.	20	(94)
8.	D	(92)	26.	True	(93)
9.	False	(92)	27.	-9	(94)
10.	$\{-1, 3, 7\}$	(92)			
11.	$\{1, 2, 3\}$	(92)			
12.	$y = 4x$	(93)			
13.	4	(93)			
14.	$\frac{36}{7}$	(93)			
15.	$\frac{27}{2}$	(93)			
16.	C	(93)			
17.	B	(93)			
18.	D	(93)			

UNIT XI   TEACHER'S ANSWER KEY   Test C

FIRST YEAR ALGEBRA

1. Function	(92)	19. C (93)
2. $\{0, 1, 2, 3\}$	(91)	20. $\frac{1200}{7}$ (93)
3. $\{0, 1, 2\}$	(91)	
4. A, B	(91)	21. ± 4 (93)
5. D	(91)	22. C (94)
6. True	(92)	23. B (93)
7. C	(92)	24. D (93)
8. D	(92)	25. 21 (94)
9. False	(92)	26. False (93)
10. $\{1, 7, 13\}$	(92)	27. -1 (94)
11. $\{1, 2, 3\}$	(92)	
12. $y = \frac{1}{2}x$	(93)	
13. $\frac{1}{2}$	(93)	
14. 10	(93)	
15. $\frac{35}{4}$	(93)	
16. B	(93)	
17. A	(93)	
18. D	(93)	

UNIT XI   TEACHER'S ANSWER KEY   Test D

FIRST YEAR ALGEBRA

1.	First	(92)		19.	B	(93)
2.	$\{-2, 0, 1, 5\}$	(91)		20.	6	(93)
3.	$\{16, 4, 1, 9\}$	(91)		21.	$\{\pm 4\}$	(93)
4.	A, C	(91)		22.	B	(94)
5.	B	(91)		23.	A	(93)
6.	True	(92)		24.	C	(93)
7.	D	(92)		25.	6	(94)
8.	B	(92)		26.	True	(93)
9.	True	(92)		27.	3	(94)
10.	$\{-5, -2, 1\}$	(92)				
11.	$\{-2, 0, 2\}$	(92)				
12.	$y = -2x$	(93)				
13.	-2	(93)				
14.	$\frac{24}{5}$	(93)				
15.	$\frac{25}{2}$	(93)				
16.	D	(93)				
17.	A	(93)				
18.	C	(93)				

APPENDIX D

PROFILE SHEET

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

STUDENT PROFILE SHEET

Name of Student: _____ H.R. _____

Subject: _____ Pd. _____

SCAT Scores: _____

Quarter Grades:

	I	II	H	III	IV	H	Y

Test No.	Date	Acceptable Score	Student Score	Comments	Dates of Absence

Name of Student: _____

Test No.	Date	Acceptable Score	Student Score	Comments	Dates of Absence

Anecdotal Record:

APPENDIX E

EVALUATION SHEET

FOR

A SELF-PACING PROGRAM IN ALGEBRA

VOLUME I

REACTIONS PLEASE

This program will only be as good as you make it. Your suggestions and criticisms are earnestly sought so that they can be included in revisions of the program.

VOLUME I

Page Number (if appropriate)   Comment

Send to: Thomas E. Rowan
             Supervisor of Mathematics
             Maryland State Department of Education
             600 Wyndhurst Avenue
             Baltimore, Maryland 21210

E-2