This material, organized in a workbook format, was developed to be used with the non-college bound, lower one-third of the ninth-grade student population. Topics covered are flowcharts, set theory, number systems (natural numbers, whole numbers, integers, and rationals), number operations, percentage, measurement, finance, geometric constructions, statistics, and number bases. For the teacher's manual, see SE 016 407. (DT)
The basic material in this book was developed by eight teachers of mathematics in Arkansas Schools working on a grant to Wynne Public Schools under Title III of the Elementary and Secondary Education Act in the summer of 1966. The material was classroom tested in 1966-67, revised in the summer of 1967 and again in the summer of 1968. The material was edited for printing by Mrs. Evelyn Underwood, Mr. Ed White, Mrs. Wanda Lacy, Mrs. Judy Ahart and Mr. Gene Catterton. The editing and printing was financed by the State Title III Program.

The material was developed to be used with the non-college bound student in general and the lower one third of the ninth grade student population in particular. The material develops our number system starting with counting numbers and proceeding through rationals. As the different ideas of numbers are developed, real life problems are used to illustrate the use of the ideas. The authors believe that any teacher who uses this material will enjoy greater success if he will acquire problems from his own local area to use in addition to the ones in this book.

We wish to express appreciation to Dr. Cecil McDermott, of Hendrix College; Mr. Terry Shoemaker of the Jefferson County School in Colorado; Mr. Truett Goatcher, Supervisor in the Department of Education, and Mr. Charles Watson of the State Title III staff, who served as consultants during the revision and editing of the material.
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During the summer of 1971 a committee, directed by Gene Catterton and funded under section 303 of the Elementary and Secondary Education Act 91-230 by Title III section of the Arkansas Department of Education revised, up-dated and prepared the original material for printing. The committee was composed of the following teachers who used the materials: Mrs. Evelyn Underwood, Mrs. Wanda Lacy, Mr. Ed White and Mrs. Judy Ahart. Mathematics consultants to the committee were Dr. Cecil McDermott and Mr. Truett Goatcher.

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D. PERCENTAGE
E. SHARPIE SECTION
Example 1

Start
Clear T

<table>
<thead>
<tr>
<th>23</th>
<th>46</th>
<th>18</th>
<th>92</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>+92</td>
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Depress T
Record Total 179
End

Exercise 1

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<tr>
<th>98</th>
<th>192</th>
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<tbody>
<tr>
<td></td>
<td>471</td>
</tr>
<tr>
<td></td>
<td>+64</td>
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Exercise 2

<table>
<thead>
<tr>
<th>268</th>
<th>541</th>
</tr>
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<tbody>
<tr>
<td>-193</td>
<td>-267</td>
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</table>

Start
Clear T

<table>
<thead>
<tr>
<th>268</th>
<th>193</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Depress T
Record Total 75
End

# Calculator Practice

### Add:

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<th>3.</th>
<th>4.</th>
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<td>349</td>
<td>1398</td>
<td>5610</td>
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<td></td>
<td>350</td>
<td>764</td>
<td>9871</td>
<td>2345</td>
<td>1156</td>
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<tr>
<td></td>
<td>910</td>
<td>610</td>
<td>6070</td>
<td>3387</td>
<td>2595</td>
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<td></td>
<td>590</td>
<td>444</td>
<td>6767</td>
<td>4353</td>
<td>5687</td>
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<tr>
<td></td>
<td>56</td>
<td>600</td>
<td>674</td>
<td>7008</td>
<td>76</td>
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<tr>
<td></td>
<td>542</td>
<td>876</td>
<td>9876</td>
<td>7654</td>
<td>62</td>
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</table>

<table>
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<tr>
<th></th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2765</td>
<td>9874</td>
<td>7190</td>
<td>1000</td>
<td>98,709</td>
</tr>
<tr>
<td></td>
<td>1133</td>
<td>1138</td>
<td>1117</td>
<td>9999</td>
<td>38,470</td>
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<tr>
<td></td>
<td>4756</td>
<td>3899</td>
<td>3030</td>
<td>9510</td>
<td>10,489</td>
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<tr>
<td></td>
<td>9876</td>
<td>1098</td>
<td>1819</td>
<td>9722</td>
<td>45,901</td>
</tr>
<tr>
<td></td>
<td>7364</td>
<td>9495</td>
<td>5867</td>
<td>9206</td>
<td>60,007</td>
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<tr>
<td></td>
<td>4685</td>
<td>9874</td>
<td>9765</td>
<td>2094</td>
<td>98,764</td>
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<tr>
<td></td>
<td>1980</td>
<td>1010</td>
<td>9001</td>
<td>1037</td>
<td>76,347</td>
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</table>

### Subtract:

<table>
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<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9087</td>
<td>7865</td>
<td>890,765</td>
<td>90,876</td>
</tr>
<tr>
<td></td>
<td>-4580</td>
<td>-1098</td>
<td>-91,081</td>
<td>-9,871</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>15.</th>
<th>16.</th>
<th>17.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100,098</td>
<td>1,098,765,432</td>
<td>9,080,705,050</td>
</tr>
<tr>
<td></td>
<td>-8,761</td>
<td>-78,965,190</td>
<td>-98,765,430</td>
</tr>
</tbody>
</table>

18. 983,765 - 18,765 = 

19. 9,876,543,210 - 123,456,789 = 

---
Example 3.

326
\times 94

\begin{array}{c}
\text{Start} \\
\text{Clear T} \\
326 \\
94 \\
\text{Record Total} \\
30,644 \\
\text{End}
\end{array}

Exercise 3.

492
\times 87

\begin{array}{c}
\text{Start} \\
\text{Clear T} \\
492 \\
87 \\
\text{End}
\end{array}

Example 4.

12,662 \div 487 =

\begin{array}{c}
\text{Start} \\
\text{Clear T} \\
12,662 \\
487 \\
\text{Record Total} \\
26 \\
\text{End}
\end{array}

Exercise 4.

8473 \div 37 =

\begin{array}{c}
\text{Start} \\
\text{Clear T} \\
8473 \\
37 \\
\text{End}
\end{array}
Multiply:

1. $4657 \times 431$
2. $6780 \times 328$
3. $1098 \times 19$
4. $675,478 \times 49.761$
5. $9776 \times 57$
6. $98,765 \times 76$
7. $90,100 \times 107$
8. $3,456,789 \times 567$
9. $76,610,987 \times 1,098$
10. $98,761,000 \times 5,678$

Divide:

11. $10,600 \div 25 = $
12. $952 \div 56 =$
13. $9408 \div 112 =$
14. $3375 \div 15 =$
15. $5951 \div 11 =$
16. $14,518 \div 17 =$
17. $350,027 \div 541 =$
18. $129,388 \div 823 =$
19. $666,000 \div 150 =$
20. $99,661 \div 219,254,200$
Which Is Heavier?

Every line segment is a one digit numeral.

The 6's are curved;
The 9's are straight.
Add all of my numbers
to find my weight.

My weight

Izzy the Lizard

Bengy the Tiger

My weight
UNIT II
SETS

A. Set: A set is a collection of objects or ideas.

Examples:
1. Set of dishes
2. Pupils in this room
3. Leaves on a certain tree
4. Symbols for making flowcharts
5. Grains of sand on the earth
6. Stars

Exercises

1. Give 3 examples of sets in this room.

2. Give 3 examples of sets in your home.

3. Give 3 examples of student groups in your school.
B. Elements: Elements are the members belonging to a set. Elements may be described or listed.

Exercises

<table>
<thead>
<tr>
<th>Description</th>
<th>Listed Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set A= {Starter set of dishes} = {Plates, cups, saucers, bowls}</td>
<td></td>
</tr>
<tr>
<td>2. Set B= {Teacher of this class} = {                                        }</td>
<td></td>
</tr>
<tr>
<td>3. Set C= {The set of letters in my name} = {                                        }</td>
<td></td>
</tr>
<tr>
<td>4. Set D= {                                    } = {Dimes, nickels, pennies}</td>
<td></td>
</tr>
<tr>
<td>5. Set E= {                                      } = {I, V, X, L, C, D, M}</td>
<td></td>
</tr>
<tr>
<td>6. Set F= {Favorite record} = {                                        }</td>
<td></td>
</tr>
<tr>
<td>7. Set G= {The pupils in this room= } (List on another paper)</td>
<td></td>
</tr>
</tbody>
</table>

C. Finite Set: A finite set is a set in which all the elements can be counted. (There is a last element).

Exercises

<table>
<thead>
<tr>
<th>Description</th>
<th>Listed Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set J= {The counting numbers} = {1, 2, 3, 4, ..., 49, 50}</td>
<td></td>
</tr>
<tr>
<td>2. Set K= {The odd numbers less than 100} = {                                        }</td>
<td></td>
</tr>
<tr>
<td>3. Set L= {The letters of the alphabet} = {                                        }</td>
<td></td>
</tr>
<tr>
<td>4. Set M= {                                    } = {3, 6, 9, ..., 30, 33}</td>
<td></td>
</tr>
<tr>
<td>5. Set N= {                                      } = {1, 3, 5, 7, ..., 27, 29}</td>
<td></td>
</tr>
<tr>
<td>6. Set O= {Set of even counting numbers between 10 and 1000} = {                                        }</td>
<td></td>
</tr>
</tbody>
</table>
D. Infinite Set: An infinite set is a set in which all the elements cannot be counted. (There is no last element).

Examples:
1. Counting numbers
2. Even numbers
3. Multiples of 3
4. Odd numbers
5. Rational numbers
6. Whole numbers

Many infinite sets can be listed by pattern.

Example:
Set Z = Set of all counting numbers = \{1, 2, 3, 4, 5, ...\}

Exercises
1. Set Y = Set of all even counting numbers = \{\}
2. Set X = Set of all counting numbers which are multiples of three = \{\}
3. Set W = \{4, 8, 12, 16, 20, ...\}
4. Set V = \{4, 9, 16, 25, 36, ...\}

E. Empty or null sets: A set having no elements is the empty or null set. This is written \{\} or \Ø

Examples:
1. Set U = The students in this class who are college graduates. \Ø
2. Set T = The people in this class who ride tricycles to school. \{\}

Exercises
1. Set S = \{Women who have been President of the United States.\}
2. How many elements are the set of Jolly Green Giants in this class room?
F. Subset: A set whose elements are also members of another set is called a subset.

Examples:
1. Set A = \{1, 2, 3, 4, 5, 6, 7\}
   Set B = \{1, 2, 3, 4\}
   Set C = \{1, 2, 3, 4, 5, 6\}
   Set D = \{1, 2, 3, 4, 5, 6, 7\}
   Set E = \{1\}

Sets B, C, D, and E are all subsets of Set A.
2. Set A = \{=, -, \times, ÷\}
   Set B = \{=, \times\}

Set B is a subset of Set A.
3. Set S = \{1, 2, 3\}
   Set T = \{1, 2, 3, 4, 5, \ldots\}

Set S is a subset of Set T.

The null set is a subset of every set.

Every set is a subset of itself. (Set S is a subset of Set S) (Set T is a subset of Set T)

Exercises

1. Set N = \{Sunday, Saturday, Friday\}
   a. List all the subsets of one element.
   b. List all the subsets of two elements.
   c. List all the subsets of three elements.
   d. List all the subsets of four elements.
   e. Is the null set a subset of this set? ________
   f. How many subsets did you obtain from Set N? ________
2. Given Set N = {Mary, Jane, Joe}
   a. List all subsets in Set N.
   b. What kind of a set is Set N?

3. Given Set S = {3, 7, 6, 1}
   a. List all subsets of one element in Set S.
   b. List all subsets of two elements in Set S.
   c. List all subsets of three elements in Set S.
   d. List all subsets of four elements in Set S.
   e. List the elements of a set of which S is a subset.

4. How many subsets are possible:
   a. from a three element set?
   b. from a four element set?

G. Venn Diagrams: Venn diagrams are drawings that show the relation of sets and subsets.

Example.
1. Set A = {All students in school}
   Set B = {All students assigned to this room this hour}
   Set C = {All boys assigned to this room this hour}
   Let Set A be pictured as a geometric figure such as a circle.
Since Set B is a subset of Set A, it may be pictured as a smaller figure inside the larger figure.

Since Set C is a subset of Set B, it may be represented by an even smaller figure.

Is Set C a subset of Set A?

---

**Exercises**

Use Venn diagrams to show the relationship between the following sets.

1. Set A is the set of all boys in our state.
   - Set B is the set of all boys in our school.
   - Set C is the set of all boys in our mathematics class.

2. Set D is the set of counting numbers less than 50.
   - Set E is the set of even counting numbers less than 50.
   - Set F is the set of counting numbers less than 50 which can be divided by three.

**H. Intersection of Sets:** The intersection of two or more sets is a set containing all elements that are common to the individual sets.

Example:

1. \[ A = \{3, 4, 5, 6\} \quad \text{Set } B = \{3, 5, 7, 9, 11\} \]
   
   List the set of elements which belong to both Set A and Set B.
   - \[ N = \{3, 5\} \]
Set N is formed by the intersection of Set A and Set Y. The following Venn diagram shows this intersection.

Exercises

1. Set A = \{1, 2, 3\}
   Set B = \{3, 4, 5\}
   Set C = \{\text{Set A intersection Set B}\} = \{\text{---}\}

   Draw a Venn diagram of these sets. Shade only the intersection. (Set C)

2. The set of even numbers 1 through 20 = \{\text{---}\} = Set K.

   The set of numbers 1 through 20 which can be divided by three = \{\text{---}\} = Set J.

   The intersection of Set K and Set J = \{\text{---}\} = Set D.

   Show these sets using a Venn diagram.
I. Number System: A set of numbers that obeys a definite set of laws when added, subtracted, multiplied or divided.

Infinite sets play an important role in the study of mathematics. The outline of our number system involves several infinite subsets.

- 11. Complex Number System
- 10. Imaginary Numbers
- 9. Real Numbers
- 8. Irrational Numbers
- 7. Rational Numbers
- 6. Fractional Numbers
- 5. Integers
- 4. Negative Integers
- 3. Whole Numbers
- 2. Zero
- 1. Counting Numbers

What is the only subset above which is not infinite? ___________

Our study will be mainly about the sets in the dotted line. We will see why we need these sets of numbers and what they are.

Can you give an example of a number from each subset in the outline?

Set Number: 1. _____ 7. _____
2. _____ 8. _____
3. _____ 9. _____
4. _____ 10. _____
5. _____ 11. _____
6. _____
J. Renaming Numbers: Every number has many names.

--- Exercises ---

1. List ten names for the number (10).

2. Draw lines from 6 to all other names for 6 that you can find in this box.

   \[
   \begin{align*}
   (8 \div 2) & & (7 + 3) & & (5 + 1) \\
   (3 + 3) & & 6 & & (11 - 6) \\
   (1 + 11) & & (10 - 5) & & (4 + 2) \\
   \end{align*}
   \]

3. Draw a loop around all those number names which tell how many \( \bigcirc \)'s you see in the picture.

\[
\begin{align*}
\bigcirc & & \bigcirc & & \bigcirc & & 2 + 2 + 1 & & 7 - 3 \\
\bigcirc & & \bigcirc & & 5 + 0 & & 3 + 2 \\
6 - 3 & & 8 - 4 & & 9 - 2 \\
1 + 1 + 1 + 2 & & 2 + 2 + 2 \\
4 + 1 & & 3 + 3 - 1 \\
\end{align*}
\]
UNIT III
COUNTING NUMBERS

A. Investigation of Counting Numbers

Exercises

1. How many members are in your family?
2. How many mathematics books do you have in your home?
3. What is the use of the black cable you often find laid across a highway or street?
4. How many windows are in your home?
5. How many desks are in this mathematics classroom?
6. How many students are there in this mathematics class?
7. How many words do you count on this page?
8. What is the total number of letters used in writing the words on this page?
9. What is the average number of letters used per word?
Exercises

From one counting number to the next counting number

1. 13 + \_ = 14
2. 6 + 1 = \_
3. \_ + 1 = 124
4. 1256 + \_ = 1257
5. a. \_ + \_ + \_ = 3
   b. \_ + \_ = 3
6. a. \_ + \_ + \_ + \_ = 4
   b. \_ + \_ = 4
   c. 3 + \_ = 4
7. If any counting number is chosen how do you find the next counting number?
8. a. What are the different names for the number four in exercise 6?
   b. Is there a difference between "b" and "c" in exercise 6?
   c. Can you write exercise 6 in still another way?
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td>1.</td>
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<td>2.</td>
<td>6</td>
<td>3.</td>
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<tr>
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<td></td>
<td>34</td>
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<tr>
<td>5.</td>
<td>3</td>
<td>6.</td>
<td>454</td>
<td>7.</td>
</tr>
<tr>
<td>476</td>
<td></td>
<td>7</td>
<td></td>
<td>32</td>
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<td>4876</td>
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<tr>
<td>21</td>
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<td>5</td>
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<td>25</td>
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<tr>
<td>92</td>
<td></td>
<td></td>
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<tr>
<td>9.</td>
<td>98</td>
<td>10.</td>
<td>86,456</td>
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<tr>
<td></td>
<td>8</td>
<td>24,514</td>
<td></td>
<td>6719</td>
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<tr>
<td>345</td>
<td>18,632</td>
<td></td>
<td>8547</td>
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<tr>
<td>87</td>
<td>97,543</td>
<td></td>
<td>1357</td>
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<tr>
<td>7652</td>
<td>12,543</td>
<td></td>
<td>6429</td>
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<tr>
<td>56</td>
<td>67,892</td>
<td></td>
<td>8165</td>
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<tr>
<td></td>
<td>14,897</td>
<td></td>
<td>4321</td>
<td></td>
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<tr>
<td></td>
<td>64,523</td>
<td></td>
<td>9658</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18,324</td>
<td></td>
<td>4231</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65,889</td>
<td></td>
<td>6614</td>
<td></td>
</tr>
</tbody>
</table>
### Calculator Practice

1. 334  
   346  
   532  

2. 567  
   876  
   545  

3. 891  

4. 156  
   348  
   763  

5. 245  
   631  
   893  

6. 872  
   134  
   576  

7. 865  
   544  
   322  

8. 218  
   422  
   553  

9. 871  
   992  
   332  

10. 321  
    654  
    798  

11. 161  
    385  
    369  

12. 893  
    568  
    432  

13. 354  
    786  
    825  

14. 319  
    813  
    457  

15. 562  
    137  
    689  

16. 154  
    632  
    987  

17. 654  
    321  
    811  

18. 635  
    274  
    862
Does the addition tape at the right agree with the tickets? If there are mistakes, circle them and correct them. Also, correct the total.
3. Addition of counting numbers on a number line

Example:

Think of the distance between the points as a unit of measure.

Problem \(4 + 7 =\)

Begin at "start" and count 4 units to the right. (positive)
Beginning at 4 count 7 units to the right.

Which counting number did you reach?

Exercises

Make number lines for the following problems:

1. \(8 + 3\)  2. \(7 + 2 + 4\)  3. \(1 + 7 + 3\)
   4. \(5 + 1 + 3\)  5. \(8 + 1 + 3 + 2\)  6. \(6 + 1 + 1 + 2\)
7. Mary has 5 shades of Revlon lipstick and Sue has 9 shades.
   a. Make a number line.
   b. Number 15 units from start.
   c. The two girls have how many shades in all?
   d. What counting numbers were used in this problem?
   e. What was the greatest counting number obtained?
   f. What operation was used in this problem?

8. Joe hit 2 home runs, Jim hit 3 home runs, and John hit 4 home runs.
   a. Make a number line.
   b. Number the units.
   c. How many home runs were hit altogether?
   d. What counting numbers were used in this problem?
   e. What was the greatest counting number obtained?
   f. What operation was used in this problem?

9. During library reading period, Mary read 22 pages, Jane read 11 pages, and Joe read 16 pages.
   a. Make a number line.
   b. Can you find another idea (or number) to use in place of the word "start"?
   c. How many pages were read by Mary, Jane and Joe?
   d. Perform the operation using the number line.
   e. What was the greatest counting number obtained?

10. John has 5 nickels, Jim 3 nickels, Al 1 nickel and Bob 2 nickels.
    a. Make a number line.
    b. Number the units.
    c. How many nickels do all the boys have?
    d. What counting numbers were used in this problem?
    e. What was the greatest counting number obtained?
    f. What operation was used in this problem?
Magic Squares: A magic square is a square which is divided into a number of smaller squares called cells. By following a few simple rules, consecutive counting number may be placed in these cells so that the sum of each row, column, and diagonal is the same.

Magic squares with an odd number of cells:

1. Begin by placing any counting number in the center cell of top row.
2. Proceed diagonally upward to the right.
3. If you stop outside the large square, go to the bottom cell in that column or the extreme left cell in that row.
4. If you stop in a full cell, go back to the last number and place the next number in the empty cell below.
5. Small cell at top right with X should be treated as full cell.

Example:

```
  8  1  6
  3  5  7
  4  9  2
```

Exercises

1. 
2. 
3.
Magic squares with an even number of cells:

1. Begin by drawing in the diagonals.
2. Start in the top left corner and count consecutively placing only the numbers that fall in cells through which a diagonal passes.
3. Put the first consecutive number not written in the next to the last cell and count back to the beginning placing numbers in the empty cells.

Example:

```
  1 15 16 4
 12 6 7 9
  8 10 11 15
 13 3 2 16
```

---

Exercises

1. 
2. 
3. 
4.
C. Closure Property for Addition

Exercises

1. \[
\begin{array}{c}
XX \\
XXX \\
\end{array}
\]
How many X's do you see in the box? ______

2. \[
\begin{array}{c}
XX \\
XX \\
\end{array}
\]
How many X's are in this box? ______

3. How many X's are in both boxes? ______

4. Is your answer a counting number? ______

5. a. How many girls are in this class? ______
    b. How many boys are in this class? ______
    c. How many students are in this class? ______

6. What type of number is answer "c"? ______

7. Add the following:

\[
\begin{array}{cccccccc}
22 & 33 & 8 & 162 & 142 \\
15 & 12 & 13 & 221 & 97 \\
\end{array}
\]

8. Can you give an example of adding two counting numbers, where your answer is not a counting number? ______

9. If you add any two counting numbers, what type of number is your answer? ______

10. Add:

\[
\begin{array}{cccccccc}
7 & 12 & 13 & 14 & 51 & 32 \\
9 & 41 & 8 & 7 & 6 & 42 \\
\end{array}
\]

Note: Another way of stating problem 9 is to say the set of counting numbers is \textit{closed} under the operation of addition.
Use the chart on the following page to find the number of seeds needed.

<table>
<thead>
<tr>
<th>Crops to be planted</th>
<th>Distance between rows</th>
<th>Distance between plants</th>
<th>No. of seeds per acre</th>
<th>No. of acres</th>
<th>Total number of seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>30&quot;</td>
<td>4&quot;</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td>30&quot;</td>
<td>24&quot;</td>
<td></td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Watermelons</td>
<td>42&quot;</td>
<td>50&quot;</td>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>30&quot;</td>
<td>2&quot;</td>
<td></td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Cantaloupes</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>30&quot;</td>
<td>4&quot;</td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Did you strike out?

In the arrangement of matches at the left, there are four small squares and one large square, making five squares in all. Can you change the position of three matches to reduce the number of squares to three?
<table>
<thead>
<tr>
<th>Spacing In Row</th>
<th>30&quot;</th>
<th>32&quot;</th>
<th>34&quot;</th>
<th>36&quot;</th>
<th>38&quot;</th>
<th>40&quot;</th>
<th>42&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>104,538</td>
<td>98,002</td>
<td>92,238</td>
<td>87,114</td>
<td>82,529</td>
<td>78,420</td>
<td>74,670</td>
</tr>
<tr>
<td>4&quot;</td>
<td>52,269</td>
<td>49,001</td>
<td>46,119</td>
<td>43,557</td>
<td>41,264</td>
<td>39,201</td>
<td>37,335</td>
</tr>
<tr>
<td>6&quot;</td>
<td>34,846</td>
<td>32,667</td>
<td>30,746</td>
<td>29,038</td>
<td>27,510</td>
<td>26,134</td>
<td>24,890</td>
</tr>
<tr>
<td>8&quot;</td>
<td>26,134</td>
<td>24,501</td>
<td>23,060</td>
<td>21,778</td>
<td>20,632</td>
<td>19,600</td>
<td>18,667</td>
</tr>
<tr>
<td>10&quot;</td>
<td>20,908</td>
<td>19,600</td>
<td>18,448</td>
<td>17,423</td>
<td>16,506</td>
<td>15,680</td>
<td>14,934</td>
</tr>
<tr>
<td>12&quot;</td>
<td>17,423</td>
<td>16,334</td>
<td>15,373</td>
<td>14,519</td>
<td>13,755</td>
<td>13,067</td>
<td>12,445</td>
</tr>
<tr>
<td>14&quot;</td>
<td>14,934</td>
<td>14,000</td>
<td>13,177</td>
<td>12,445</td>
<td>11,790</td>
<td>11,200</td>
<td>10,667</td>
</tr>
<tr>
<td>16&quot;</td>
<td>13,067</td>
<td>12,250</td>
<td>11,530</td>
<td>10,889</td>
<td>10,316</td>
<td>9,800</td>
<td>9,334</td>
</tr>
<tr>
<td>18&quot;</td>
<td>11,615</td>
<td>10,889</td>
<td>10,249</td>
<td>9,679</td>
<td>9,170</td>
<td>8,711</td>
<td>8,297</td>
</tr>
<tr>
<td>20&quot;</td>
<td>10,454</td>
<td>9,800</td>
<td>9,224</td>
<td>8,711</td>
<td>8,253</td>
<td>7,840</td>
<td>7,467</td>
</tr>
<tr>
<td>22&quot;</td>
<td>9,503</td>
<td>8,909</td>
<td>8,385</td>
<td>7,919</td>
<td>7,503</td>
<td>7,127</td>
<td>6,788</td>
</tr>
<tr>
<td>24&quot;</td>
<td>8,711</td>
<td>8,167</td>
<td>7,687</td>
<td>7,259</td>
<td>6,877</td>
<td>6,533</td>
<td>6,222</td>
</tr>
<tr>
<td>26&quot;</td>
<td>8,041</td>
<td>7,539</td>
<td>7,095</td>
<td>6,701</td>
<td>6,372</td>
<td>6,031</td>
<td>5,744</td>
</tr>
<tr>
<td>28&quot;</td>
<td>7,467</td>
<td>7,000</td>
<td>6,588</td>
<td>6,222</td>
<td>5,955</td>
<td>5,600</td>
<td>5,334</td>
</tr>
<tr>
<td>30&quot;</td>
<td>6,969</td>
<td>6,533</td>
<td>6,149</td>
<td>5,808</td>
<td>5,502</td>
<td>5,227</td>
<td>4,978</td>
</tr>
<tr>
<td>32&quot;</td>
<td>6,534</td>
<td>6,125</td>
<td>5,765</td>
<td>5,445</td>
<td>5,158</td>
<td>4,900</td>
<td>4,667</td>
</tr>
<tr>
<td>34&quot;</td>
<td>6,149</td>
<td>5,765</td>
<td>5,426</td>
<td>5,124</td>
<td>4,855</td>
<td>4,649</td>
<td>4,392</td>
</tr>
<tr>
<td>36&quot;</td>
<td>5,808</td>
<td>5,445</td>
<td>5,125</td>
<td>4,840</td>
<td>4,586</td>
<td>4,356</td>
<td>4,149</td>
</tr>
<tr>
<td>38&quot;</td>
<td>5,502</td>
<td>5,158</td>
<td>4,855</td>
<td>4,585</td>
<td>4,344</td>
<td>4,126</td>
<td>3,930</td>
</tr>
<tr>
<td>40&quot;</td>
<td>5,227</td>
<td>4,900</td>
<td>4,612</td>
<td>4,356</td>
<td>4,126</td>
<td>3,920</td>
<td>3,733</td>
</tr>
<tr>
<td>42&quot;</td>
<td>4,978</td>
<td>4,667</td>
<td>4,392</td>
<td>4,148</td>
<td>3,930</td>
<td>3,733</td>
<td>3,536</td>
</tr>
<tr>
<td>44&quot;</td>
<td>4,752</td>
<td>4,455</td>
<td>4,193</td>
<td>3,960</td>
<td>3,751</td>
<td>3,564</td>
<td>3,394</td>
</tr>
<tr>
<td>46&quot;</td>
<td>4,545</td>
<td>4,261</td>
<td>4,010</td>
<td>3,788</td>
<td>3,588</td>
<td>3,409</td>
<td>3,247</td>
</tr>
<tr>
<td>50&quot;</td>
<td>4,182</td>
<td>3,920</td>
<td>3,690</td>
<td>3,485</td>
<td>3,301</td>
<td>3,136</td>
<td>2,987</td>
</tr>
<tr>
<td>54&quot;</td>
<td>3,872</td>
<td>3,630</td>
<td>3,416</td>
<td>3,226</td>
<td>3,057</td>
<td>2,904</td>
<td>2,766</td>
</tr>
<tr>
<td>58&quot;</td>
<td>3,605</td>
<td>3,379</td>
<td>3,181</td>
<td>3,004</td>
<td>2,846</td>
<td>2,704</td>
<td>2,575</td>
</tr>
<tr>
<td>62&quot;</td>
<td>3,372</td>
<td>3,161</td>
<td>2,975</td>
<td>2,810</td>
<td>2,662</td>
<td>2,529</td>
<td>2,409</td>
</tr>
<tr>
<td>66&quot;</td>
<td>3,168</td>
<td>2,970</td>
<td>2,795</td>
<td>2,640</td>
<td>2,500</td>
<td>2,376</td>
<td>2,263</td>
</tr>
<tr>
<td>70&quot;</td>
<td>2,987</td>
<td>2,800</td>
<td>2,635</td>
<td>2,489</td>
<td>2,358</td>
<td>2,258</td>
<td>2,133</td>
</tr>
<tr>
<td>74&quot;</td>
<td>2,825</td>
<td>2,649</td>
<td>2,493</td>
<td>2,354</td>
<td>2,231</td>
<td>2,119</td>
<td>2,018</td>
</tr>
<tr>
<td>78&quot;</td>
<td>2,751</td>
<td>2,579</td>
<td>2,427</td>
<td>2,292</td>
<td>2,172</td>
<td>2,063</td>
<td>1,965</td>
</tr>
<tr>
<td>80&quot;</td>
<td>2,680</td>
<td>2,513</td>
<td>2,365</td>
<td>2,234</td>
<td>2,116</td>
<td>2,010</td>
<td>1,915</td>
</tr>
<tr>
<td>82&quot;</td>
<td>2,613</td>
<td>2,450</td>
<td>2,306</td>
<td>2,178</td>
<td>2,063</td>
<td>1,960</td>
<td>1,867</td>
</tr>
</tbody>
</table>
D. Commutative Property for Addition

---

**Exercises**

1. 17     
   36     
   36     
   17     
   Observe your results.

2. 8     
   15     
   15     
   8     
   What seems to be true of the results?

3. 29     
   13     
   45     
   37     
   45     
   13     
   29     
   Check your results and compare.

4. Could you find another arrangement of the numbers in the last problem that will give the same results?

5. Tommy has 15 rock-and-roll records, Joe has 12, and Bill has 2.
   a. What is the total number of records? ____________
   b. Could the order be rearranged? ____________
   c. How many different ways? ____________
   d. List these ways. ____________

6. Johnny pushes his grocery cart to the checkout stand and unloads the groceries onto the counter. Does the clerk have to check his items in the order in which they are placed on the counter? Why?

7. Check the groceries on the following page and compare tapes and totals with other members of the class.

---

Note: Since numbers can be added in any order with the same results being obtained, addition then is said to be commutative.
Pernell's Pride U.S. Inspected Grade 'A'

**FRYERS**

- Cut Up, Lb. 37c
- Whole Lb.

**JOY LIQUID**

- Giant Size
- 22 oz. bottle

- Wagner
- **ORANGE DRINK**
- Quart 25¢

**YOUNG TENDER**

- **Yellow Squash**
- lb. 19¢

**CALIFORNIA STRAWBERRIES**

- Coca Cola, Pepsi, Dr. Pepper
- Qt. Drinks 3 for 89¢

**BETTY CROCKER**

- Cake Mix
- **WITH OUR COUPON OFFER**
  - 1-lb. 79¢
  - 2-oz. pkg.
E. Identity Element for Addition

Exercises

1. How many times does the letter "p" appear in the word "apple"?

2. How many times does the letter "p" appear in the word "grape"?

3. How many times does the letter "p" appear in the word "banana"?

4. Can you write a symbol for the answer in exercise 3?

5. Give this symbol a name?

6. Is this newly named number a counting number?

7. In addition, the number zero has a special property. $5 + 0 = 5$, $7 + 0 = 7$, $0 + 21 = 21$. Since zero is "special" in addition, we call it the identity element for _______.

8. Add:
   a. 330  
   b. 40  
   c. 43  
   d. $7 + 8 + 10 + 12 + 20 + 17 = 207$  
   e. $13 + 30 + 27 + 14 + 26 = 90$  
   f. $10$  
   g. $90$  
   h. $10$  
   i. $30$

9. a. What purpose does the zero serve in each numeral of problem 8?

b. Zero is the _______ element for addition and also a place holder in numerals.

NOTE: The identity element for addition is a number that can be added to any given number and the sum is that given number.
10. The following items were bought for Mrs. Smith's new kitchen:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teflon griddle</td>
<td>$1.88</td>
</tr>
<tr>
<td>Storage set</td>
<td>1.33</td>
</tr>
<tr>
<td>Electric can opener</td>
<td>7.77</td>
</tr>
<tr>
<td>Dish drainer</td>
<td>1.14</td>
</tr>
<tr>
<td>6 Tumblers</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Total

The clerk was given $20.00. What change should be returned? ____________

11. The following supplies and food freezer were purchased by Mrs. Smith:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home freezer</td>
<td>$198.88</td>
</tr>
<tr>
<td>Plastic freezer bags</td>
<td>.88</td>
</tr>
<tr>
<td>1 roll freezer paper</td>
<td>1.28</td>
</tr>
<tr>
<td>1 package plastic containers</td>
<td>.87</td>
</tr>
<tr>
<td>1 roll tape</td>
<td>.90</td>
</tr>
</tbody>
</table>

Total Purchase

Is the cost more or less than $210? ____________

How much more or how much less? ____________

12. Mr. Russell purchased the following extras for his car:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirror muff</td>
<td>$.39</td>
</tr>
<tr>
<td>Letter basket</td>
<td>1.41</td>
</tr>
<tr>
<td>Auto Compass</td>
<td>3.33</td>
</tr>
<tr>
<td>Fender flaps</td>
<td>1.55</td>
</tr>
<tr>
<td>Dash fence</td>
<td>.29</td>
</tr>
<tr>
<td>Seat belt retractor</td>
<td>1.59</td>
</tr>
</tbody>
</table>

Total Cost

Change from $10.00 bill ____________
Practical Applications

1. A purchase amounted to $7.56.  
The clerk was given a ten dollar bill.  
Count the change as the clerk would count it out to the customer.  Begin with $7.56 and count 7.57, 7.58, 7.59, etc.

The clerk was given a five dollar bill.  
Count the change.

3. A purchase amounted to $.32.  
The clerk was given a half-dollar.  
Count the change.

The clerk was given a twenty dollar bill.  
Count the change.

5. A purchase amounted to $34.75.  
The clerk was given a fifty dollar bill.  
Count the change.
## Calculator Practice

### Add:

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>91.35</td>
<td>45.234</td>
<td>47.09</td>
</tr>
<tr>
<td>2.</td>
<td>34.11</td>
<td>45.459</td>
<td>78.09</td>
</tr>
<tr>
<td>3.</td>
<td>22.33</td>
<td>65.365</td>
<td>93.043</td>
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<tr>
<td>4.</td>
<td>883.22</td>
<td>975.092</td>
<td>675.43</td>
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<tr>
<td>5.</td>
<td>11.99</td>
<td>3.967</td>
<td>3456.23</td>
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<td>6.</td>
<td>90.46</td>
<td>.214</td>
<td>34.87</td>
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<td>7.</td>
<td>34.94</td>
<td>90.666</td>
<td>9098.67</td>
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<td>8.</td>
<td>14.64</td>
<td>6.890</td>
<td>23.23</td>
</tr>
<tr>
<td>9.</td>
<td>82.55</td>
<td>8.543</td>
<td>3757.09</td>
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<th>5.</th>
<th>6.</th>
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<tbody>
<tr>
<td>1.</td>
<td>987,564.98</td>
<td>3987</td>
<td>3.9</td>
</tr>
<tr>
<td>2.</td>
<td>475,667.98</td>
<td>765.537</td>
<td>37.4</td>
</tr>
<tr>
<td>3.</td>
<td>388,641.53</td>
<td>28.984</td>
<td>87.9</td>
</tr>
<tr>
<td>4.</td>
<td>49,586.90</td>
<td>2,736.958</td>
<td>364.9</td>
</tr>
<tr>
<td>5.</td>
<td>98,876.98</td>
<td>37,465.987</td>
<td>364.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4758</td>
<td>3645</td>
<td>3,986</td>
</tr>
<tr>
<td>2.</td>
<td>3746</td>
<td>9087</td>
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</tr>
<tr>
<td>3.</td>
<td>4657</td>
<td>5432</td>
<td>346</td>
</tr>
<tr>
<td>4.</td>
<td>0987</td>
<td>8765</td>
<td>2,976</td>
</tr>
<tr>
<td>5.</td>
<td>7654</td>
<td>5432</td>
<td>38,675</td>
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<tr>
<td>6.</td>
<td>9876</td>
<td>3245</td>
<td>2,987</td>
</tr>
<tr>
<td>7.</td>
<td>3985</td>
<td>7865</td>
<td>23</td>
</tr>
</tbody>
</table>
### Practical Application

You have gone to work as a route salesman for Dr. Pepper Bottling Company. During the first day you drove a truck that carried 194 cases of drinks. You made only four trips to the plant that day.

<table>
<thead>
<tr>
<th>Number of cases checked out:</th>
<th>Full cases brought back at the end of day.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Pepper</td>
<td>18 18 18 10</td>
</tr>
<tr>
<td>Cartons:</td>
<td>17 10 7</td>
</tr>
<tr>
<td>K.S.D.P.</td>
<td>18 15 17</td>
</tr>
<tr>
<td>K.S.D.P. Ctns.</td>
<td>17 11 18</td>
</tr>
<tr>
<td>Dietetic:</td>
<td>18 9 11</td>
</tr>
<tr>
<td>Cartons:</td>
<td>17 9 16 7</td>
</tr>
<tr>
<td>Soda:</td>
<td>18 12 5</td>
</tr>
<tr>
<td>Nugrape:</td>
<td>18 16 4</td>
</tr>
<tr>
<td>Sun Drop:</td>
<td>18 13 9</td>
</tr>
<tr>
<td>Tin Cans:</td>
<td>17 12 15</td>
</tr>
<tr>
<td>Glass Cans:</td>
<td>18 3 6</td>
</tr>
</tbody>
</table>

Using the above information fill in your daily sales report on the following page. Get the price per case from your local dealer and compute the extensions.

Be sure to find the

a. total cases you checked out of each type drink.

b. total cases you checked out of all drinks on all four trips.

c. total full cases you brought back.

d. net cases sold of each type drink.

e. total of the net cases sold of all drinks.
<table>
<thead>
<tr>
<th>AMOUNT</th>
<th>PRICE</th>
<th>SHELLS</th>
<th>BOTTLES</th>
<th>RETURNED</th>
<th>EMPTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2140</th>
<th></th>
<th>2215</th>
<th>2169</th>
<th>2119</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CARTONS</th>
<th>DR. PEPPER</th>
<th>DAILY SALES REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL NET SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NET SALES</td>
</tr>
</tbody>
</table>
UNIT IV
WHOLE NUMBERS

A. Investigation of Whole Numbers

1. How many digits are in the number '238'? 

What does the digit 2 mean? The digit 3? The digit 8?

2. Another name for the number 45,653 is (40,000 to 5,000 + 600 + 50 + 3). There are sets of: 

_________ ten thousands _________ hundreds 

_________ thousands _________ tens 

_________ ones 

This number written in expanded notation is 4 (10,000) + 5 (1,000) + 6 (100) + 5 (10) + 3.

3. 33,333 = 3(10,000) + 3(1,000) + 3(100) + 3(10) + 3 

Written in multiples of 10 this number is equal to 3(10 x 10 x 10 x 10) + 3(10 x 10 x 10) + 3(10 x 10) + 3(10) + 3 

How does each group compare with the group to its right?

NOTE: 100 can be written as 10 x 10 but it also can be written 10^2. The small 2 placed to the upper right of a numeral is called an exponent. An exponent tells us how many times a number is used as a factor.

The number above can also be written with exponents as: 

3(10^4) + 3(10^3) + 3(10^2) + 3(10^1) + 3(10^0) 

Our number system is based on the number we know as "ten" and is called the decimal number system.
Exercises

Write the following numbers:

1. 564  
   Using multiples of 10  
   Using exponents  
2. 7,032  
   Using multiples of 10  
   Using exponents  
3. 230,156  
   Using multiples of 10  
   Using exponents

Acrostic

There are twenty mathematical terms in this puzzle. There are no extra letters; they may be upside down or diagonal; but they are in order. Circle them and list them.
Across

1. Twice fifty-six  
4. CXXXII  
7. Half of 3864  
8. Half of 12,012  
10. No. of years in decade  
11. No. of pounds in one-tenth of a ton  
13. No. of letters in alphabet  
14. A dozen more than a thousand  
16. III, IV, V, VI  
18. No. of elements in a null set  
19. 0 + 5  
20. MDCCIX  
23. 1027 times two  
26. 5 x 2 + 4 - 2 + 9  
27. Ninety tens  
29. 2 score plus 4  
30. MDCCXCIX  
32. 4 to 1 backwards  
34. 33 x 30 + 9  
35. CCII

Down

1. MCM  
2. Lucky (or unlucky?) number  
3. MMCCXXII  
4. MDCCIII  
5. 56 + 5  
6. 45^2  
7. CXI  
9. DCLXVI  
12. Cipher  
15. No. of years in a century  
17. No. which refers to high society  
20. 112  
21. 3046 plus 5133  
22. One less than ten thousand  
23. Twice MVI  
24. 9, 8, 7, 6, ..., 1  
25. 212 + 3  
28. 8 times 0  
31. 10^2 - 1  
33. Half of forty
B. Associative Property of Addition

Example:
The result of $5 + 7$ is 12. If we then add 9, the final result is 21. The result of $7 + 9$ is 16. If we then add the result to 5, the final result is 21. These combinations can be written as follows using parentheses:

$$(5 + 7) + 9 = 21$$

$$5 + (7 + 9) = 21$$

---

**Exercises**

In the following exercises see if the associative property holds true:

1. a. $(18 + 39) + 27 =$
   b. $18 + (39 + 27) =$

2. a. $(276 + 345) + 467 =$
   b. $276 + (345 + 467) =$

3. a. $3208 + (1609 + 876) =$
   b. $(3208 + 1609) + 876 =$

4. Use 13, 45 and 32 and give an example of the associative property.
   a. 
   b. 

---

**A Cardless Card Trick**

Ask someone to think of any card in the deck giving the value of 11 to a Jack, 12 to a Queen, 13 to a King, and 1 to an Ace; add the number of the card next higher in sequence. (If he's thinking of a King, add 14.) Multiply the result by 5. Add the value of the suit (clubs 6, diamonds 7, hearts 8, spades 9) to his total; ask for this result. Mentally deduct 5, and tell him the card he thought of. The last number shows you the suit and the rest tells the number of the card.
C. Closure Property for Multiplication

Exercises

1. What is the result in each of the following problems?
   a. $4 \times 8 \times 6 =$ 
   b. $144 \times 12 =$ 
   c. $1,859 \times 76 \times 54 =$ 
   d. $7 \times 9 \times 8 =$ 
   e. $34 \times 746 \times 2,100 =$ 
   f. $39 \times 1 =$ 
   g. $49 \times 94 =$ 
   h. $9,876,432 \times 32,587 =$

2. What kind of number is each answer above?

3. Is there any case of multiplying whole numbers in which the product is not a whole number?

4. Multiply manually and then check on the machine.
   a. $7 \times 9 =$ 
   b. $8 \times 12 =$ 
   c. $17 \times 4 =$ 
   d. $18 \times 21 =$ 
   e. $64 \times 83 =$ 
   f. $79 \times 81 =$ 
   g. $83 \times 126 =$ 
   h. $764 \times 34 =$ 
   i. $273 \times 142 =$ 
   j. $69 \times 4,782 =$

NOTE: The product of two or more whole numbers is a whole number. Therefore, the whole numbers are closed under multiplication.
Calculator Practice

Multiply:

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,038</td>
<td>8,492</td>
<td>9,765</td>
<td>344</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>354</td>
<td>253</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>4,657</td>
<td>8,762</td>
<td>48,027</td>
<td>5,862</td>
</tr>
<tr>
<td></td>
<td>82</td>
<td>752</td>
<td>9,084</td>
<td>906</td>
</tr>
<tr>
<td>3</td>
<td>8,375</td>
<td>654</td>
<td>98,762</td>
<td>47,624</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>57</td>
<td>75,243</td>
<td>9,073</td>
</tr>
<tr>
<td>4</td>
<td>524,903</td>
<td>759,372</td>
<td>75,903,613</td>
<td>243</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>81,065,432</td>
<td>8,196,432</td>
<td>63,826</td>
<td></td>
</tr>
<tr>
<td></td>
<td>36,789</td>
<td>65,432</td>
<td></td>
<td>432</td>
</tr>
<tr>
<td>6</td>
<td>890</td>
<td>8,476</td>
<td>5,762</td>
<td>462</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>374</td>
<td>7,364</td>
<td>75</td>
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<tr>
<td>7</td>
<td>87,302</td>
<td>729,137</td>
<td>8,931,876</td>
<td>87,907</td>
</tr>
<tr>
<td></td>
<td>3,628</td>
<td>087</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
D. Commutative Property of Multiplication

Example:

\[
\begin{array}{cc}
23 & 15 \\
\times 15 & \times 23
\end{array}
\]

What do you observe to be alike in these problems?
What do you observe about these problems that is not the same?
Is order important in multiplication?

---

**Exercises**

1. \[37 \times 96\]
   Can you write the answer to this problem without computing?
   \[96 \times 37\]

2. \[58 \times 72\]
   \[x72 \times 58\]

3. \[246 \times 183\]
   \[x183 \times 246\]

4. a. \[(78 \times 43) \times 64 =\]
   b. \[64 \times (78 \times 43) =\]
   Write this answer without computing.
   c. What principle of multiplication works here?

---

**"Smart Work"**

Arrange the numbers 1, 2, 3, and 4 in the 4 x 4 square so that the sum of each row, column and diagonal will be 10.
### Calculator Practice

#### Multiply:

1. a. 324  b. 632  c. 843  d. 985
   - 25
   - 56
   - 72
   - 43

2. a. 3730  b. 5340  c. 54  d. 2454
   - 37
   - 54
   - 5340
   - 62

3. a. 1227  b. 14724  c. 57138  d. 257
   - 324
   - 654
   - 257
   - 57138

4. a. 49083  b. 34578  c. 82559
   - 985
   - 787
   - 389

5. a. 52000  b. 15476  c. 71389
   - 309
   - 137
   - 908

6. a. 28113  b. 38564  c. 42153  d. 34215
   - 1843
   - 1419
   - 6192
   - 7281
E. Subtraction on the Number Line

Example:

0 1 2 3 4 5 6 7 8 9 10 11 12

Jim has 5 candy bars and he gave his girl fried two of the candy bars.

a. Begin at 0, count 5 units to the right (positive direction).
b. Then count 2 units in the opposite direction (negative direction).
c. You stop on the whole number 3.

Exercises

1. Make a number line for the following problems:
   a. 8-5   b. 10-4   c. 7-2
   d. What whole numbers were used?
   e. What whole number was reached?
   f. What operation was performed?

2. Doyne weighed 189 lbs. He decided to go on a diet and lost 15 lbs.
   a. What did he weigh after dieting?
   b. What kind of number is this?
3. Joe went to Al's Cycle Shop to buy a used Honda. Al had a Super Hawk for $240 and a Super Sport for $350.

a. How much would Joe save if he bought the Super Hawk?
b. What kind of number is this?

4. NUMBER PUZZLE

ACROSS
a. 31-7
b. 861-479
c. 1246-463
d. 17,383-9,126
f. 314-288
h. 53-47
i. 2314-1979
j. 85-36
m. 111-39
o. 43,782-37,495
q. 991-986
r. 19-2
s. 2518-1826

down
a. 543-267
b. 83-35
c. 31-28
d. 17,383-9,126

down (continued)
e. 777-751
f. 9641-6243
g. 891-888
h. 654-227
i. 1469-1217
j. 923-862
k. 79-3
l. 88,881-88,872
**Calculator Practice**

Subtract:

1. \[84,362 - 76,879 = 7,483\]
2. \[98,634 - 82,786 = 15,848\]
3. \[64,389 - 24,418 = 40,021\]
4. \[18,888 - 9,999 = 8,889\]

5. \[46,564 - 22,863 = 23,701\]
6. \[34,685 - 24,342 = 10,343\]
7. \[18,631 - 2,192 = 16,439\]
8. \[62,453 - 1,798 = 60,655\]

9. \[91,435 - 68,720 = 22,715\]
10. \[23,149 - 6,751 = 16,398\]
11. \[19,345 - 6,820 = 12,525\]
12. \[78,325 - 64,109 = 14,216\]

13. \[39,154 - 26,307 = 12,847\]
14. \[58,416 - 32,790 = 25,626\]
15. \[81,084 - 79,325 = 1,759\]
16. \[98,134 - 76,520 = 21,614\]

17. \[89,315 - 20,647 = 68,668\]
18. \[73,981 - 45,720 = 28,261\]

**Little Goodie**

1. Write the year of your birth.
2. Write the year when an important event occurred in your life.
3. Write the number of years since the important event occurred.
4. Write your age this year.
5. Add the four figures.
F. Distributive Property

--- Excerpts ---

1. By use of separate number lines show the result of each:
   a. \( 2 \times (5 + 3) \)
   b. \((2 \times 5) + (2 \times 3)\)
   c. \(3 \times (4 + 2)\)
   d. \(3 + (4 \times 2)\)
   e. \((3 + 4) \times (3 + 2)\)

2. Place in the geometrical symbol the correct sign or numeral:
   a. \(6 \times 32 = 6 \times (30 + \triangle)\)
   b. \(8 \times 47 = 8 \times (\square + 7)\)
   c. \(9 \times 25 = \square \times (\circ + 5)\)
   d. \(6 \times 73 = 6 \triangle (70 + 3)\)
   e. \(8 \times 64 = 8 \diamond (60 \triangle 4)\)
3. Give an expression on the right that equals the one given on the left. (Do not compute.)

a. \(3 (13 + 28) =\)

b. \((6 \cdot 7) + (6 \cdot 9) =\)

c. \((24 + 18 + 31)9 =\)

d. \((37 \cdot 13) + (13 \cdot 18) =\)

4. Find the results:

a. \(6(815 + 346) =\)

b. \((86 + 35)3 =\)

c. \((7 \cdot 231) + (7 \cdot 154) =\)

5. By use of the distributive principle multiply:

a. \(68 \times 9\)

b. \(57 \times 7\)

c. \(325 \times 4\)

d. \(4061 \times 3\)

e. \(562 \times 13\)
G. Prime Numbers

Exercises

1. A number is circled below if its only factors are 1 and the number itself. These are "special" numbers. Circle all "special" numbers in this list.

Circled numbers: 2 3 4 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97

2. There are _______ "special" numbers.

3. The first special number is _______.

4. The numbers 71 and 73 are pairs of "special" numbers. The first pair of special numbers is _______ and _______.

5. The last special number in this list is _______.

6. The even special number is _______.

7. What is the first counting number that is not special? _______.

8. Are 6 and 8 special numbers? _______.

9. $2 \times ___ = 6$

10. $2 \times ___ \times ___ = 8$

11. The special factors of 10 are ___ and _______.

NOTE: The "special" numbers in the above exercises are called prime numbers. A prime number is a counting number, other than one, with exactly two factors.
12. \[ 90 = \quad 9 \quad x \quad \underline{} \quad x \quad \underline{} \]

13. \[ 90 = \quad \underline{} \quad x \quad 3 \]

\[ 90 = \quad 5 \quad x \quad \underline{} \quad x \quad 3 \]

15. Using short division

\begin{align*}
\text{2} & \quad \underline{90} \\
\text{5} & \quad \underline{45} \\
\text{3} & \quad \underline{9} \\
\text{3} & \quad \underline{3} \\
\end{align*}

\[ 90 = 2 \times \underline{} \times \underline{} \times \underline{} \]
16. Are there other factors of 90 that will give the same prime factors?

17. How many sets of prime factors has 90?

18. How many sets of prime factors does any counting number have?

19. Does the order of multiplying the primes change the product?

20. Make these into factor trees as was done in problem 14.
   a. 18 =
   b. 72 =

21. What was done here?

22. Can you finish this one?

23. Express each number as a product of primes:
   a. 153 =
   b. 275 =
   c. 1890 =
### H. Prime Factors

#### Exercises

<table>
<thead>
<tr>
<th>Number</th>
<th>Prime Factors</th>
<th>Pairs of factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 60</td>
<td>$2 \times 2 \times 3 \times 5$</td>
<td>$1 \times 60$</td>
</tr>
<tr>
<td>2. 60</td>
<td>$\bigcirc \times (2 \times 3 \times 5)$</td>
<td>$2 \times 30$</td>
</tr>
<tr>
<td>3. 60</td>
<td>$3 \times (2 \times 2 \times \bigcirc)$</td>
<td>$\bigcirc \times 20$</td>
</tr>
<tr>
<td>4. 60</td>
<td>$(\bigcirc \times \bigcirc) \times (3 \times 5)$</td>
<td>$4 \times \bigcirc$</td>
</tr>
<tr>
<td>5. 60</td>
<td>$5 \times (\bigcirc \times \bigcirc \times 3)$</td>
<td>$5 \times 12$</td>
</tr>
<tr>
<td>6. 60</td>
<td>$(2 \times 3) \times (2 \times 5)$</td>
<td>$\bigcirc \times \bigcirc$</td>
</tr>
<tr>
<td>7. 108</td>
<td>$\bigcirc \times \bigcirc \times \bigcirc \times \bigcirc \times \bigcirc \times \bigcirc$</td>
<td>$\bigcirc \times 108$</td>
</tr>
<tr>
<td>8. 108</td>
<td>$2 \times (\bigcirc \times \bigcirc \times \bigcirc \times \bigcirc)$</td>
<td>$2 \times \bigcirc$</td>
</tr>
<tr>
<td>9. 108</td>
<td>$(\bigcirc \times \bigcirc) \times (3 \times 3 \times 3)$</td>
<td>$\bigcirc \times \bigcirc$</td>
</tr>
<tr>
<td>10. 108</td>
<td>$\times (\bigcirc \times \bigcirc \times 3 \times 3)$</td>
<td>$\bigcirc \times 36$</td>
</tr>
<tr>
<td>11. 108</td>
<td>$(3 \times 2) \times (\bigcirc \times \bigcirc \times \bigcirc \times \bigcirc)$</td>
<td>$\bigcirc \times \bigcirc$</td>
</tr>
<tr>
<td>12. 108</td>
<td>$(\bigcirc \times \bigcirc \times \bigcirc) \times (3 \times 3)$</td>
<td>$\bigcirc \times 9$</td>
</tr>
</tbody>
</table>
A short way to write \(2 \times 2 = 4\) is \(2^2 = 4\).

13. A short way to write \(3 \times 3 = 9\) is \(3^2 = 9\).

14. \(2 \times 2 \times 2 = 8\), \(2^3 = 8\).

15. \(3 \times 3 \times 3 = \boxed{}\), \(3^3 = 27\).

16. Can you show other examples of the renaming of such products?

**THINK BEFORE YOU ACT!**

Examples: a. \(3 \rightarrow \downarrow = 14\)  b. \(25 \uparrow \rightarrow \leftarrow = 24\)  c. \(17 \rightarrow \rightarrow \leftarrow \rightarrow 38\)

Using the vector chart, solve each problem below. Can you do this without any help?

1. \(6 \rightarrow \rightarrow = \boxed{}\)

2. \(35 \downarrow \downarrow = \boxed{}\)

3. \(14 \uparrow \uparrow = \boxed{}\)

4. \(5 \leftarrow \leftarrow \uparrow \uparrow = \boxed{}\)

5. \(18 \uparrow = \boxed{}\)

6. \(10 \leftarrow = \boxed{}\)

7. \(16 \rightarrow \downarrow \rightarrow = \boxed{}\)

8. \(47 \downarrow \rightarrow \leftarrow \leftarrow = \boxed{}\)

9. \(\boxed{} \rightarrow \rightarrow \downarrow \downarrow = 44\)

10. \(1 \leftarrow \downarrow \uparrow \rightarrow = \boxed{}\)

11. \(20 \leftarrow \leftarrow \leftarrow = \boxed{}\)

12. \(6 \downarrow \uparrow = \boxed{}\)
Vector Chart

0 1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39
40 41 42 43 44 45 46 47 48 49
50 51 52 53 54 55 56 57 58 59
60 61 62 63 64 65 66 67 68 69
70 71 72 73 74 75 76 77 78 79
80 81 82 83 84 85 86 87 88 89
90 91 92 93 94 95 96 97 98 99
100 101 102 103 104 105 106 107 108 109
110 111 112 113 114 115 116 117 118 119
120 121 122 123 124 125 126 127 128 129
130 131 132 133 134 135 136 137 138 139
140 141 142 143 144 145 146 147 148 149
150 151 152 153 154 155 156 157 158 159
I. Common Factors

Exercises

1. □ is the common factor of
   (2 x 7) and (7 x 17)

2. (5 x 11^2)
   and
   (3 x 11^2)
   have □ for a common factor

3. 5 x 7 x 23
   and
   3 x 7 x 23
   have □ and □ for common factors

4. 2^2 x 3 x 5
   and
   2 x 3 x 5^3
   have □, □ and □ for common factors

5. 2^2 x 7 x 11^2
   and
   2 x 7 x 11
   have □, □ and □ for common factors
   and
   2^2 x 7^2 x 11

6. Write as products of primes and find the common factors.

   144 =

   188 =

   Common factors are □
J. Division of Whole Numbers

Exercises

1. \(625 \div 25 = \)
2. \(1728 \div 12 = \)
3. \(50,481 \div 237 = \)
4. \(95,953 \div 793 = \)
5. \(56,561 \div 347 = \)
6. \(363 \div 121 = \)
7. \(627 \div 209 = \)
8. \(1318 \div 659 = \)
9. \(747 \div 83 = \)
10. \(1036 \div 37 = \)
11. \(19,400 \div 776 = \)
12. \(58,368 \div 456 = \)
13. \(500,973 \div 893 = \)
14. \(299,552 \div 851 = \)
15. \(186,660 \div 1,220 = \)
16. \(9468 \div 12 = \)
17. \(28,075 \div 25 = \)
18. 525 shares of a particular stock sold for $590,625. What was the price per share?

19. Mr. Jones bought 1,125 acres of land for $365,625. What was the price per acre?

20. Bobby Jones made 581 points on 7 tests. What was his average score?

21. Place the quotient in the correct square:
   a. $65 \div 5 =$
   b. $72 \div 24 =$
   c. $527 \div 31 =$
   d. $102 \div 6 =$
   e. $24 \div 4 =$
   f. $784 \div 28 =$
   g. $354 \div 59 =$
   h. $70 \div 7 =$
   i. $5696 \div 365 =$
   j. $96 \div 8 =$
   k. $22,712 \div 5,678 =$
   l. $270 \div 15 =$
   m. $270 \div 18 =$
   n. $217 \div 31 =$
   o. $2277 \div 99 =$
   p. $100 \div 20 =$

Find the sum of each row.
Find the sum of each column.
Find the sum of each diagonal.
There is a simple method of checking computation that works in most cases.

Step 1 Add the digits in each number until you get a one digit number. In subtraction the minuend must be larger than the subtrahend even if this means it will contain two digits.

Step 2 Work problem

Step 3 Check

Addition:

\[
\begin{align*}
435 & \rightarrow 12 \rightarrow 1+2 \rightarrow 3 \\
127 & \rightarrow 10 \rightarrow 1+0 \rightarrow 1 \rightarrow 3+1+7 \rightarrow 11 \rightarrow 1+1 \rightarrow 2 \\
295 & \rightarrow 16 \rightarrow 1+6 \rightarrow 7 \\
857 & \rightarrow 8+5+7 \rightarrow 20 \rightarrow 2+0 \rightarrow 2
\end{align*}
\]

Subtraction:

\[
\begin{align*}
4384 & \rightarrow 19 \rightarrow 1+9 \rightarrow 10 \\
1575 & \rightarrow 18 \rightarrow 1+8 \rightarrow 9 \rightarrow 10 - 9 \rightarrow 1 \\
2809 & \rightarrow 19 \rightarrow 1+9 \rightarrow 10 \rightarrow 1 + 0
\end{align*}
\]

Multiplication:

\[
\begin{align*}
187 & \rightarrow 16 \rightarrow 1+6 \rightarrow 7 \\
143 & \rightarrow 8 \rightarrow 8 \\
561 & \\
748 & \\
26,741 & \rightarrow 2+6+7+4+1 \rightarrow 20 \rightarrow 2+0 \rightarrow 2
\end{align*}
\]

Division: (Check by multiplication then add remainder)

\[
\begin{align*}
29 & \rightarrow 1+6+5 \rightarrow 12 \rightarrow 1+2 \rightarrow 3 \\
165 & \rightarrow 2+9 \rightarrow 11 \rightarrow 1+1 \rightarrow 2 \\
4931 & \rightarrow 4+9+3+1 \rightarrow 17 \rightarrow 1+7 \rightarrow 8 \\
330 & \rightarrow 146 \rightarrow 1+4+6 \rightarrow 11 \rightarrow 1+1 \rightarrow 2 \\
1631 & \\
1485 & \\
146 & \\
57
\end{align*}
\]
UNIT V
INTEGERS

A. Integers

Examples:
1. $7 - 11 = -4$
2. $15 - 21 = -6$

Exercises

1. $34 - 34 = ______$
2. $34 - 35 = ______$
3. $1,436 - 8,561 = ______$
4. $271 - 463 = ______$
5. $1,429,600 - 7,358,547 = ______$
6. $580,575 - 40,580,575 = ______$
7. $968,523 - 1,068,523 = ______$
8. $34 - 107 = ______$
9. $4,267 - 58,462 = ______$
10. $59,576 - 73,856 = ______$

NOTE: The set of whole numbers and their opposites form the set of integers.
11. \(48,549 - 568,452 = \) 
12. \(46,398 - 84,531 = \) 
13. \(6,341 - 8,569 = \) 
14. \(94,837,256 - 96,483,725 = \) 
15. \(49 - \) 
16. \(31 - \) 
17. \(\) 
18. \(76,542 - \) 
19. \(\) 
20. \(\) 
21. \(8 - \) 
22. \(35 - \) 
23. \(\) 
24. \(\) 

---

**Figure Me Out**

Give the missing numbers so that this will be a magic square.

<table>
<thead>
<tr>
<th></th>
<th>(\frac{9}{12})</th>
<th>(\frac{4}{12})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\frac{11}{12})</td>
<td></td>
</tr>
<tr>
<td>(\frac{10}{12})</td>
<td></td>
<td>(\frac{6}{12})</td>
</tr>
</tbody>
</table>
B. Properties of Addition

Exercises

Are the answers to these problems found in the set of integers?

1. $543 + (-543)$
2. $1,742 + (-2,342)$
3. $100 + 99$

Work these problems with the calculator.

4. a. $5,432 + 3,780$
   b. $3,780 + 5,432$
5. a. $-432 + 358$
   b. $358 + (-432)$
6. a. $-1,540 + (-2,544)$
   b. $-2,544 + (-1,540)$

Compare the answer in (a) to the answer in (b). What property is illustrated in problems 4, 5, and 6?

Work these problems without using the calculator.

7. $475 + (-364)$
8. $-364 + 475$
9. $-1,643 + 986$
10. $986 + (-1,643)$

Work these problems using the calculator.

11. a. $(345 + 562) + 792$
    b. $345 + (562 + 792)$
12. a. $(-1,184 + .984) + 300$
    b. $-1,184 + (984 + 300)$

What do you notice about the answers in problem 11? In problem 12? What property does this illustrate?
Shade the squares which are not needed for this puzzle.

### Across

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td>124 + -35</td>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>576 + -386</td>
<td>d.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>12,723 + -2,720 + 1,175</td>
<td>g.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>966 +</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>3,796 + 4,732 + -7574</td>
<td>j.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>-601 + -537 + -989 + 213</td>
<td>l.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m.</td>
<td>2,503 +</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p.</td>
<td>347 + -341</td>
<td>q.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r.</td>
<td>-6,732 + 6,543 + 403</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Down

<p>| | | | | |</p>
<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>1,976 + -1,164</td>
<td>b.</td>
<td>987 + -73</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>998 + -416 + -403</td>
<td>d.</td>
<td>-123 + 456 + -789 + 10,312</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>876 + -577 + -299</td>
<td>g.</td>
<td>-321 + -233 + 555</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>-4078 +</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>-9,643 + -7,653 + 17,600</td>
<td>m.</td>
<td>-265 +</td>
<td></td>
</tr>
<tr>
<td>n.</td>
<td>2,406 + -1,389 + -986</td>
<td>o.</td>
<td>564 + -809 + 252</td>
<td></td>
</tr>
</tbody>
</table>
C. Additive Inverse

Example: \(5 + (-5) = 0\)
\(-5 + 5 = 0\)

---

Exercises

Fill in the following blanks:

1. \(\_ + 6 = 0\)
2. \(-10 + 10 = \_

3. \(-3 + \_ = 0\)
4. \(-547 + \_ = 0\)

5. \(140 + \_ = 0\)
6. \(0 + \_ = 0\)

7. \(0 + 0 = \_\)
8. In addition, the inverse of zero is \_

9. In addition, the inverse of \(-31\) is \_
10. In addition, the inverse of \(31\) is \_

---

**NOTE:** If the addition of two numbers produces the additive identity element, then one number is the additive inverse of the other.
D. Division of Integers

Exercises

1. \( 48 + 6 = \) Is the result an integer?_______

2. \( 9 + 3 = \) Is the result an integer?_______

3. \( 625 + 25 = \) Is the result an integer?_______

4. \( 1,246,104 + 486 = \) Is the result an integer?_______

5. \( 3,386,955 \div 7,895 = \) Is the result an integer?_______

6. \( 5,964,959 \div 5,368 = \) Is the result an integer?_______

NOTE: From problem #6 we see the integers are not closed under division. We would like to be able to divide any two integers. Therefore, we must extend the set of integers; or, create a number which will give us the answer to the division of any two integers. (Exception: Dividing by zero)

Example: \( 9 - 4 \) is not an integer. Therefore we create the number \( \frac{9}{4} \) so we can divide.

\[ 9 + 4 = \frac{9}{4} \]

The set that includes the integers and all the "new type" numbers needed for division is called rational numbers.
Practical Application

ARKANSAS POWER & LIGHT COMPANY

NET MONTHLY RATE

<table>
<thead>
<tr>
<th>Summer Rate*</th>
<th>Winter Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.45 for the first 15 Kwh or less</td>
<td>$1.45 for the first 15 Kwh or less</td>
</tr>
<tr>
<td>3.80¢ per Kwh for the next 40 Kwh</td>
<td>3.80¢ per Kwh for the next 40 Kwh</td>
</tr>
<tr>
<td>2.70¢ per Kwh for the next 145 Kwh</td>
<td>2.70¢ per Kwh for the next 145 Kwh</td>
</tr>
<tr>
<td>1.75¢ per Kwh for the next 500 Kwh</td>
<td>1.75¢ per Kwh for the next 200 Kwh</td>
</tr>
<tr>
<td>1.15¢ per Kwh for all additional Kwh</td>
<td>1.15¢ per Kwh for the next 600 Kwh*</td>
</tr>
<tr>
<td></td>
<td>0.80¢ per Kwh for all additional Kwh</td>
</tr>
</tbody>
</table>

* Summer Rate will apply for the billing months of May through October and Winter Rate will apply for the billing months of November through April.

**Kwh billed at 1.15¢ shall be reduced to 200 when Customer has an approved electric water heater in regular use.

Electric Water Heating

Customers using an approved electric water heater will be billed 1.0¢ per Kwh for up to 400 Kwh, provided at least 200 Kwh are first billed at the above rates.

Using the above rates work these problems.

1. Find the number of Kwh used if the bill was $21.75.

2. How many Kwh were used if the bill was $59.75?

3. If the bill is $173.75 how many Kwh are used?

4. How many Kwh could you get for $200.75?

5. What is the total number of Kwh used in problems 1. and 2.?
There are 20 mathematical terms in this puzzle. There are extra letters and words which you will not use. The words may be upside down or on a diagonal but they are in order. Circle and list them.

<table>
<thead>
<tr>
<th>B R C I F L O W C H A R T E S B U S T</th>
<th>Q W E R E I T Y A T Y U U I O P A S D</th>
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<td>W A S U I N V B R S B D F T G H S N J</td>
</tr>
<tr>
<td>A B C D E F G H I J Q R L M N O P E F</td>
<td>I J L K M T C A R T B U S T U V W D E</td>
</tr>
<tr>
<td>M A S D A L E E V E M I A J U D Y I T</td>
<td>M A R Y C L O E N O R A X R U T H V P</td>
</tr>
<tr>
<td>W F S P B J L H L R C L O S E D V I P</td>
<td></td>
</tr>
</tbody>
</table>

Think

A man with a five-gallon bucket and a three-gallon bucket went to a well to get exactly four gallons of water. How was he able to get the four gallons of water by using only the two buckets?
UNIT VI
RATIONAL NUMBERS

A. Multiplying Rational Numbers

Rational numbers in fractional form are multiplied by obtaining the product of the numerators and the product of the denominators.

Examples:
1. \( \frac{5}{8} \times \frac{1}{4} = \frac{5 \times 1}{8 \times 4} = \frac{5}{32} \)
2. \( \frac{11}{3} \times \frac{28}{5} = \frac{11 \times 28}{3 \times 5} = \frac{308}{15} \)

Exercises

1. a. \( \frac{1}{3} \times \frac{1}{5} = \frac{1 \times 1}{3 \times 5} = \frac{1}{15} \)
   b. \( \frac{5}{6} \times \frac{5}{6} = \frac{5 \times 5}{6 \times 6} = \frac{25}{36} \)
   c. \( \frac{3}{5} \times \frac{5}{7} = \frac{3 \times 5}{5 \times 7} = \frac{15}{35} = \frac{3}{7} \)
   d. \( \frac{2}{3} \times \frac{21}{4} = \frac{2 \times 21}{3 \times 4} = \frac{42}{12} = \frac{7}{2} \)

   e. Are all the results above rational numbers?

   f. Try to think of an example in which the result is not a rational number.

   g. Can we conclude that the operation of multiplication is closed under the rational numbers?

2. Multiply:
   a. \( \frac{5}{6} \times \frac{9}{8} = \frac{5 \times 9}{6 \times 8} = \frac{45}{48} = \frac{15}{16} \)
   b. \( \frac{4}{5} \times \frac{12}{13} = \frac{4 \times 12}{5 \times 13} = \frac{48}{65} \)
   c. \( \frac{9}{8} \times \frac{5}{6} = \frac{9 \times 5}{8 \times 6} = \frac{45}{48} = \frac{15}{16} \)
   d. \( \frac{6}{13} \times \frac{12}{5} = \frac{6 \times 12}{13 \times 5} = \frac{72}{65} \)

   e. What do you notice about problems a and c, and b and d?

   f. What do you think we can conclude about multiplication of rational numbers?
3. a. \( \left( \frac{2}{3} \times \frac{4}{5} \right) \times \frac{5}{4} = \)
   b. \( \frac{2}{3} \times \left( \frac{4}{5} \times \frac{5}{4} \right) = \)
   c. \( \left( \frac{7}{2} \times \frac{3}{2} \right) \times \frac{3}{4} = \)
   d. \( \frac{7}{2} \times \left( \frac{3}{2} \times \frac{3}{4} \right) = \)
   e. Compare the answers in problems a and b.
   f. Compare the answers in problems c and d.

4. a. \( \frac{13 \times 1}{7} = \)
   b. \( \frac{8 \times 1}{9} = \)
   c. \( \frac{7 \times 1}{8} = \frac{7}{8} \)
   d. \( \frac{17}{15} \times 1 = \frac{17}{15} \)
   e. \( \frac{13}{14} \times 1 = \frac{13}{14} \)
   f. Any number multiplied by 1 produces that same _______.
      The identity for multiplication is ________.

5. a. \( \frac{4}{5} \times \frac{5}{4} = \)
   b. \( \frac{2}{3} \times \frac{3}{2} = \)
   c. \( \frac{17}{5} \times \frac{5}{17} = \)
   d. \( \frac{7}{8} \times 1 = \)
   e. \( \frac{24}{91} \times 1 = \)
   f. \( \frac{16}{17} \times 1 = \)
   g. \( \frac{7}{12} \times 1 = \)
   h. \( \frac{8}{1} \times 1 = \)
   i. \( \frac{11}{9} \times 1 = \)
   j. In multiplication, how do you find the inverse of a number? ________
   k. The multiplicative inverse of \( \frac{7}{8} \) is ________.
   l. The multiplicative inverse of 12 is ________.
   m. The multiplicative inverse of \( \frac{7}{3} \) is ________.
Multiply:

1. $\frac{1}{3} \times 4 = $
2. $6 \times \frac{1}{8} = $
3. $\frac{5}{12} \times 5 = $

4. $9 \times \frac{1}{81} = $
5. $\frac{4}{12} \times \frac{2}{4} = $
6. $\frac{1}{2} \times \frac{1}{8} = $

7. $\frac{25}{18} \times \frac{9}{10} = $
8. $\frac{2}{5} \times \frac{1}{8} = $
9. $\frac{5}{12} \times \frac{12}{5} = $

10. $\frac{22}{7} \times \frac{16}{35} = $
11. $\frac{5}{10} \times \frac{27}{10} = $
12. $\frac{16}{24} \times \frac{3}{4} = $

13. $48 \times \frac{1}{16} = $
14. $\frac{7}{12} \times 4 = $

15. Fill in the operation and equal signs

<table>
<thead>
<tr>
<th></th>
<th>24</th>
<th></th>
<th>3</th>
<th>=</th>
<th>30</th>
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<td>2</td>
<td></td>
<td>4</td>
<td>2</td>
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</tr>
<tr>
<td>24</td>
<td>2</td>
<td>5</td>
<td>60</td>
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<td></td>
</tr>
</tbody>
</table>
B. Reducing Rationals Using Primes

Exercises

1. Rename these numbers:

\[
\frac{5 \times 7}{3 \times 7} = \frac{5}{3} \times \frac{1}{7} = \frac{5}{3} \times \frac{1}{\Box} = \frac{5}{3}
\]

\[
\frac{35}{21} = \frac{5}{3}
\]

2. Find the prime factors of each numerator and each denominator.

a. \( \frac{15}{25} = \frac{3 \times 5}{5 \times 5} \)

b. \( \frac{81}{18} = \frac{3 \times 3 \times 3}{2 \times 3 \times 3} \)

c. \( \frac{12}{18} = \frac{2 \times 3 \times 2}{3 \times 3 \times 2} \)

d. \( \frac{75}{21} = \frac{3 \times 5 \times 5 \times 5}{3 \times 7 \times 3 \times 3} \)

e. \( \frac{39}{65} = \frac{3 \times 13}{3 \times 5 \times 13} \)

f. \( \frac{4620}{231} = \frac{2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 7}{3 \times 7 \times 3 \times 3} \)

3. Rename these numbers so that some of the factors will be the identity.

a. \( \frac{15}{25} = \frac{3}{5} \times \frac{5}{\Box} \)

b. \( \frac{81}{18} = \frac{9}{2} \times \frac{2}{2} \)

c. \( \frac{12}{18} = \frac{2}{3} \times \frac{3}{3} \)

d. \( \frac{75}{21} = \frac{5}{3} \times \frac{3}{3} \)

e. \( \frac{39}{65} = \frac{3}{5} \times \frac{5}{5} \)

f. \( \frac{4620}{231} = \frac{2 	imes 3 \times 3 \times 3}{3 \times 3 \times 3} \)

4. Rename these results so that you have a fraction using the smallest numbers possible for numerator and denominator.

a. \( \frac{15}{25} = \frac{3 \times 5}{5 \times 5} = \frac{3}{5} \times \frac{5}{5} = \frac{3}{5} \)

b. \( \frac{81}{18} = \frac{9}{2} \times \frac{2}{2} \)

c. \( \frac{12}{18} = \frac{2}{3} \times \frac{3}{3} \)

d. \( \frac{75}{21} = \frac{5}{3} \times \frac{3}{3} \)

e. \( \frac{39}{65} = \frac{3}{5} \times \frac{5}{5} \)

f. \( \frac{4620}{231} = \frac{2 	imes 3 \times 3 \times 3}{3 \times 3 \times 3} \)
5. We can find an easy way to reduce \( \frac{153}{102} \) using primes.

\[
\frac{153}{102} = \frac{3 \times 17}{3 \times 17}
\]

\[
\frac{153}{102} = \frac{3 \times 17}{3 \times 17}
\]

\[
\frac{153}{102} = \frac{3 \times 17}{3 \times 17}
\]

\[
153 + 102 =
\]

6. Reduce

a. \( \frac{200}{100} = \)

b. \( \frac{60}{54} = \)

c. \( \frac{150}{66} = \)

d. \( \frac{48}{9} = \)

e. \( \frac{77}{66} = \)

f. \( \frac{66}{77} = \)

g. \( \frac{14}{16} = \)

h. \( \frac{9}{81} = \)

i. \( \frac{36}{48} = \)

j. \( \frac{81}{648} = \)

k. \( \frac{3}{24} = \)

l. \( \frac{12}{72} = \)
1. An oil well is drilled in an area that has 80 acres spacing. The oil company pays a 1/8 royalty interest in the lease. This simply means that the owner or owners get one barrel out of every 8 barrels produced by this well. Mr. Young owns 20 acres of this 80 acre unit. If the well will average 40 barrels per day @ $2.60 per barrel, how much money should Mr. Young receive in royalty in a 30 day month?

2. John Doe is operating an oil well (#1-A) for Humble Oil Corp. Materials and labor for May cost $4,783.00. Partners in well #1-A are as follows:

   J. Brown - 3/32
   P. Black - 5/64
   J. Lowe - 3/8
   R. Rogers - 7/64
   C. Rogers - 1/16
   B. Franks - 3/16
   D. Young - 3/32

Bill each man for his pro-rata share of cost of operations for May.
C. Multiplying Decimals

Examples:

<table>
<thead>
<tr>
<th></th>
<th>2.34</th>
<th>23.4</th>
<th>.234</th>
</tr>
</thead>
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<tr>
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<td>5.64</td>
<td>56.4</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>-------</td>
<td>-------</td>
</tr>
</tbody>
</table>

Exercises

1. The number of digits to the right of the decimal in 13.1976 is

2. Examine the following:

   97.3 \times 0.125 = 12.1625
   
   0.0231 \times 836 = 19.3116

   State in words a rule that will tell where the decimal point should be located.

3. If we multiply .6 \times .7 we know that this is the same as multiplying the fractions \frac{6}{10} \times \frac{7}{10}. This is equal to \frac{42}{100} which is the decimal .42. If instead it was .06 \times .7 we would have \frac{6}{100} \times \frac{7}{10} = \frac{42}{1000}; in this case our decimal value is .042.

4. Place the decimal point at the proper place in each product:

   a. 65.84 \times 0.45 = \underline{296280}
   b. 75.31 \times 1.28 = \underline{963968}
   c. 32.14 \times 2.3 = \underline{73922}
   d. .72 \times 6.6 = \underline{4752}

5. Multiply and place the decimal point correctly:

   a. 56.28 \times .332 = \underline{18.76636}
   b. 326.7 \times 4.03 = \underline{1317.161}
   c. 1.213 \times 71.2 = \underline{86.84196}
   d. 72.3 \times 60.0 = \underline{4338}

   e. 700 \times 2.35 = \underline{1645}
   f. 36.41 \times 90.7 = \underline{3305.067}
   g. 73.67 \times 21.2 = \underline{1567.604}
   h. .202 \times .101 = \underline{0.020422}


**ORDER SHEET**

**Tapscott's INC.**
IMPORTER OF FLORAL PRODUCTS

---

**SHIP TO:**
**House of Flowers**
**P.O. Box 366**
**LEPANTO, ARK**

**Date:** 5/14/71

---

**QUANTITY**
**ARTICLE AND COLORS**
**PRICE**
**EXTENSION**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
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<td></td>
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**TAX TOTALS:** 115.25

---

**THE FOLLOWING ABBREVIATIONS ARE USED IN FILLING YOUR ORDER:**

- B.O. - BACK ORDER
- O & D - OUT AND DISCONTINUED
- O F S - OUT FOR SEASON
- T O - TEMPORARILY OUT

---

**CHECK THE EXTENSIONS. MAKE ANY CORRECTION NEEDED.**

---

**TERMS:**
Net 30 Days to those having a favorable rating in Dun and Bradstreet or Florist Credit Guide. If not rated as above, Cash or C.O.D. 125% deposit required. However, you can establish credit with us by furnishing names and complete addresses of three references plus the name of your bank.

---

**MINIMUM ORDER:**
Service Charge $2.00
On Orders Less Than $20.00

---

**HOW TO SHIP GOODS:**
See Back Side of This Page for Cost.
### Calculator Practice

#### Multiply:

1. \[39.34 \times 4.7 = 47.5\]
   - \[398,571.89 \div 4,758 = 83.5\]
   - \[395.8 \div 47.5 = 8\]

2. \[586.7 \div 46,577 = 0.013\]
   - \[472.54 \div 9.08 = 51.86\]
   - \[8.6543 \div 7.86 = 1.105\]

3. \[97.67 \div 8.0 = 12.21\]
   - \[685.098 \div 57.7 = 11.9\]
   - \[5,746.8 \div 87.09 = 65.5\]

4. \[47.9 \times 84,759.6 = 867.8\]
   - \[47.5 \times 8.0 = 0.123\]

5. \[987.765 \times 1504,856 = 475,912.5\]
   - \[857.96 \times 0.87690 = 574,697.9\]

6. \[47,589.765 \times 69.48475 = 1,093,948\]
   - \[8.9087 \times 64.867 = 673.57\]

7. In each problem, locate the decimal in the numeral in the box.
   - a. \[.4855 \times 3.03 = 1.471055\]
   - b. \[9546 \times .02 = 2.00466\]
   - c. \[1.5328 \times \frac{9776}{9776} = 1.49846528\]
   - d. \[7456733 \times 67.543 = 503,650,117,019\]
1. Find extensions and total.

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<th>%</th>
<th>AMOUNT</th>
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<td>BULG.</td>
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<td></td>
<td>LB</td>
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<tr>
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<td>MIN.</td>
<td>TOTAL</td>
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**Address**: KROGER V297

**Route No.**: V207

**Date**: 6-26-71

**02352**
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<td>1 Large Order</td>
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<td>2 81s XIS</td>
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**Subtotal:** 20.20

**Tax:** 3.20

**Total:** 23.40

**Cash:** 50.00

**Change:** 26.60

**4:00 pm**

**Till Total:** 23.40

**Cashier:**

**Manager:**

**Customer Signature:**

---

Finish the cash slip. Find the time it takes to pay off the balance.

---

#2845

Forrest City, AR

G. O. No. Washington

Goodyear Service Stores

---

Practical Application
D. Division of Rational Numbers

Example: \( \frac{7}{8} \div \frac{3}{4} \)

Rename as: \( \frac{7}{8} \times \frac{4}{3} = \frac{7 \times 4}{8 \times 3} = \frac{7}{8} \times \frac{4}{3} = \frac{7 \times 4}{8 \times 3} = \frac{28}{24} \)

Exercises

1. a. \( \frac{2}{7} \div \frac{1}{3} = \)
   b. \( \frac{5}{3} \div \frac{1}{2} = \)
   c. \( \frac{5}{6} \div \frac{1}{3} = \)
   d. \( \frac{2}{3} \div \frac{5}{6} = \)
   e. \( \frac{3}{8} \div \frac{1}{2} = \)
   f. Was the result of each exercise above a rational number? 
   g. Can you think of an example where the result is not a rational number? 
   h. Is the set of rational numbers closed under division?

2. \( \frac{2}{3} \div \frac{4}{5} = \frac{10}{12} \)
   \( \frac{4}{5} \div \frac{2}{3} = \frac{12}{10} \)
   Is \( \frac{2}{3} \div \frac{4}{5} \) the same as \( \frac{4}{5} \div \frac{2}{3} \)?
   Is division commutative?

3. \( \left( \frac{2}{3} \div \frac{1}{4} \right) \div \frac{3}{5} = \frac{40}{9} \) and \( \frac{2}{3} \div \left( \frac{1}{4} \div \frac{3}{5} \right) = \frac{24}{15} \)
   Is division associative?
Exercises

Work each problem and put the answer in the appropriate square in the chart.

1. \( \frac{3}{4} \div \frac{5}{4} \)
2. \( \frac{6}{7} \div \frac{1}{14} \)
3. \( \frac{12}{13} \div \frac{13}{7} \)
4. \( \frac{5}{3} \div \frac{6}{9} \)
5. \( \frac{4}{16} \div \frac{3}{4} \)
6. \( \frac{15}{20} \div \frac{3}{5} \)
7. \( \frac{34}{22} \div \frac{13}{11} \)
8. \( \frac{8}{21} \div \frac{3}{7} \)
9. \( \frac{27}{35} \div \frac{3}{7} \)
10. \( \frac{24}{10} \div \frac{5}{12} \)
11. \( \frac{15}{25} \div \frac{7}{5} \)
12. \( \frac{136}{238} \div \frac{9}{14} \)
13. \( \frac{19}{18} \div \frac{5}{6} \)
14. \( \frac{81}{64} \div \frac{27}{16} \)
15. \( \frac{125}{169} \div \frac{25}{26} \)
16. \( \frac{144}{289} \div \frac{36}{34} \)

---

Compound Savings

A teenage boy decided to save his money for 30 days. The first day he saved 1¢, the second day 2¢, the third 4¢, and the fourth 8¢. If he continues to save twice as much money each succeeding day, how much will he have accumulated at the end of the 30 day period?
E. Reading decimal numerals:
When reading a mixed decimal, the decimal point is read "and". First read the whole number, then read the word "and" to show the position of the decimal point, and then read the decimal fraction.

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<td>4</td>
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</table>

Twenty-four and fifty-four hundredths

EXERCISES
Write the following decimal numerals in words.

1. 8.6
2. 100.43
3. .50062
4. .00009
5. 5.0
6. 225.089
7. 4.1575

F. Writing decimal numerals:
To write a mixed decimal, write the whole number, place the decimal point after the whole number, and then write the decimal fraction.

EXERCISES

1. eighty hundredths
2. five hundredths
3. eight thousandths
4. one ten-thousandth
5. one hundred twenty-eight and two tenths
6. two hundred six and twenty-six hundredths
7. three thousand and eight hundredths
G. Rounding Off Decimal Numerals

Examples:

1. It is 713 miles from New York to Chicago; this distance might be quoted as a distance of 700 miles. We say that 713 has been rounded off to the nearest 100 miles.

2. When 17.462 is rounded off to tenths the result is 17.5. Why?

Steps to follow in rounding off any decimal number:

a. Locate the digit that is in the "round off" position. Draw a square around it.

b. Draw a circle around the digit to the right of the square.

c. If the digit in the circle is a 5, 6, 7, 8, or 9, then add one to the digit in the square. Replace all digits to the right of the square with zeros.

d. If the digit in the circle is a 0, 1, 2, 3, or 4, then do not change the digit in the square. Replace all digits to the right of the square with zeros.

3. When 13.827 is rounded off to tenths the result is 13.800 or just 13.8.
**EXERCISES**

1. Round off 7253.483 to:
   a. Hundredths
   b. Tenths
   c. Ones
   d. Tens
   e. Hundreds
   f. Thousands

2. Round off the following numbers to one's place:
   a. 147.2
   b. 95.68
   c. 4723.01
   d. 93.51
   e. 94.5
   f. 89.7
   g. 26.49

3. Round off the following numbers to hundredths:
   a. 1.255
   b. 14.314628
   c. 90.88888
   d. 33.33333
   e. 141
   f. 192.65499

4. Round off products as indicated:
   a. Hundredths
   b. Tenths
   c. Thousandths
   d. Hundredths
   e. Ten thousandths
   f. Tenths
   g. Ones
   h. Hundredths
   i. Tens
   j. Hundreds
   k. Thousands

   4.5 x .16
   176.9 x 2.3
   2.5398 x 86
   8563.5427 x 8.36
   95199 x 56.1
   4.6 x 18.5
   100 x 0.14
   123 x 9
   26.93 x 14.6
   100 x 14.6
   236 x 7.39
### CONSOLIDATED BALANCE SHEET

#### ASSETS

**PROPERTY, PLANT AND EQUIPMENT**

- Less: Reserves for depletion and depreciation

**INVESTMENTS, at cost**

- Municipal bonds
- Miscellaneous

**CURRENT ASSETS**

- Cash
- Temporary cash investments
- Special deposits
- Accounts Receivable:
  - Customers
  - Others
- Notes receivable—including installments due after one year:
  - Customers
  - Others
- Inventories:
  - Extracted products, chemicals and crude oil, at market or cost
  - Cement products, at cost
  - Materials and supplies, at average cost
  - Manufactured products, lower of FIFO cost or market
  - Gas in underground storage, at average cost
  - Other current and accrued assets
- Prepayments

**DEFERRED CHARGES**

- Debt discount and expense being amortized over life of outstanding issues
- Other

### Round Off

<table>
<thead>
<tr>
<th>1966</th>
<th>hundreds</th>
<th>hundred thousands</th>
<th>tens</th>
<th>thousands</th>
<th>millions</th>
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<tbody>
<tr>
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<td>$124,900,411</td>
<td>$288,818,425</td>
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<tr>
<td>$1,033,215</td>
<td>3,656,144</td>
<td>$4,689,359</td>
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<tr>
<td>$5,706,685</td>
<td>215,592</td>
<td>20,925,101</td>
<td>16,798,149</td>
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<td>9,051,515</td>
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<tr>
<td>$1,544,481</td>
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</table>

The notes to financial statements are an integral part of this statement.
II. Changing Fractions To Decimal Equivalents

To change a fraction to decimal form, divide the numerator by the denominator. The decimal point in the quotient should be located directly above the decimal point in the dividend.

Example: \[ \frac{3}{4} = .75 \]

\[ \begin{array}{c|c}
  4 & 3.00 \\
  \hline
  2 & 8 \\
  \hline
  2 & 0 \\
  \hline
  2 & 0 \\
\end{array} \]

\[ \frac{3}{4} = .75 \]

Exercises

Change each of the following fractions to decimal form. Carry out as many decimal places as necessary.

1. \[ \frac{4}{5} \]
2. \[ \frac{7}{8} \]
3. \[ \frac{1}{4} \]
4. \[ \frac{1}{2} \]
5. \[ \frac{1}{5} \]
6. \[ \frac{13}{25} \]
7. \[ \frac{11}{20} \]
8. \[ \frac{15}{16} \]
9. \[ \frac{1}{9} \]
10. \[ \frac{8}{50} \]
11. \[ \frac{9}{500} \]
12. \[ \frac{123}{500} \]

In division of decimals, change the decimal fraction to a fraction having whole numbers as the numerator and the denominator. Then divide the regular way. Notice the use of 1, the identity for multiplication, in the examples.

Examples: 1. \[ .3 \times .4 \]
\[ \frac{.3}{.4} = \frac{.3}{.4} \times \frac{10}{10} = \frac{30}{40} = .75 \]
2. \[ 2.70 \div .6 \]
\[ 2.70 \times 100 = 270 \div 100 = 4.5 \]
3. \[ 3.16 \div .4 \]
\[ 3.16 \div .4 = \frac{316}{4} = 7.95 \]
\[ \begin{array}{c|c}
  .4 & 3.16 \\
  \hline
  .4 & 3.16 \\
  \hline
  .1 & 6 \\
  \hline
  .0 & 6 \\
\end{array} \]
### Exercises

Change the following fractions to decimals.

1. \( \frac{3}{4} \)  
2. \( \frac{4}{8} \)  
3. \( \frac{3}{5} \)  
4. \( \frac{4}{7} \)

5. \( \frac{5}{32} \)  
6. \( \frac{43}{50} \)  
7. \( \frac{1}{2} \)  
8. \( \frac{2}{7} \)

9. \( \frac{1}{5} \)  
10. \( \frac{1}{8} \)  
11. \( \frac{1}{12} \)  
12. \( \frac{3}{7} \)

13. \( \frac{7}{20} \)  
14. \( \frac{5}{36} \)  
15. \( \frac{3}{1000} \)  
16. \( \frac{3}{1} \)

17. \( \frac{3}{8} \)  
18. \( \frac{4}{16} \)  
19. \( \frac{5}{7} \)  
20. \( \frac{5}{3} \)

### Brain Teaser

In a will, a man leaves $626.00 to three friends. When the man dies, his friends are 20, 30, and 5. Divide the money among the three in proportion to their ages.
### CALCULATOR PRACTICE

**Decimal Values of Rational Numbers \( \leq 1 \)**

(Save for reference)

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<th>( \frac{1}{x} )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>10</th>
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<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Complete the chart using four decimal place accuracy.

Mark \( \times \) in rectangles whose value is not less than one.

Example: \( \frac{3}{4} = \frac{1 \times 3}{4 \times 4} \) \( \{ \text{Locate } \frac{1}{4} \text{ on left} \} \) \( \{ \text{Locate } 3 \text{ at top} \} \) = .7500
**Decimal Values of Rational Numbers < 1**

(Save for Reference)

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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete the chart using four decimal place accuracy.

Mark X in rectangles whose value is not less than one.

---

**Challenge Problem**

A man drops a clock on the floor and it breaks into four pieces. Each piece shows a sum of 20.

Can you show where the breaks occurred? Is it possible for the breaks to have occurred in more than one way and still show sums of 20?
Exercises

Use machines to check the problems by multiplying.

1. \(25 \underline{.10600}\)
2. \(.823 \underline{1.28388}\)
3. \(5.41 \underline{3.50027}\)
4. \(.798 \underline{52.1094}\)
5. \(.1225 \underline{1.057175}\)
6. \(66.59 \underline{30.21854}\)

Work these problems on the calculator.

7. \(.952 \div 5.6 = \) 
8. \(94.08 \div 1.12 = \)
9. \(31.904 \div 9.97 = \)
10. \(49.94032 \div 66.41 = \)
11. \(.118944 \div 5.664 = \)
12. \(18.4815 \div .555 = \)
13. \(654.61466 \div 7.42 = \)
14. \(2192.542 \div 99.661 = \)
15. \(184.7032 \div 5.56 = \)
16. \(53.9377 \div 54.1 = \)
17. \(.20522 \div 6.62 = \)
18. \(33.75 \div .15 = \)
19. \(1.4518 \div .017 = \)
20. \(152.49 \div 6.63 = \)
21. \(59.51 \div 1.1 = \)
22. \(6.660 \div 1.5 = \)
### Practical Application

**Phone**
FR-2-5121

**SUPPLY COMPANY**

MAIN AT ROOSEVELT  
LITTLE ROCK, ARKANSAS  
P. O. BOX 144

**DATE**  
Dec 30 1965

**SOLD TO**
Hazel Sanders

**STREET**

**CITY**

**DESCRIPTION**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Unit Price</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
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<td>1010</td>
<td>Custom Snap Body Waves</td>
<td>1.50</td>
<td>Free</td>
</tr>
<tr>
<td>2.2</td>
<td></td>
<td>9.95</td>
<td>Free</td>
</tr>
<tr>
<td>5.5</td>
<td>Custom Fint Perm Waves</td>
<td>9.95</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Body Heat &amp; Hold Waves</td>
<td>2.95</td>
<td>Free</td>
</tr>
<tr>
<td>8.8</td>
<td>Control</td>
<td>4.45</td>
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</tr>
<tr>
<td>6.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No Merchandise Accepted For Return After 45 Days From Date of Invoice, Unless Defective.

Our Responsibility For Delivery and Damage Ceases After Delivery to Carrier. Make All Claims For Losses or Damages with Carrier Immediately.

---

**Note:**

- A. Back Ordered Will Ship Soon
- B. To Be Shipped Direct From Factory
- C. Discontinued By The Factory
- D. Delivered By Salesman
- E. Order Not Clear, Our Guess
- F. Out of Stock, Please Reorder
- G. Not Stock, Item Cancelled
- H. Reorder, Give Size, Color, etc.
- I. Substituted, If Not Satisfactory, Return For Credit

**Total**

<table>
<thead>
<tr>
<th><strong>Sales Tax</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Ins. & Trans.**

**NET TOTAL**

---

**Find the total, the sales tax, and the net total. Find the price per item on each entry. Do not include free items in figuring the unit price.**
Practical Application

CROSS COUNTY HOSPITAL
POST OFFICE DRAWER H
WYNNE, ARKANSAS 72396

Problems in Hospital Laundry

During April 1966 a hospital laundry processed 123,950 lbs. of
linen. The total number of hours worked by all laundry employees
was 3,040. The total cost for all supplies and salaries was
$7,150.

Question:

1. What was the number of lbs. of laundry processed per
   employee hour?

2. What was the cost per lb. to process the laundry?

Problem in Medical Records Department

Total salary expense in Medical Records Dept. during April 1966
was $2,490.32.

Total other expenses in Medical Records Dept. during April 1966
was $255.85.

Total patients discharged during April 1966 was 1,155.

Question:

1. How much did it cost to process each patient's chart?
On the following page you will find an invoice for merchandise ordered from Mallard Pen and Pencil Company, Inc. See if you can answer the following questions in regard to these materials:

1. What was the date of the order?__________________________
2. What was the shipping date?__________________________
3. How was the merchandise shipped?__________________________
4. Who paid freight on this shipment?__________________________
5. Was all the merchandise shipped that was ordered?________
6. What are the terms of the sale and how much does this discount amount to on this order?__________________________
7. How many pencils in a gross?__________________________
8. How many dozen in a gross?__________________________
9. How many cases in this shipment?__________________________
10. What was the total weight of the shipment?__________________________
11. If the "Humdinger" pencils sold for $2.16 per gross, what would the per cent of mark-up be?__________________________
12. What is the cost price per compass?__________________________
13. What is the cost price of compasses per dozen?__________________________
14. What is the cost price per ruler?__________________________
15. Write a check to pay the bill.
<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
<th>Price</th>
<th>Quantity</th>
<th>Shipped</th>
<th>Sold</th>
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<td>140.40</td>
<td>Compass</td>
<td>14.70</td>
<td>1</td>
<td>7760</td>
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<td>1</td>
<td>75</td>
<td>1</td>
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</tbody>
</table>

Terms: 2% Com & Net 60

Pencils of Quality, Georgetown, Kentucky

MacKard Pen & Pencil Co., Inc.

Invoice No. 4270
I. Renaming Rational Numbers

**Exercises**

1. a. $\frac{1}{1} \quad$ b. $\frac{5}{5} = \square$  
   c. $\frac{7}{il} = \square$
   d. $\frac{8}{8} = \square$  
   e. $\frac{9}{9} = \square$

2. a. $\frac{12}{15} = \square \cdot \frac{4}{5}$  
   b. $\frac{2}{3} \cdot \square = \frac{11}{21}$
   c. $\square \cdot \frac{7}{8} = \frac{28}{32}$  
   d. $\frac{8}{36} = \frac{2}{9} \cdot \square$
   e. $\frac{1}{7} \cdot \square = \frac{3}{21}$

3. a. $8 = \frac{8}{\square}$  
   b. $\frac{3}{4} + \frac{3}{5} = \frac{\square}{20} + \frac{\square}{20}$
   c. $6 = \frac{6}{1}$  
   d. $\frac{1}{2} \div \frac{2}{3} = \frac{\square}{6} + \frac{\square}{6}$
   e. $\frac{2}{3} + \frac{1}{6} = \frac{\square}{6} + \frac{1}{\square}$

4. a. $5 \frac{2}{3} = 5 + \square$  
   b. $4 \frac{1}{4} = \frac{\square}{4} + \frac{\square}{4}$
   c. $9 \frac{1}{6} = \square + \frac{1}{6}$  
   d. $3 \frac{1}{7} = \frac{21}{\square} + \frac{1}{\square}$
5. Change fractions to decimals or vice versa:
   a. \( \frac{2}{5} = \) \_
   b. \( \frac{7}{8} = \) \_
   c. \( \frac{6}{5} = \) \_

6. Write the numeral represented by the following:
   a. \( 2^2 = \) \_
   b. \( 3^3 = \) \_
   c. \( 4^2 = \) \_

7. Write in exponent form:
   a. \( 49 = \) \_
   b. \( 25 = \) \_
   c. \( 81 = \) \_

8. Fill in the blanks:
   a. 15 minutes = _____ hrs.
   b. 2 pounds = _____ ounces
   c. _____ inches = 2\frac{1}{2} feet
   d. 2 quarters = _____ dimes
   e. _____ yards = 72 inches

9. (Optional)
   a. \( \frac{82}{ten} = \) eight
   b. \( \frac{122}{three} = \) ten

NUMBERS DIVISIBLE BY THREE

Any number is divisible by 3 if the sum of the digits is divisible by 3. For example, 129 is divisible by 3 since \( 1 + 2 + 9 = 12 \) and 12 is divisible by 3. Checking, we see that 129 divided by 3 is 43.

Is 8217 divisible by 3?

When is a number divisible by 2?

When is a number divisible by 5?

When is a number divisible by 10?
J. Finding the Least Common Multiple

Exercises

1. R is the set of the multiples of 5.
   \[ R = \{ \} \]

2. Q is the set of the multiples of 6.
   \[ Q = \{ \} \]
   a. Is the set of multiples of 5 finite or infinite? _____
   b. Is the set of multiples of 6 finite or infinite? _____

3. The members common to both sets R and Q form a new set.
   \[ E = \{ \} \]
   This is the set of common multiples of 5 and 6.

4. What is the least element in set E? _______
   This is called the Least Common Multiple of 5 and 6.

5. Now what about the numbers 8 and 12?
   Multiples of 8 = \{ \}
   Multiples of 12 = \{ \}
   Common multiples of 8 and 12 = \{ \}
   Least common multiple of 8 and 12 is \[

6. By forming sets of multiples, find the Least Common Multiple of:
   a. 12 and 15
      \[ \text{multiples of 12} = \{ \} \]
      \[ \text{multiples of 15} = \{ \} \]
      \[ \text{common multiples of 12 and 15} = \{ \} \]
      LCM is \[
   
   b. Multiples of 6 = \{ \}
      Multiples of 8 = \{ \}
      Multiples of 9 = \{ \}
      Common multiples of 6, 8, 9 = \{ \}
      LCM is \[
   
   c. 8, 9, 12
7. Find the LCM of the denominators in the following problems.

a. \( \frac{2}{5} + \frac{1}{2} + \frac{2}{3} \)
   \( \text{LCM} = \)

b. \( \frac{4}{5} + \frac{8}{9} + \frac{1}{5} \)
   \( \text{LCM} = \)

c. \( \frac{9}{10} + \frac{4}{5} + \frac{14}{15} \)
   \( \text{LCM} = \)

d. \( \frac{h}{7} + 5 + \frac{9}{2} \)
   \( \text{LCM} = \)

e. \( \frac{2}{3} + \frac{1}{27} + \frac{h}{9} \)
   \( \text{LCM} = \)

f. \( \frac{4}{16} + 3 + \frac{6}{7} \)
   \( \text{LCM} = \)

g. \( \frac{h}{13} + \frac{1}{2} + \frac{3}{2} \)
   \( \text{LCM} = \)

h. \( \frac{7}{18} + \frac{3}{13} + \frac{5}{6} \)
   \( \text{LCM} = \)

i. \( \frac{9}{10} + \frac{10}{9} + \frac{10}{21} \)
   \( \text{LCM} = \)

j. \( \frac{3}{4} + \frac{4}{3} + \frac{1}{5} \)
   \( \text{LCM} = \)

k. \( \frac{4}{45} + \frac{1}{15} + \frac{h}{45} \)
   \( \text{LCM} = \)

l. \( \frac{24}{29} + \frac{13}{39} + \frac{128}{13} \)
   \( \text{LCM} = \)
K. Changing Mixed Numerals to Improper Fractions

Exercises

1. \(6 \frac{1}{3} = \)
2. \(2 \frac{1}{3} = \)
3. \(3 \frac{1}{3} = \)
4. \(3 \frac{1}{2} = \)
5. \(4 \frac{1}{2} = \)
6. \(5 \frac{1}{2} = \)
7. \(5 \frac{1}{4} = \)
8. \(5 \frac{2}{4} = \)
9. \(7 \frac{2}{4} = \)
10. \(53 \frac{3}{21} = \)
11. \(3 \frac{5}{41} = \)
12. \(3 \frac{5}{6} = \)
13. \(11 \frac{5}{9} = \)
14. \(9 \frac{2}{3} = \)
15. \(53 \frac{1}{6} = \)
16. \(2 \frac{3}{4} = \)
17. \(9 \frac{3}{7} = \)
18. \(3 \frac{1}{10} = \)

Grandfather Time

\(6666\)

HOW OLD AM I?
L. Addition of Fractions

Example:

\[ \frac{3}{4} + \frac{4}{5} = \left(\frac{3}{4} \cdot \frac{5}{5}\right) + \left(\frac{4}{5} \cdot \frac{4}{4}\right) = \frac{15}{20} + \frac{16}{20} = \frac{31}{20} \]

Exercises

1. \[ \frac{1}{3} + \frac{1}{3} = \]

2. \[ \frac{5}{7} + \frac{1}{7} = \]

3. \[ \frac{6}{13} + \frac{2}{13} + \frac{3}{13} = \]

4. \[ \frac{3}{4} + \frac{3}{8} = \]

5. \[ \frac{5}{12} + \frac{1}{3} = \]

6. \[ \frac{1}{2} + 4 = \]

7. \[ \frac{1}{3} + \frac{1}{4} = \]

8. \[ \frac{5}{4} + \frac{9}{8} = \]

9. In the above problems is each answer a rational number?

10. Are the rational numbers closed under addition?

---

Trick Numbers

1. Write twelve thousand twelve hundred and twelve.

2. Write one hundred using only the nine digits and the signs of arithmetic.

3. Write nineteen using only four 9's.
### Exercises

Work each of the following problems and place the answers in the appropriate box in chart. After you have completed the chart find the sum of each row and column.

1. \[ \frac{1}{5} + \frac{2}{10} \]
2. \[ \frac{4}{9} + \frac{4}{18} \]
3. \[ \frac{1}{3} + \frac{5}{6} \]
4. \[ \frac{3}{5} + \frac{4}{5} \]

5. \[ \frac{5}{10} + \frac{4}{10} \]
6. \[ \frac{7}{13} + \frac{12}{26} \]
7. \[ \frac{18}{20} + \frac{3}{10} \]
8. \[ \frac{9}{12} + \frac{1}{4} \]

9. \[ \frac{5}{6} + \frac{9}{12} \]
10. \[ \frac{7}{21} + \frac{2}{3} \]
11. \[ \frac{4}{30} + \frac{4}{5} \]
12. \[ \frac{1}{3} + \frac{1}{2} \]

13. \[ \frac{9}{16} + \frac{7}{16} \]
14. \[ \frac{7}{12} + \frac{5}{6} \]
15. \[ \frac{1}{3} + \frac{2}{6} \]
16. \[ \frac{6}{18} + \frac{2}{3} \]

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>6</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>10</td>
<td>11</td>
<td>12</td>
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<tr>
<td>13</td>
<td></td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>
M. Addition Properties of Rational Numbers

--- Exercises ---

1. a. \[ \frac{1}{6} + \frac{4}{6} = \_ + \_ \]

b. \[ \frac{3}{5} + \_ = \frac{4}{5} + \frac{3}{5} \]

c. \[ \frac{2}{5} + \frac{3}{10} = \_ + \frac{2}{5} \]

d. \[ \frac{2}{3} + \frac{7}{9} = \frac{7}{9} + \_ \]

You used the _______________ property to complete the above problem. Check your answers in the boxes by comparing the sum of the fractions on each side of the equal sign.

2. a. \[ \left( \frac{1}{5} + \frac{2}{5} \right) + \frac{4}{5} = \]

As problem a is written, what two fractions would you combine first? Then what fraction would you add to this sum? What is your answer?

b. \[ \frac{1}{5} + \left( \frac{2}{5} + \frac{4}{5} \right) = \]

As problem b is written, what two fractions would you combine first? Then what fraction would you add to this sum? How does your final answer compare with a?

c. \[ \left( \frac{3}{4} + \frac{2}{3} \right) = \frac{4}{5} \]

As problem c is written, what two fractions would you combine first? What do you have to do before combining them? What fraction would you add to this sum? Do you have to do the same as above before you can combine them? What is your answer?

d. Rewrite problem c to indicate combining \( \frac{3}{4} \) to the sum of \( \frac{2}{3} \) and \( \frac{4}{5} \). What answer do you get?

Problems a, b, c, and d illustrate the _______________ property.
3. a. \( \frac{2}{3} + \_ \_ \_ = \frac{2}{3} \)
   b. \( \frac{1}{10} + 0 = \_ \_ \_ \)
   c. \( 0 + \frac{5}{6} = \_ \_ \_ \)

   How does the result of each of these problems compare with the given fraction? Can we assume that there exists an identity element for addition of fractions? If so, what is the identity element?

4. a. \( \frac{1}{5} + \frac{-1}{5} = \_ \_ \_ \)
   b. \( \frac{4}{5} + \_ \_ \_ = 0 \)
   c. \( \_ \_ \_ + \frac{-2}{3} = 0 \)
   d. \( \frac{7}{8} + \frac{7}{8} = \_ \_ \_ \)
   e. \( \frac{-9}{7} + \_ \_ \_ = 0 \)
   f. \( \_ \_ \_ + \frac{5}{9} = 0 \)

   What is true about the addends of each example above?

   Compare the results of the above examples.

   The result in all these problems is the \_ \_ \_ \_ \_ \_ \_ \_ \_ element for addition.

   Therefore, each addend is the \_ \_ \_ \_ \_ \_ \_ \_ \_ of the other addend.

5. Complete the Fraction-o-Graphs

   \[ \begin{array}{cccc}
   \Delta & \Box & \bigcirc & \text{Hexagon} \\
   a. 3\frac{1}{2} & 5\frac{4}{5} & 1\frac{1}{8} & 2\frac{3}{4} \\
   b. \frac{7}{8} & \frac{5}{6} & \frac{2}{3} & \frac{7}{9} \\
   c. \frac{1}{4} & \frac{3}{4} & \frac{5}{4} & \frac{1}{7} \\
   d. \frac{9}{10} & \frac{1}{16} & \frac{3}{5} & \frac{5}{7} \\
   \end{array} \]

   \[ \begin{array}{c}
   \text{Hexagon} + (\Delta + \Box) = \\
   \bigcirc + (\bigcirc + \Box) + \Delta \\
   \end{array} \]

   a. \( \frac{23}{4} + (3\frac{1}{2} + 5\frac{4}{5}) = \_ \_ \_ \)
   e. \( (1\frac{1}{8} + 5\frac{4}{5}) + 3\frac{1}{2} = \_ \_ \_ \)
   b. \_ \_ \_ 
   f. \_ \_ \_ 
   c. \_ \_ \_ 
   g. \_ \_ \_ 
   d. \_ \_ \_ 
   h. \_ \_ \_ 

   \[ \begin{array}{c}
   \end{array} \]
N. Comparing Fractions

Exercises

1. Circle the larger fraction of each pair.
   1/3 or 1/4
   3/5 or 8/10
   1/2 or 3/5
   1/7 or 3/14
   1/4 or 5/8
   7/9 or 13/18

2. Cross out the incorrect word in the parentheses.
   (a) For a particular fraction as the denominator decreases
       the value of the fraction (increases, decreases).
   (b) For a particular fraction as the numerator increases
       the value of the fraction (increases, decreases).

3. Arrange these fractions from least to the greatest.
   3/4  7/8  5/6  11/12  23/24

4. Arrange these fractions from the greatest to the least.
   3/8  5/6  3/4  5/12  7/10
0. Addition of Decimals

Example:

Add:  

\[
\begin{array}{c}
14.32 \\
5.678 \\
\hline
14.320 \\
5.678 \\
\hline
19.998 \\
\end{array}
\]

In order to keep the decimal point in correct position, we must place zeros as placeholders. Then the problem rewritten would be:

\[
\begin{array}{c}
14.320 \\
5.678 \\
\hline
19.998 \\
\end{array}
\]

Zeros are placed to give the same numbers of digits to the right of the decimal point.

Exercises

1. \(146.59 + 11.687 = \)
2. \(1,156.834 + 998.62 + 6.9 = \)
3. \(742.544 + 69.3194 + 7.13 = \)
4. \(9,645.7853 + 573.478 + 69.72 + 17.9 = \)
5. \(456.6 \quad 6. \quad 4,456.93 \quad 68.58 \quad -579.643 \quad 79.474 \quad 62.1455 \)
6. \(77.77 + 5.555 + 333.3 = \)
7. \(107.9 + 10.06 + 3.293 = \)
8. \(\$104.93 + \$87.45 + \$6.57 \)
9. \(\boxed{} \quad + \quad -709.45 = 57.567 \)
Practical Applications
JUNIOR ACHIEVEMENT

Company Profits Tax Computation For Operating Year 19-19

<table>
<thead>
<tr>
<th>UNIRAC</th>
<th>South 31st &amp; Tulsa</th>
<th>Fort Smith</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Company</td>
<td>Business Center Address</td>
<td>City</td>
</tr>
</tbody>
</table>

All tax receipts are retained in the local area for the benefit of achievers.

GROSS INCOME

1. From sale of products or services .... $911.50
2. Other income ................................ 16.84
3. Total income ................................ 

DEDUCTIONS

4. Cost of goods sold:
   a. Raw materials ................................ $380.26
   b. Direct labor .................................. 54.60
5. Rent .............................................
6. Shop supply .................................... 8.67
7. Office supply .................................... 48.84
8. Depreciation ....................................
9. Salaries and other compensation ........ 56.60
10. Commissions .................................... 20.23
11. Other expenses:
    a. Advertising and promotion ................
    b. Annual Report ................................
    c. Contributions ................................
    d. Bad debts ....................................
    e. Other ........................................ 24.25
12. Total deductions ......................... $646.92 $646.92
13. Net income before taxes .................

No expenses on the following items: annual report, advertising and promotion, contributions, bad debts, and depreciation.

Compute total income, rent, and net income before taxes and write the results in the appropriate blanks.
<table>
<thead>
<tr>
<th>Item/Stock Number/Silo/Color/Description</th>
<th>Quantity</th>
<th>Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td>100</td>
<td>$20</td>
<td>$2000</td>
</tr>
<tr>
<td>Item 2</td>
<td>50</td>
<td>$30</td>
<td>$1500</td>
</tr>
<tr>
<td>Item 3</td>
<td>100</td>
<td>$10</td>
<td>$1000</td>
</tr>
<tr>
<td>Item 4</td>
<td>50</td>
<td>$20</td>
<td>$1000</td>
</tr>
</tbody>
</table>

Subtotal: $5500

Discount: 10%

Total after Discount: $4950

Shipping Charges:
- $50 (Ground Shipping)
- $20 (Air Freight)

Total Shipping: $70

Grand Total: $5020

Payment Options:
- Check
- Credit Card

Address:
- 123 Main Street
- Anytown, USA 12345

Signature: [Signature]

Date: 10-01-11

Orders:
- No Orders
- New Customer
- Change Address
- New Customer No.
Find the total price for each item. The Arkansas sales tax for each item is 4.1%.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1</td>
<td></td>
</tr>
<tr>
<td>Item 2</td>
<td></td>
</tr>
<tr>
<td>Item 3</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal: $123.45
Sales Tax: $5.00
Total: $128.45

Associate Store

Values

Good Place

A

Home

5-3-42
P. Subtraction of Rationals

To subtract two fractions, use the identity for multiplication to get common denominators. Then subtract numerators from numerators and denominators from denominators.

Example:

\[ \frac{2}{3} - \frac{3}{5} = \frac{2}{3} \times \frac{5}{5} - \frac{3}{5} \times \frac{3}{3} = \frac{2 \times 5}{3 \times 5} - \frac{3 \times 3}{5 \times 3} = \frac{10}{15} - \frac{9}{15} = \frac{1}{15} \]

Exercises

1. \( \frac{4}{7} - \frac{2}{7} = \)
2. \( \frac{8}{15} - \frac{2}{15} = \)
3. \( \frac{4}{5} - \frac{1}{10} = \)
4. \( \frac{7}{8} - \frac{2}{5} = \)
5. \( 1\frac{2}{9} - \frac{7}{8} = \)
6. \( 1\frac{1}{4} - 1\frac{5}{6} = \)
7. Is the answer to 6 a rational number?
8. \( 5\frac{1}{3} - 3\frac{2}{3} = \)
9. \( 8 - 1\frac{7}{16} = \)
10. \( 4\frac{3}{8} - 2\frac{1}{4} = \)
11. \( 14\frac{1}{4} - 5\frac{2}{3} = \)
12. \( 2\frac{3}{4} - 1\frac{1}{3} = \)
13. \( 24\frac{1}{5} - 12\frac{2}{3} = \)
14. \( 3\frac{7}{16} - 1\frac{3}{4} = \)
15. \( 5\frac{4}{15} - 1\frac{1}{3} = \)
Q. Subtraction Properties of Rational Numbers

Exercises

1. a. $\frac{3}{4} - \frac{1}{4} =$  
   b. $\frac{13}{15} - \frac{7}{15} =$  
   c. $\frac{5}{9} - 1 \frac{1}{2} =$

   In the above problems, are all the answers rational numbers?
   Can you conclude, then, that the rational numbers are **closed** for subtraction?

2. a. $\frac{3}{4} - \frac{2}{3} =$  
   b. $\frac{2}{3} - \frac{3}{4} =$

   What property of subtraction is illustrated in problem a. and b.?

   Examine the answers in a. and b.; are these answers the same?
   Can we conclude that subtraction is commutative?

3. a. $\frac{3}{4} - (\frac{2}{3} - \frac{1}{2}) =$  
   b. $(\frac{3}{4} - \frac{2}{3}) - \frac{1}{2} =$

   What do the above examples have in common?
   By form, do they show a property which we have already studied?
   What does the final result tell us about this property?
Brain Exercises

WHAT TIME IS IT?

Each problem consists of two parts. The answer to each part will be found on the outer circle. What time does each problem represent? (clock on page 109)

<table>
<thead>
<tr>
<th>MINUTE HAND</th>
<th>HOUR HAND</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: $\frac{3}{4} + \frac{1}{2} = \frac{5}{4}$</td>
<td>$3.08 + 2.42 = 5.5$</td>
<td>2:24</td>
</tr>
<tr>
<td>1. $\frac{3}{6} - \frac{1}{3} =$</td>
<td>2.08 - 1.08 =</td>
<td></td>
</tr>
<tr>
<td>2. $\frac{3}{6} \times \frac{2}{3} =$</td>
<td>$1 \frac{1}{4} \times 1 \frac{2}{4} =$</td>
<td></td>
</tr>
<tr>
<td>3. $\frac{5}{16} \times \frac{4}{5} =$</td>
<td>$3.6 \div 1.2 =$</td>
<td></td>
</tr>
<tr>
<td>4. $\frac{16}{7} \div \frac{8}{7} =$</td>
<td>$2.01 + 1.89 + 1.10 =$</td>
<td></td>
</tr>
<tr>
<td>5. $\frac{14}{7} + \frac{5}{7} =$</td>
<td>$1 \div \frac{3}{2} =$</td>
<td></td>
</tr>
<tr>
<td>6. $1.28 + 2.72 =$</td>
<td>$\frac{5}{16} - \frac{3}{16} + \frac{6}{16} =$</td>
<td></td>
</tr>
<tr>
<td>7. $1.32 + 11.08 =$</td>
<td>$\frac{7}{16} + \frac{2}{8} - \frac{4}{4} + 1 =$</td>
<td></td>
</tr>
</tbody>
</table>

Suggestion: Use toothpicks for hands on clocks to save erasing.
WHAT TIME IS IT?
Way Out Problem

Let the horizontal numbers represent the numerator and vertical numbers represent the denominator of a rational number.

Example: The dot circled \( \frac{7}{2} \) is \( 2 \). Join the dots representing the answers in the A and B part of each problem below.

By working the problems in order, circle the problem number at which you are able to determine the design.

1. a. \( \frac{7}{1} - \frac{4}{1} = \frac{3}{1} \)
   b. \( \frac{7}{3} - \frac{4}{3} = \frac{3}{3} \)

2. a. \( \frac{9}{4} - \frac{3}{4} = \)
   b. \( \frac{12}{6} - \frac{6}{6} = \)

3. a. \( \frac{1}{5} - \frac{1}{5} = \frac{5}{5} \)
   b. \( 1 - \frac{3}{5} = \)

4. a. \( 1 + \frac{1}{2} = \)
   b. \( 1 + \frac{2}{5} = \)

5. a. \( 1 \times \frac{1}{2} = \) \[ \square = \frac{8}{8} \]
   b. \( \frac{2}{3} \times \frac{2}{3} = \)

6. a. \( \frac{1}{3} = \frac{6}{6} \)
   b. Same as 3 (a).

7. a. \( \frac{4}{8} - \frac{1}{6} = \) \[ \square = \frac{6}{6} \]
   b. \( \frac{11}{12} - \frac{1}{12} = \) \[ \square = \frac{6}{6} \]

8. a. \( 1 \frac{3}{4} = \)
   b. \( \frac{2}{5} \cdot 4 = \)
9. a. \(1 = \frac{\square}{5}\)  
   b. Same as 9 (a)

10. a. \(\frac{1}{4} - \frac{1}{4} = \frac{\square}{4}\)  
   b. 0 = \(\frac{\square}{6}\)

11. a. \(\frac{1}{7} + \frac{1}{3} = \frac{\square}{\square}\)  
   b. 11 (a) + \(\frac{1}{7}\) =

12. a. \(\frac{5}{12} \cdot \frac{12}{1} = \frac{\square}{\square} = \frac{\square}{1}\)  
   b. \(\frac{4}{3} + \frac{8}{10} = \frac{\square}{\square} = \frac{5}{\square}\)

13. a. \(2 \frac{1}{2} - 1 \frac{3}{4}\)  
   b. Same as 7 (a)

14. a. Same as 10 (a)  
   b. \(\frac{1}{2} = \frac{\square}{\square}\)

15. a. Same as 13 (a)  
   b. \(\frac{7}{8} + \frac{3}{8} = \frac{\square}{\square} = \frac{\square}{4}\)

16. a. Same as 15 (b)  
   b. Same as 9 (a)

17. a. Same as 2 (b)  
   b. \(\frac{3}{2} - \frac{1}{3} = \frac{\square}{\square}\)

18. a. Same as 17 (b)  
   b. Same as 8 (b)

19. a. \(1 - \frac{2}{7} = \frac{\square}{\square}\)  
   b. Same as 11 (b)

20. a. Same as 14 (b)  
   b. Same as 3 (b)

21. a. Same as 2 (a)  
   b. Same as 8 (a)

22. a. Same as 11 (b)  
   b. Same as 5 (a)
R. Subtraction of Decimal Numerals

Exercises

In the subtraction of decimals, zeros must also be placed to the right of the decimal point as placeholders.

1. \(97.453 - 7.54 =\)
2. \(\underline{\phantom{0}} + 98.976 = 244.476\)
3. \(56.873 + \underline{\phantom{0}} = 113.746\)
4. \(1465.3 - 976.25 =\)
5. \(783.768 - 13.656 =\)
6. \(.3869 - .0789 =\)
7. \(.97654 - .00423 =\)
8. \(.13 - .0078 =\)
9. \(145 - 2.593 =\)
10. \(\underline{\phantom{0}} + 991.55 = 1157\)
11. \($863.57 - $79.41 =\)
12. \($75.76 + \underline{\phantom{0}} = $1,145\)

Count Down

Can you write from 10 to 1 backwards? Time yourself. How many seconds did it take?
### Calculator Practice

**Subtract:**

1. \[ \begin{array}{ccc}
    \text{3,425.56} & \text{34,567.987} & \text{345.789} \\
    \text{2,976.43} & \text{27,659.654} & \text{4.987} \\
\end{array} \]

2. \[ \begin{array}{ccc}
    \text{6,789} & \text{6,785} & \text{4,567} & \text{2,345} & \text{654} \\
    \text{2,345} & \text{3,456} & \text{2,345} & \text{345} & \text{345} \\
\end{array} \]

3. \[ \begin{array}{ccc}
    \text{987,634} & \text{8,765,432} & \text{7,658,646} \\
    \text{34,567} & \text{456,745} & \text{654,765} \\
\end{array} \]

4. \[ \begin{array}{ccc}
    \text{847,563.87} & \text{746,575.7856} \\
    \text{36,585.75} & \text{25,346.7563} \\
\end{array} \]

5. \[ \begin{array}{ccc}
    \text{384,757,665.76} & \text{85,756,393.89} \\
    \text{87,659,475.86} & \text{6,547,896.76} \\
\end{array} \]

6. \[ \begin{array}{ccc}
    \text{8,475,8578} & \text{958,674.9789} & \text{56.76} \\
    \text{3,456,7658} & \text{654,354.9876} & \text{76.98} \\
\end{array} \]

7. \[ \begin{array}{ccc}
    \text{958,746,353.756} & \text{35,643,654.987} \\
    \text{8,765,547.307} & \text{67,898,765.876} \\
\end{array} \]
5. Comparing Decimal Numerals

---Exercises---

1. Arrange these numbers from the least to the greatest.
   .9
   .88
   .5683
   .34778
   .77
   .06

2. Arrange these numbers from the greatest to the least.
   1.8
   1.50
   1.77
   1.70
   1.08
   1.35
   1.009

3. Arrange these numbers from the least to greatest.
   .8875
   5.1
   6.005
   70.466
   11.663
   2.975
   14.50998

4. Which has the least value? Circle answer
   a. Seven tenths or seven hundredths
   b. Nine hundredths or nine thousandths
   c. Two and five tenths or two and five thousandths

---PERFECT NUMBERS---

A number is perfect if it is the sum of its divisors. For example, 6 has divisors 1, 2, 3 (we exclude the number itself) and 1 + 2 + 3 = 6. There is only one other perfect number between 6 and 50. Can you find that number?
T. Order of Operations

Exercises

1. Place parentheses which show the operation(s) you would perform first.
   a. \( 4 \cdot 3 - 5 \)
   b. \( 8 + 7 \cdot 2 \)
   c. \( 8 - 4 \div 4 \)
   d. \( 6 \cdot 3 - 2 \cdot 4 \)
   e. \( 12 + 3 \cdot 5 \)

2. Find the value of each.
   a. \( 3 + 6 \cdot 5 = \)
   b. \( \frac{12}{3} - \frac{10}{5} = \)
   c. \( 7 \cdot 3 + 4 \cdot 8 = \)
   d. \( 2 \cdot 3 + 4 = \)
   e. \( 3(5 + 6) = \)
   f. \( 9 - 3 - 2 = \)
   g. \( 9 - (3 - 2) = \)
   h. \( 7 (5 - 2) = \)
   i. \( 9 - \frac{12}{3} + 6 \cdot \frac{8}{2} = \)
   j. \( 5 \cdot 6 - 3 \cdot 2 + 8 \cdot 3 = \)

3. Find the value of each.
   a. \( 12 + 13 - 2 (3 - 1) = \)
   b. \( 8 - 12 + 6 + (7 - 1) - 5 = \)
   c. \( 5 + (6 + 3 - 2 + 4) = \)
   d. \( 20 + 11 - 4 + 7 - 2 + 1 + 4 - 15 = \)
   e. \( 8 \left[ 2 + 7 + (6 - 4 - 8 \div 4) + 2 \cdot 4 - 1 \right] = \)
   f. \( 43 - 2 + 19 + 4 + 16 - 4 + 9 - 5 - 13 + 2 = \)
   g. \( 3 - 2 + (8 - 2 + 5 + 3 - 4 + 2) - 3 = \)
   h. \( 23 + 6 + 3 - (7 + 4) - 8 = \)
Exercises

1. \[2 + \left( \frac{3}{2} \right) - 2 \cdot 3 \cdot \frac{6}{1} = -1\]

2. \[20 - \left[ 8 + 3 \cdot \frac{2}{1} \right] + 4 = 12\]

3. \[\left( \frac{30}{2} \right) \div (5 \cdot 2) - 3 = 1\]

4. \[\left( 27 \div 9 \right) + (27 + 9) \div 3 = 11\]

5. \[\left( 14 \cdot 2 \right) + 5 \div 11 = 30\]

6. \[(3 \cdot 9) + \left( \frac{9}{3} + 2 \right) = 30\]

7. \[11 + 2 (6 + 4) - 3(1 + 3) = 18\]

8. \[16 - \{10 \div 2 + (6-4) - 5\} = 8\]

9. \[18 - (9+4-3 + 2) = 4\]

10. \[9 + \{20 - \left( \frac{5}{2} + 3 \cdot \frac{1}{2} + 8 \right) + 3\} - 8 = 12\]

11. \[14 - 5 + \left( \frac{3}{2} \right) \cdot 18 \div 2 - (18 + 2 - 10) - 5 \cdot 3 \div 11 = 1\]

12. \[45 \div 8 - 5 + 3 \cdot \frac{17}{59} - 8 = -1\]

13. \[94 \div 14 \div 2 + 10 - 17 + 8 = 3\]
Dot to Dot

Complete the drawing by starting at the given answer and connecting in order the correct answers to the problems.

1. $4.7 + .03 = 4.73$
2. $5.78 - 2.4 = 3.38$
3. $6.4 \times 8 = 51.2$
4. $3.34 \div 3 = 1.11$
5. $.084 + .006 = .090$
6. $36 \div .6 = 60$
7. $7.82 + 2.07 = 9.89$
8. $67.3 + 238 = 305.3$
9. $9 \times .03 = .27$
10. $112 - 64.7 = 47.3$
11. $78.6 \times .04 = 3.144$
12. $2374 \div 26 = 91.3$
13. $.667 + .333 = 1$
14. $38.96 + 2.903 = 41.869$
15. $784 \div 16 = 49$
16. $83 \times 2.4 = 199.2$
17. $9.84 - 3.6 = 6.24$
18. $2.97 \div 99 = .03$
19. $6.49 + 732.4 = 739.89$
20. $7.03 - .97 = 6.06$
21. $.38 \div .309 = 1.25$
22. $5.75 + 1.25 = 7$
23. $12.5 \div 8 = 1.5625$

24. $3.25 \div .25 = 13$
25. $42.6 + 2.08 = 44.68$
26. $71.42 = 321$
27. $.68 - .94 = .74$
28. $47.9 \times 3.5 = 167.65$
29. $.52 \times .48 = .25$
30. $.81 \div .9 = .9$
31. $4\%$ of 125 = 5
32. $32$ is $50\%$ of 64
33. $1\%$ of 67.50 = .675
34. $\%$ of 84 is 21
35. $6\%$ of $6,750 = 405$
36. $3.40$ is $\%$ of $500$
37. $680 \times 6\% = 41.08$
38. $238 + 4.29 = 242.29$
39. $.428 \div 4 = .107$
40. $6.09 \times 4.5 = 27.405$
41. $.72 \div .8 = .9$
42. $.007 + .0008 = .0078$
43. $.6 + .004 = .604$
44. $.43 \times .2 = .086$
45. $.006 \div .02 = .332$
46. $36.4 - 3.06 = 33.34$
47. $45 = \%$ of 150
For Fun

There are ten mathematical errors on this page. Find them.

25'

300 sq. ft.

3 tons = 5000 lbs.

5/4 \cdot 1/12 = 15/4

C = 2 \pi R

1 \text{ ft.} 5 \text{ in.} = 17 \text{ in.}

1/4 : 1/3 = 1/12

1 \text{ ft.} = 1/3 \text{ yd.}

Length of bow = 2'

\text{Surface Area of Silo: } A = \pi Tdh
\quad R = 3.6 \times 10' \times 40

5 - 2 =

36.7

5.50

.784

6320

7.526

Area of Circle
diameter = 8" 
A = 50.24"
The Pizza Party

1

2 Set had a party at the home of her parents, the 3 . When everyone arrived, she 4 them with math. 5 . She didn't have a date for the party because she was batting 6 with her boyfriend that week so she called him 7 . For dinner they had 8 ribs since it was a pizza party. All the glasses of Root Beer were full of Pepsi. The 9 party was bound to be a big success! The difference between the boys and girls could be determined by the 10 numbers and their 11 and everyone knew their 12 value, since there were only a few chairs.

The arrival of our instructor's wife, Eve Ann, with the professor himself, Mr. 13 , caused a moment of silence. Soon they were their old selves and the party went on. The professor and Eve Ann didn't 14 with any of the students because they were so involved
with the 15______ at the serving table. The 16____
of the front door allowed only a 17______ of the noise
to escape to the adjacent 18_______. Miss 19______
made her entrance with a musical 20_______. She has had
much experience because her parents are 21______ of
now business, but they are now divided.

Fill the blanks with words from this list. For instance,
No. 4 blank would be filled with the word "renamed." Words
may be used only once or not at all.

associate    counting    added    closure

distributive  fraction    end    integer

operations    identity    null    prime

opposites     divided    odd    start

products     renamed    place    square

property     symbols    sets    whole

number     zero
UNIT VII

PERCENTAGE

A. Student Investigation

Approximately what per cent of the nose cone is shaded? Another way of asking the same question would be: If the nose cone is mentally separated into 100 equal parts, how many of these parts are shaded? One of these 100 parts is $1/100$ of the nose cone, or one per cent of it.

The symbol used for one per cent is $\%$.

\[ \frac{1}{100} \text{ is the same as } 1\% \]

In the problem above, 100 equal parts would be hard to see! But it does appear that $1/2$ of the nose cone is shaded.

Since $1/2 = 1/2 \times 1 = 1/2 \times 50/50 = 50/100$ or $50 \times 1/100$, if $1\%$ is substituted for $1/100$ the answer is $50\%$.

Examples:

Change the following to $\%$:

1. $\frac{3}{4} = \frac{3}{4} \times 1 = \frac{3}{4} \times 25/25 = \frac{75}{100} = 75 \times 1/100 = .75$

\[ .75 = \frac{75}{100} = 75 \times 1/100 = 75\% \]

2. $.025 = 2.5 \times 1/100 = 2 \ 1/2 \text{ percent.}
3. \( \frac{1}{8} = \frac{.125}{1000} = \frac{125}{1000} = \frac{1}{100} = 12.5 \times \frac{1}{100} \)

Therefore, \( \frac{1}{8} = 12\frac{1}{2} \) per cent

---

**Exercises**

1. \( \frac{1}{5} = \)  
2. \( \frac{1}{2} = \)  
3. \( .83 = \)

4. \( \frac{6}{10} = \)  
5. \( .6 = \)  
6. \( \frac{1}{20} = \)

7. \( .04 = \)  
8. \( .004 = \)  
9. \( \frac{1}{50} = \)

10. \( .75 = \)  
11. \( .075 = \)  
12. \( \frac{1}{12} = \)

13. \( \frac{17}{25} = \)  
14. \( \frac{8}{20} = \)  
15. \( .008 = \)

Change these per cents to decimals and then to fractions.

16. 40\% = \___, \___  
17. 75\% = \___, \___
18. 12.5\% = \___, \___  
19. 9.8\% = \___, \___
20. .1\% = \___, \___  
21. 5\% = \___, \___
Exercises

Find the per cent of each number.

1. 82% of 350 =
2. 6% of $39 =
3. 75% of 2000 =
4. 50% of 366 =
5. 4.5% of 800 =
6. 180% of 350 =
7. 0.5% of 650 =
8. 12½% of 1000 =
9. 33½% of 99 =
10. ¼% of 100 =

Find the rate of per cent.

1. 16 is____% of 24
2. $0.48 is____% of $3.20
3. 25 is____% of 75
4. 9 is____% of 4
5. 5 is____% of 2
6. 50 is____% of 200
7. 36 is____% of 100
8. 2 is____% of 1
9. 27 is____% of 99
10. 0.54 is____% of 9

Find the missing numbers.

1. 28% of____ = 7
2. 9% of____ = 72
3. 54 is 3.6% of____
4. 2½% of____ = 81
5. 60% of____ = 46.8
6. 26.3% of____ = 18.41
7. 0.25% of____ = 2.5
8. ¼% of____ = 6.25
9. 0.25% of____ = 6.25
10. 100% of____ = 100
Matching Exercises

1. 25% of 95
   a. 253.08
   b. 4195.8
   c. 253.18
   d. 623.96
   e. 6239.6
   f. 2375
   g. 922.50
   h. 54.39
   i. 922.50
   j. 53625
   k. 419.58
   l. 12.215
   m. 26308
   n. 543.9
   o. 23.75
   p. 90.72
   q. 0.9072
   r. 122.15
   s. 32956
   t. 536.25
   u. 329.56
   v. 9.072

Find the per cents and totals

1. 9% of 658 =
2. 21% of 658 =
3. 58% of 658 =
4. 7% of 658 =
5. 5% of 658 =

Total

Total

124
If 25% of 999 is 249.75, then 75% of 999 is \(3(249.75)\) or 749.25.

Using this easy method, work these problems:

1. 33% of 100 is \(\square\), thus 66% of 100 is \(\square\).

2. 56% of 88 is \(\square\), thus 28% of 88 is \(\square\).

3. 40% of 95 is \(\square\), thus 10% of 95 is \(\square\).

4. .6% of 125 is \(\square\), thus 2.4% of 125 is \(\square\).
(Home) has the ball on the 50 yd. line heading toward (visiting)'s goal.

You are the score keeper.

Here are your instructions:

a. The answer to each problem tells you the yardage made each play. If answer is positive, yards gained; if answer is negative, yards lost.

b. If answer is zero, there is a fumble and the other team recovers the ball.

c. A team has four downs to make 10 yards.

d. When a team makes enough yardage to reach the goal, they score. The other team gets the ball on the 50 yd. line.

e. No extra points are scored.

f. Use the chart on page 128 to keep up with the game.

1. \(10626.0 \div 885.5 = \)
2. \(4427 \div -233 = \)
3. \(\frac{11}{4} \div \frac{22}{88} = \)
4. 30% of 10 =
5. \(7,956 - (15912 \times .5) = \)
6. 20% of 25 =
7. \(96714.7 \div 5689.1 = \)
8. \(\frac{5}{4} + \frac{7}{12} + 1 + \frac{1}{6} = \)
9. \(\frac{7}{16} - \frac{1}{2} + 33 \frac{7}{16} = \)
10. \(119794.65 \div 7986.31 = \)
11. \(-7989.64 + 7969.64 = \)
12. \( \frac{1}{3} \times \frac{1}{4} \times \left( \frac{1}{6} + \frac{11}{12} \right) = \)

13. \( \left( \frac{117}{15} \div \frac{9}{25} \right) - \frac{80}{3} = \)

14. \( (28 \times .25) \times 5 = \)

15. \( \frac{23}{3} + \frac{68}{6} = \)

16. \( 4^2 = \)

17. \( .05 \times 700 = \)

18. \( 11 \times \underline{\text{___}} = 121 \)

19. \( (50 \times 2) - (100 \div 4) + 70 = \)

20. \( \frac{1}{7} + \frac{1}{4} + \frac{1}{14} + \frac{1}{2} + \frac{33}{28} = \)

21. \( \frac{2}{12} + \frac{12}{72} -2 = \)

22. \( 100 = \underline{\text{2}} \)

23. \( 49 = 7 \times \underline{\text{___}} \)

24. \( 144 = 2 \times 2 \times 2 \times 2 \times 3 \times \underline{\text{___}} \)

25. \( 75 = 5 \times 3 \times \underline{\text{___}} \)

26. \( 50\% \text{ of } 4 = \)

27. \( (5 \% \text{ of } 40) - (.5 \times 4) = \)

28. \( 34335444775 \div 512469325 = \)

29. \( 2^4 = \)

What is the final score?

What is the total yardage gained by the home team? _____
by the visiting team? _____

What is the total yardage lost by the home team? _____
by the visiting team? _____
B. Interest

\[ I = P \times R \times T \]

Interest = Principal \times Rate \times Time

\[ \frac{Interest}{Principal \times time} = Rate \]

\[ \frac{Interest}{Rate \times Principal} = Time \]

\[ \frac{Interest}{Rate \times Time} = Principal \]

Note: Time in the formula \( I = P \times R \times T \) is in years.
<table>
<thead>
<tr>
<th></th>
<th>Interest</th>
<th>Principal</th>
<th>Rate</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$25,000</td>
<td>5%</td>
<td>1 yr.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10,000</td>
<td>8%</td>
<td>2 yrs.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>575</td>
<td>6%</td>
<td>5 yrs.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>425</td>
<td>7%</td>
<td>90 days</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>750</td>
<td>5%</td>
<td>60 days</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>25,000</td>
<td>4%</td>
<td>3 yrs.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3,808</td>
<td>___%</td>
<td>4 yrs.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>800</td>
<td>___%</td>
<td>2 yrs.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>600</td>
<td>___%</td>
<td>3 yrs.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1,500</td>
<td>___%</td>
<td>45 days</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1,900</td>
<td>___%</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>500</td>
<td>___%</td>
<td>30 days</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>600</td>
<td>8%</td>
<td>___yr.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>2,000</td>
<td>6%</td>
<td>___yr.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>520</td>
<td>2%</td>
<td>___yr.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>400</td>
<td>8%</td>
<td>___days</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>2,352</td>
<td>5%</td>
<td>___days</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>7,650</td>
<td>6%</td>
<td>___days</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>$163.80</td>
<td>___</td>
<td>3%</td>
<td>3 yrs.</td>
</tr>
<tr>
<td>20</td>
<td>12.00</td>
<td>___</td>
<td>2%</td>
<td>2 yrs.</td>
</tr>
<tr>
<td>21</td>
<td>19.80</td>
<td>___</td>
<td>10%</td>
<td>1 yr.</td>
</tr>
<tr>
<td>22</td>
<td>199.80</td>
<td>___</td>
<td>5%</td>
<td>2 yrs.</td>
</tr>
<tr>
<td>23</td>
<td>335.20</td>
<td>___</td>
<td>8%</td>
<td>5 yrs.</td>
</tr>
<tr>
<td>24</td>
<td>20.00</td>
<td>___</td>
<td>4%</td>
<td>180 days</td>
</tr>
</tbody>
</table>
In the following problems:
Use 360 days to find daily interest.
Find annual interest-rate.
Divide annual interest by 360 days
to find daily factor.
Daily factor should be carried to
thousandths.

For example:
$10,000 at 6% = $600
$600 \times 360 = $1.667 per day.

1. LOAN OF $15,000 at 6%.
   a. WHAT IS AMOUNT OF ANNUAL INTEREST?
   b. WHAT IS DAILY FACTOR?
   c. WHAT IS AMOUNT OF INTEREST FOR 66 DAYS?
   d. LOAN MADE JULY 1, 1971 DUE WHEN?

2. LOAN OF $200,000 AT 5 3/4% FOR 90 DAYS.
   a. WHAT IS AMOUNT OF ANNUAL INTEREST?
   b. WHAT IS DAILY FACTOR?
   c. WHAT IS THE AMOUNT OF INTEREST FOR 90 DAYS?
   d. INTEREST WOULD BE_____ IF LOAN WAS $200.
   e. LOAN MADE SEPTEMBER 5, 1971 DUE WHEN?
C Commission

Commission = Base x Rate

Example: John's paper route:

Papers sold = 65
Price of each paper = 15¢
Rate of commission = 30%

John's commission = $2.93

Exercises

1. Mr. Graves, insurance salesman:

Amount of Insurance sold: $2500
Rate of Commission: 15%

Mr. Graves' Commission:

2. Don Jackson, appliance salesman in large department store:

Sold $6,120 worth of appliances in one month:
Rate of Commission: 6%

Don's commission for that month:

3. John Greene: car salesman

Amount of sales - 1st week: $2400
Amount of sales - 2nd week: $900
Amount of sales - 3rd week: $2550
Amount of sales - 4th week: $2625

Rate of commission: 4%

Total sales:

Total amount of commission:
DEAR ANN LANDERS: I am a salesman in a large department store. Like most salesmen of major items (furniture, rugs, jewelry, refrigerators, stoves, etc.) I work on commission. Last week I spent the better part of two days with three couples. They asked dozens of questions, which I was happy to answer. That's what I'm here for. I gave them my card and said if they decided to buy I'd be happy to help them. At the end of the week I followed up by telephoning these couples and all three told me they had been in the store and bought the item from someone who just happened to be standing there. They all added, "You aren't on commission are you?"

Note: Each couple purchased only one item.
D. Discount

Discount = Selling price X Rate

\[ \text{Exercises} \]

1. Phillip buys a 12 hp. boat motor:

\[
\begin{align*}
\text{Selling price} & = \$380.25 \\
\text{Rate of discount} & = 10\% \\
\text{Amount of discount} & = \$ \\
\text{Phillip's price} & = \$
\end{align*}
\]

2. Jim is buying a new Plymouth V.I.P.

\[
\begin{align*}
\text{Selling price} & = \$4250 \\
\text{Rate of discount} & = 15\% \\
\text{Amount of discount} & = \$ \\
\text{Jim's price} & = \$
\end{align*}
\]

3. Phyllis is buying ten 33 1/3 rpm stereo records.

\[
\begin{align*}
\text{Selling price} & = \$5.98 \text{ each} \\
\text{Rate of discount} & = 30\% \\
\text{Amount of discount} & = \$ \\
\text{Phyllis' price} & = \$
\end{align*}
\]

Example: Judy buys a sweater:

\[
\begin{align*}
\text{Selling price} & = \$8.95 \\
\text{Rate of discount} & = 20\% \\
\text{Amount of discount} & = \$1.79 \\
\text{Judy's Price} & = \$7.16
\end{align*}
\]
<table>
<thead>
<tr>
<th>Retail Price</th>
<th>Rate of Discount</th>
<th>Amount Discount</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,400</td>
<td></td>
<td></td>
<td>$1,920</td>
</tr>
<tr>
<td>$18.75</td>
<td></td>
<td></td>
<td>18.00</td>
</tr>
<tr>
<td>$15.00</td>
<td></td>
<td></td>
<td>11.25</td>
</tr>
<tr>
<td>$100.00</td>
<td></td>
<td></td>
<td>95.50</td>
</tr>
<tr>
<td>$800.00</td>
<td></td>
<td></td>
<td>768.00</td>
</tr>
<tr>
<td>$1.44</td>
<td></td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td>$16.00</td>
<td></td>
<td></td>
<td>15.00</td>
</tr>
<tr>
<td>$75.00</td>
<td></td>
<td></td>
<td>70.00</td>
</tr>
<tr>
<td>$32.00</td>
<td></td>
<td></td>
<td>28.00</td>
</tr>
<tr>
<td>$80.00</td>
<td></td>
<td></td>
<td>68.00</td>
</tr>
<tr>
<td>$175.00</td>
<td></td>
<td></td>
<td>140.00</td>
</tr>
<tr>
<td>$4.50</td>
<td></td>
<td></td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>Retail Price</td>
<td>Rate of Discount</td>
<td>Amount of Discount</td>
</tr>
<tr>
<td>---</td>
<td>--------------</td>
<td>------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>1.</td>
<td>$ .50</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>$900.00</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>$ 8.59</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>$ 50.55</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>$ 19.00</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>$ 23.98</td>
<td>66%</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>$ 34.88</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>$146.10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>$ 6.90</td>
<td>1/3 off</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>$198.88</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>$ 12.95</td>
<td>1/4 off</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>$ 11.75</td>
<td>15%</td>
<td></td>
</tr>
</tbody>
</table>
### Practical Application

#### Northside High School Athletic Department
North 23rd and B Streets  
Fort Smith, Arkansas

**COST OF SUITINGS:**

<table>
<thead>
<tr>
<th>Item</th>
<th>List Price</th>
<th>Team Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 pair shoulder pads</td>
<td>$24.50</td>
<td>$16.95</td>
</tr>
<tr>
<td>1 helmet</td>
<td>$33.50</td>
<td>$24.95</td>
</tr>
<tr>
<td>1 pair football shoes</td>
<td>$30.00</td>
<td>$24.95</td>
</tr>
<tr>
<td>1 pair football pants</td>
<td>$28.50</td>
<td>$20.95</td>
</tr>
<tr>
<td>1 jersey</td>
<td>$18.50</td>
<td>$13.95</td>
</tr>
<tr>
<td>1 pair Grizzly Bear emblems</td>
<td>$1.25</td>
<td>$0.95</td>
</tr>
</tbody>
</table>

**Total**

Using list price and team price, figure the rate of discount and the amount of discount.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount of Disc.</th>
<th>% of Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. on shoulder pads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. helmet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. shoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. pants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. jersey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. emblems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each year 32 boys are fitted with new equipment. Figure the cost at list price then at team price.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>List Price</th>
<th>Team Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Pads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helmets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerseys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emblems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Practical Application

STERLING STORES COMPANY, INC

1. Fourth of July Sale

beach towels (were $1.98) 40% off
stereo LP records (were $3.89) 1/3 off
candy (was .79 per lb.) 25% off

Nancy bought
2 beach towels
4 stereo LP records
3 lb. candy

sale price  total price

3% tax

How much did Nancy save?

2. Joe Payne's Dance Contest

First Prize - Stereo Tape Cartridge Player

How much was saved?

What was the rate of discount?
Exercises

1. List Price | Discounts | Net Price
--- | --- | ---
a. $75.00 | 20%, 12½% | 
b. $75.00 | 20% + 12½% | 

Did you get the same result for both methods?

Note: In successive discounts the discount rates must not be added together.

2. List Price | Discounts | Net Price
--- | --- | ---
a. $18.50 | 10%, 5% | 
b. $923.00 | 30%, 25%, 15% | 
c. $40.16 | 50%, 20%, 10% | 
d. $27.60 | 33 1/3%, 25% | 
e. $117.00 | 20%, 15%, 5% | 

3. A store offers a motor bike for $450 less discounts of 20% and 10%. Another store offers the same bike at $475 less 25% and 10% discounts.

Which one would you buy?

4. Which would you rather buy, a stereo priced at $225.00 with discounts of 25%, 20%, 12½%, or the same stereo with a single discount of 50%?
Practical Application

REMITTANCE ADVICE

DUE DATE

Barton Lumber Company

CORNER HUNTINGTON & UNION • TELEPHONE WEBSTER 2-6675

Damon efumher

Company

CORNER HUNTINGTON & UNION • TELEPHONE WEBSTER 2-6675

Jonesboro, Arkansas

<table>
<thead>
<tr>
<th>Reference</th>
<th>CHARGES</th>
<th>CREDITS</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>104 gal. BPS Housepaint</td>
<td>$8.72/gal.</td>
<td>40¢/gal. promotional discount</td>
<td></td>
</tr>
<tr>
<td>50 squares roofing</td>
<td>$11.98/sq.</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>15 pc. 12' metal molding</td>
<td>44¢/lin. ft.</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>

Use the name of any building contractor in your town as the buyer. Assume you are the bookkeeper for the contractor. Find the balance after successive discounts for each item. What is the total amount of the order before sales tax is added?
E. Taxes

1. Sales Tax - Arkansas 3%

Schedules: .00 - .14 no tax .15 - .44 1¢
.45 - .74 2¢ .75 -1.14 3¢

<table>
<thead>
<tr>
<th>Purchase</th>
<th>Sales Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $17.74</td>
<td></td>
</tr>
<tr>
<td>b. $33.95</td>
<td></td>
</tr>
<tr>
<td>c. $295.00</td>
<td></td>
</tr>
<tr>
<td>d. $8.98</td>
<td></td>
</tr>
<tr>
<td>e. $0.50</td>
<td></td>
</tr>
<tr>
<td>f. $0.88</td>
<td></td>
</tr>
<tr>
<td>g. $1487.98</td>
<td></td>
</tr>
<tr>
<td>h. $2.39</td>
<td></td>
</tr>
</tbody>
</table>

2. School Millage (rate varies by school districts)

<table>
<thead>
<tr>
<th>Millage</th>
<th>School Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jonesboro 49 mills</td>
<td>Hope 40 mills</td>
</tr>
<tr>
<td>Lepanto 45 mills</td>
<td>Ft. Smith 49 mills</td>
</tr>
<tr>
<td>Wynne 49 mills</td>
<td>Little Rock 51 mills</td>
</tr>
</tbody>
</table>

49 mills = $4.90 tax per $100 assessed evaluation
Arkansas Law: assessed value = 20% real value.

<table>
<thead>
<tr>
<th>Assessed Evaluation</th>
<th>Millage</th>
<th>School Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $650.</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>b. $85.</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>c. $1175.</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>d. $1720.</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>e. $210.</td>
<td>49.5</td>
<td></td>
</tr>
</tbody>
</table>

3. Gas Tax-Federal: 4¢ gallon State: 7 1/2¢ gallon
(Taxes included in pump price. No sales tax extra)

<table>
<thead>
<tr>
<th>Purchase</th>
<th>Pump Price</th>
<th>Total</th>
<th>Federal Tax</th>
<th>State Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 14.3 gal.</td>
<td>30.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. 5.0 gal.</td>
<td>32.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. 19.7 gal.</td>
<td>32.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. 11.4 gal.</td>
<td>34.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. 16.5 gal.</td>
<td>31.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Cigarette Tax: Federal - 4¢ per pack
Arkansas - 17 3/4¢ per pack

Carton Price: $4.25 How much of this is tax? ____
What is the price per pack? ____
a. **Monthly rental (single line)** $5.80
   - Long distance call to Little Rock 1.90
   - Long distance call to Memphis .85
   - Long distance call to St. Louis 2.20
   - Long distance call to Dallas 4.65
   - Long distance call to Fayetteville 2.63

   Sub Total ______________________
   - Federal Tax ______________________
   - State Tax ______________________
   - Total ______________________

b. What would be the amount of the statement if no long distance calls were made?

6. **Personal Property and Real Property Tax.**

   Mills on assessed value
   - School Tax 49
   - County Tax 5
   - County Library Tax 1
   - County Road Tax 3
   - County Hospital Tax 4.2
   - Courthouse Bonds .8
   - City Tax 5
   - Firemen's Pension .25
   - Police 1

   **Arkansas Law:** assessed value = 20% real value

   Jim owns:
   a. **In city:**
      - Home $11,500 Value
      - Furniture 5,000 Value
      - Car 2,225 Value
      - Total Assessed Value
   b. **Outside city:**
      - 40 acre farm $8,500 Value

   c. What is the total assessed value?
   d. What is the city tax rate?
   e. What is the farm tax rate?
   f. What is the total city taxes?
   g. What is the total farm taxes?
   h. What were the total taxes paid?
   i. How much did Jim pay in school taxes?
   j. How much did Jim pay to support the county library?
   k. How much did he pay to support the city administration?
Mrs. A. A. Rudd bought a container for $5.98, 6 chiffon roses at 65 cents each, 3 pineapple blossoms at 65 cents each, and 1 can of spray paint for $1.15. What was her total bill including tax? Write the sales ticket.
F. Mark-Up

\[
\text{Mark-Up} = \text{Selling Price} - \text{Cost}
\]

\[
\% \text{ Mark-up} = \frac{\text{Amount of mark-up}}{\text{Cost}} \quad \text{Change to } \%\]

\[
\% \text{ Mark-up} = \frac{\text{Amount of mark-up}}{\text{Selling Price}} \quad \text{Change to } \%
\]

Example: Pork & Beans:

Selling Price = 15¢
Cost per can = 11¢
Mark-up = 4¢

\[
\% \text{ mark-up on selling price} = 26.7\%
\]
\[
\% \text{ mark-up on cost} = 36.4\%
\]

--- Exercises ---

1. A grocer buys butter at 62¢ a pound and sells it at 73¢ a pound.
   a. Find the mark-up.
   b. What percent of cost is the mark-up?
   c. What percent of the selling price is the mark-up?

2. Copy and complete the table, then find the percent of mark-up on the selling price and cost.

<table>
<thead>
<tr>
<th>Cost</th>
<th>Selling Price</th>
<th>Mark-up (Margin)</th>
<th>% mark-up on Selling Price</th>
<th>% mark-up on Cost Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $ .45</td>
<td>$ .60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. $ .84</td>
<td>$ 1.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. $ 2.50</td>
<td>$ 2.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. $ 3.75</td>
<td>$ 4.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. $20.00</td>
<td>$23.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
G. Per Cent Increase or Decrease

\[
\% \text{ of Increase} = \frac{\text{Amount of Increase}}{\text{Original}}
\]

Change answers to per cents:

1. Mrs. Riddle buys an air conditioner this year:
   Price last year = $300
   Price this year = $400
   Amount of increase =
   Per cent of increase =

   \[
   \% \text{ of Decrease} = \frac{\text{Amount of Decrease}}{\text{Original}}
   \]

2. Mary goes to buy gasoline:
   Original price 41.9¢ per gallon
   Present price 32.9¢ per gallon
   Amount of decrease =
   Per cent of decrease =
3. Color TV

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Price last year</td>
<td></td>
</tr>
<tr>
<td>Price this year</td>
<td>$475</td>
</tr>
<tr>
<td>Amount of decrease</td>
<td>$145</td>
</tr>
<tr>
<td>Per cent of decrease</td>
<td></td>
</tr>
</tbody>
</table>

4. Belinda Adams: Secretary

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary last year</td>
<td>$3,400</td>
</tr>
<tr>
<td>Salary this year</td>
<td>$3,900</td>
</tr>
<tr>
<td>Amount of increase</td>
<td></td>
</tr>
<tr>
<td>Per cent of increase</td>
<td></td>
</tr>
</tbody>
</table>

5. Short Cut Check

Checking multiplication by casting out 9's

Check problems "b" and "c" as "a" is checked.

a. 235 1
   66 x 3
   1410
   1410
   15510
   3

b. 621
   237
   527

c. 725
RETAIL INSTALLMENT CONTRACT

The undersigned Seller sells and the undersigned Buyer of more than one, jointly and severally, purchases, subject to the terms and conditions as set forth on both sides hereof the Merchandise described below, to be kept at the above address. Buyer acknowledges that Seller has offered to sell the below described Merchandise for the cash sale price indicated but Buyer has elected to purchase on the terms and upon the conditions of this agreement. Seller hereby acquires a purchase money security interest in the Merchandise sold hereunder in accordance with the Uniform Commercial Code to secure the liens' interest of the Total of Payments and other charges if applicable, pursuant to this agreement. Buyer agrees to pay the Merchandise in which the Security interest is preserved consecutively monthly payments to be made at the place designated by Seller or his assignee. FINANCE CHARGE begins to accrue on the date described in the contract or on a later date if such date is inserted hereafter. Complete only if such person is less than age 65 on date of this contract and a charge for life insurance only or both life insurance and accident and health insurance is included. If Buyer is a corporation, no charge for any insurance should be included. See Notice of Proposed Group Insurance on the reverse side hereof. Buyer acknowledges and confirms, with respect to any insurance purchased hereunder and for which the entire thereof is not forth under item 4a above, (a) the purchase of such insurance is voluntary and not required by, and Seller is the creditor hereunder; (b) Buyer's decision to purchase such insurance was made after being given to him of the costs thereof, which are: Life $ , Accident and Health $ , and Property $ (total $ ); (c) Buyer was provided with the opportunity to obtain property insurance from another person of his own choice other than the Seller. Time is of the essence hereof. In addition to the regular installment, Buyer agrees to pay as a delinquency and collection charge on each installment in default for 10 days or more, 5% of each such installment or $5, whichever is less. Buyer also agrees that if this contract is referred to an attorney to effect collection, to pay court costs plus reasonable attorneys' fees incurred.

Should balance be prepaid in full prior to maturity date, a refund of the unearned portion of the FINANCE CHARGE will be calculated using the Rule of 111 after deduction of a $25 acquisition charge, except in Arkansas where no such charge is permitted.

Judy, will you complete this contract for me? He has no trade-in and wants to pay $51.65 down and the balance in 30 months. I have already figured insurance and finance charges from the charts.
UNIT VIII
MEASUREMENT

A. Linear Measurement

Exercises

Label the points on these rulers:

1. |

2. |

3. |

4. |

5. |

6. Find the length of each side and the total distance around each figure.

\[
\begin{align*}
\text{A} & \quad \text{B} \\
\text{C} & \\
\text{D} & \\
\end{align*}
\]
Exercises

1. How many \( \frac{1}{2} \) inches are in:
   
   a. 1" _______  b. 2" _______

2. How many \( \frac{1}{8} \) inches are in:
   
   a. 1" _______  b. \( \frac{1}{2} \)

3. How many \( \frac{1}{16} \) inches are in:
   
   a. \( \frac{1}{8} \)  
   b. \( \frac{1}{4} \)  
   c. \( \frac{1}{2} \)  
   d. 1" _______

4. How many \( \frac{1}{4} \) inches are in:
   
   a. 2" _______  b. \( \frac{3}{4} \) _______
   
   c. 1" _______  d. \( \frac{1}{2} \)

5. Locate the following points on ruler.
   
   a. \( 2 \frac{1}{2} \)  
   b. \( 4 \frac{1}{16} \)  
   c. \( 2 \frac{3}{4} \)  
   d. \( 3 \frac{9}{16} \)  
   e. \( 3 \frac{3}{8} \)  
   f. \( 5 \frac{7}{16} \)  
   g. \( 5 \frac{3}{4} \)  
   h. \( \frac{7}{8} \)  
   i. \( 4 \frac{15}{16} \)
One of the most common problems in this store is figuring fractions when a product is measured in yards.

a. A customer buys 1 3/4 yds. of lace at 29¢ a yard. Find the price.

b. Another problem is that in our candy department a customer will ask for 25¢ worth of candy that sells for 80¢ per pound. How many ounces will the customer get?

2. a. Make a guess in inches. The length from start to stop is.

b. Now measure in inches! The length from start to stop is.

c. What is the amount of error?

\[
\text{per cent of error} = \frac{\text{amount of error}}{\text{distance measured}}
\]
Exercises

1. Figure A is a swimming pool:
   Width: 40'
   Length: 90'
   If you swim around the pool, how far do you swim?

2. Figure B is a _________.
   Describe it. Measure the sides.
   The perimeter of a figure like B is 144 ft. Each side has a length of _________.

3. Figure C is a _________.
   Describe it. Measure its sides.
   The perimeter of a figure like C is 135 ft. The length of the sides could be _________.

4. Figure D is a _________. How would you describe it? Measure all four sides. The perimeter of a like figure is 140 ft. Side a is 20 ft. long. Can you find the lengths of the other three sides?
Exercises

1. \[31.4 \text{ in.} \quad 10 \text{ in.} \quad 3.14\]
   \[131.88 \text{ in.} \quad 28 \text{ ft.} \quad 3.14\]

2. What is another way of finding the circumference of a circle other than measuring? Explain. Using \(c\) to represent circumference, \(D\) for diameter and 3.14 for \(\pi\) write the rule for the circumference of a circle.

   Rule 1. 

3. Use this rule to find the circumference of each circle with the given diameter.
   
   a. Diameter 8 inches 
   b. Diameter 63 miles 
   c. Diameter 8 3/4 inches 
   d. Diameter 2.5 yards 

4. a. Measure diameter in inches. 
   b. Measure A to 0. 
   c. How does this last length compare to the length of the diameter? 
   d. What is the length from 0 to A called? 
   e. Restate the rule above using \(R\) for the length of OA.

   Rule 2. 

5. Use Rule 2 to find the circumference of each circle with the radius given.
   
   a. Radius 9 feet 
   b. Radius 14 inches 
   c. Radius 3.75 miles 
   d. Radius 2 1/3 yards 
   e. Radius 2 feet 4 inches 

6. What distance in feet does the tip of a propeller travel in one revolution if its length (diameter) is 7 feet? 

7. The circumference of a tree is 5 feet 6 inches. What is the diameter of the tree?
A beautification committee wants to build a circular flower bed with a frog pond in the middle of the bed. The circular bed is to have a 10' radius. The rectangular pond is to be 3' by 5'. They will plant azaleas on the circle 1' apart and around the pond they will plant sedum every 8". What will be the cost of the plants?

Optional:

How much would it cost to plant grass in the space between the two flower beds?

One bag of sprigs cost $2.25 and plants 300 Sq. ft. with rows 12" apart and sprigs 6" apart in the row.
FLOW CHARTS FOR AZALEAS

(For Totalia Calculator)

```
Start
↓
clear T
↓
3.14 x 20 =
↓
(A) record total
↓
enter A X .29 =
↓
(B) record total
↓
(C) 16 X 12 =
↓
(depress RM
↓
8 +
↓
(D) record total
↓
enter C X .95 =
↓
(record total
↓
enter B + enter D + depress T
↓
(record total
↓
END
```

(For Ollivetti Calculator)

```
Start
↓
clear T
↓
3.14 x 20 =
↓
(A) record total
↓
enter A X .29 =
↓
(B) record total
↓
(Price of azalea
↓
perimeter of pond in inches
↓
(depress OUT
↓
8 +
↓
(C) record total
↓
enter C X .95 =
↓
(record total
↓
enter B + enter D + depress T
↓
(record total
↓
END
```
Example: What size sheave should be placed on a motor which runs @ 225 R.P.M. in order to drive a 24" sheave @ 160 R.P.M.?

P.D. of Eng. Sheave = \( \frac{\text{Sheave \, Die \times \text{ RPM} \times \text{ RPM}}}{\text{Eng. RPM}} = \frac{24 \times 160}{225} \)

\[ \frac{3840}{225} = 17" \]

Problem: What size sheave should be placed on a motor which runs @ 325 R.P.M. in order to drive a 24" sheave @ 180 R.P.M.?

Example: Find approximate belt length needed where the diameter of the big sheave is 40", the diameter of a small sheave is 15", and the center distance between sheaves is 72".

\[ \text{BL} = (D + d) \times 1.57 + 2C = 55 \times 1.57 + 2(72") = 230.35" \]

Problem: Find approximate belt length needed where diameter of big sheave is 60", diameter of small sheave is 20", and center distance between sheaves is 84".

Slack off on take-up until belts can be placed in grooves without forcing.
8. Angle Measurement

Exercises

Use your protractor to measure these angles.

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  
9. What is the sum of the angles in problem 7?
1. List the triangles in this figure.
2. The perimeter of triangle DFC is
3. The perimeter of triangle EFG is
C. Ratio:

**Exercises**

1. Compare the following quantities by division. Be sure the numbers are in the same units.

   a. 5 inches, 30 inches  
   b. 54 apples, 3 apples  
   c. 18 feet, 12 feet  
   d. 10 cars, 90 cars  
   e. 4 minutes, 4 hours  
   f. 3 days, 3 weeks  
   g. 9 inches, 9 feet  
   h. 600 lb., 2 tons  
   i. 220 ft., 1 mile  
   j. 4 weeks, 1 year

2. Find the quotient of the vertical pairs of numbers in each table. Can you complete each table?

<table>
<thead>
<tr>
<th>9</th>
<th>27</th>
<th>42</th>
<th>66</th>
<th>99</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>9</td>
<td>14</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12</th>
<th>30</th>
<th>48</th>
<th>72</th>
<th>132</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>25</td>
<td>40</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

3. A bag contained 6 red marbles, 7 white marbles and 10 green marbles.
   a. Compare the number of red marbles to the green marbles.
   b. Compare the number of green marbles to the white marbles.
   c. Compare the number of white marbles with the contents of the bag.
   d. What part of the bag's contents are not red?
   e. Compare the number of marbles that are not red to those that are red.

4. For each figure compare by division:
   a. Number of shaded parts to unshaded.
   b. Number of unshaded parts to shaded.
   c. Number of shaded parts to total number of parts.
   d. Number of unshaded parts to total number.
Practical Application

4 PLAYER
BADMINTON SET

SET CONTAINS
• 4 Metal Handle Rackets
• 4 SHUTTLE COCKS
• 1 NET
• 1 METAL POLE SET
• 1 RULE BOOK

REG. $6.88
NOW ONLY!

$4.88

1. Find the ratio of the sale price to the regular price.

2. Find the ratio of the savings to the regular price. What is the percent of discount?

3. How much is saved if you buy one of each article on this page?

4. What is the best buy on this page?
D. Proportions

1. Complete these proportions:
   
a. \( \frac{3}{4} = \frac{9}{?} \)

b. \( 4 : _\_ = 8 : 14 \)

c. \( 5 : 6 = _\_ : 42 \)

d. \( \frac{3}{9} = \frac{15}{_\_} \)

e. \( \frac{8}{24} = \frac{\_\_}{15} \)

2. Farmer Jones bought:
   
   3 - 10# ducks that cost $2.82. Batman bought (at the same price) 1 - 11# duck. How much did Batman's duck cost?

3. One apiarist harvested:
   
   1000# honey from 25 hives. Jon harvested (at the same rate) 18 bee hives. How much honey did Jon harvest?

4. Student Council buys:
   
   Records at the rate of 6 for $1.00. Mary Smith buys (at the same price) 25 records. How much do Mary's records cost?

5. Grapefruit
   
   3/49¢ 10 for _ _ _ (at the same price)
E. Scale Drawings

Exercises

1. Given scale 1/4, how long a line will represent a distance of 4 inches? 12 inches? 24 inches? 2 feet? 2 yards?

2. Given scale 1/3, what distance will be represented by a line 1 inch long? 3 inches? 1 1/2 inches? 1 foot?

3. Make a scale drawing of a swimming pool which is 50 ft. long and 24 ft. wide. Set up your own scale. Express your scale as a ratio.

4. The scale drawing at the left is of a farmer's field. If our scale is 1/4 in. = 50 rods, find the perimeter of the field.

5. Make a scale drawing of our basketball court, using the scale 1" = 10'.

164
F. Similar Triangles

Exercises

1. These are similar triangles. What characteristics can you find?

```
   10  3  5
   6

   15  3  5  25
   4  20
```

2. Similar triangles. Find the length of the missing side.

```
a. 5 ?
   3  6

b. 8 ?
   10  5

c. 5 ?

d. ? 6
```

3. a. If we drew a line from top of a tree to end of shadow, what kind of triangle will be formed?

   b. What is the height of the tree?

4. How tall is George?

   George ________ . Tom is 4' tall.

   GEORGE
   1 1/2'

   TOM
   1'
5. A tower casts a shadow 21' long at the same time a 6' man casts a shadow 3' long. How tall is the tower? Draw a diagram.

6. How long is the pond?

7. Honda 50 Cost $239.

This is $\frac{1}{2}$ the cost of a calculator.

What is the cost of a calculator?
3. Pythagorean Theorem

Exercises

Given two sides of a right triangle, find the other side.

<table>
<thead>
<tr>
<th>Side A</th>
<th>Side B</th>
<th>Hypotenuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 8</td>
<td>6</td>
<td>?</td>
</tr>
<tr>
<td>2. ?</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>3. 15</td>
<td>?</td>
<td>25</td>
</tr>
<tr>
<td>4. 5</td>
<td>12</td>
<td>?</td>
</tr>
</tbody>
</table>

5. How did you find the third side of the triangle? Explain your method or represent it in a short form.

6. The television companies measure the screen of a set by using a line which divides the screen into two right triangles. When they say a 21" screen they mean this line is 21" long.

   If I bought a 20" screen that was 12" wide, how long would the screen be?

7. The Forest Fire Prevention Association plans to build a 300 ft. tower. The guy wire will extend from the tower floor to the ground 400 ft. from the base. How many feet of wire will they need?
H. Area of Plane Geometric Figures:

--- Exercises ---

1. Find the cost of cementing a side-walk 25 ft. X 8 ft. at $.65 per sq. ft.

2. Find the cost of sodding a lawn 12 ft. by 9 ft. at $.08 per sq. ft.

3. How many square feet of floor space remain uncovered if an 8 ft. by 10 ft. rug is placed on a floor 15 ft. long and 12 ft. wide?

4. How many square feet of tarpaulin are needed to cover the infield of a baseball diamond if the space between the bases is 90 feet?

5. The official United States flag is 4 ft. wide and 7.6 ft. long. What is the area of the flag?
1. Mr. Anthony West
   Faucett Rd.
   Living room 14'3" x 12' sq. yds. Carpet $5.95 sq. yd. Pad $1.00 sq. yd. and labor $1.00 sq. yd.
   Complete

2. Mr. Paul Greene
   1605 W. 27th
   Living room 12'6" x 15' sq. yds. Carpet $4.50 sq. yd. Pad $1.00 sq. yd. and labor $1.00 sq. yd.
   Complete

3. Mr. J. H. Jones
   1419 Cherry St.
   Living room 12' x 15' sq. yds. Carpet $6.95 sq. yd. Pad $1.00 sq. yd. and labor $1.00 sq. yd.
   Complete

4. The cost of flooring a room 18' x 15' with space to be omitted (6' x 3') with 9 x 9 tile costing 15¢ each and selling 23¢. What is the cost and the profit?
1. A farmer's field is divided into two triangles. He wants to know the areas in order to buy fertilizer.

The two parts of the field have these dimensions:

a. base: 440 yards; altitude 229 yards

b. base: 605 yards; altitude 496 yards

Find the total area of the farmer's field in square yards. In acres. (4840 sq. yd. = 1 acre)

Find the cost of fertilizer if 300 lbs. will cover 1 acre and fertilizer is $3.10 per 100 lbs.

2. Find area. Put answers in appropriate place in square. The sum of row i should equal the sum of column 1, etc.

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<td>2</td>
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<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

    a. Rectangle: 1 = 20; w = 22
    b. Triangle: h = 100; b = 45
    c. Parallelogram: b = 20; h = 17
    d. Triangle: b = 50; h = 10
    e. Rectangle: 1 = 31; w = 30
    f. Triangle: b = 45; h = 8
    g. Parallelogram: b = 118; h = 35
    h. Triangle: b = 38; h = 20
    i. Rectangle: 1 = 61; w = 20
    j. Parallelogram: b = 122; h = 20
    k. Triangle: b = 20; h = 17
    l. Rectangle: 1 = 35; w = 26
    m. Triangle: b = 23; h = 60
    n. Rectangle: 1 = 50; w = 2
    o. Square: s = 10
    p. Parallelogram: b = 20; h = 100

3. A challenge:

Area of Figure | Dimensions | What type figure?
---|---|---
175 sq. in. | 10 in. 35 in. | 
322 sq. in. | 27 in. 14 in. | 
306 sq. in. | 17 in. 36 in. | 
251 sq. in. | 11 in. 23 in. |
Exercises

Finding The Areas of Circles:

1. [Diagram of a circle with a radius of 12']
   - What is the area of the square?
   - What is the area of the circle?
   - What is the area of the shaded portion?

2. [Diagram of a circular swimming pool surrounded by a circular patio with radii of 9' and 6']
   - At the left is a diagram of a circular swimming pool surrounded by a circular patio. The owner wished to paint the patio. He must find the area of the larger circle and subtract the area of the smaller circle.
   - A quart of paint costs $2.49 and will cover 10 sq. ft. Find the cost of the paint.
3. A park is 15 feet wide and 45 feet long. The park contains 2 circular flower gardens and 1 square flower garden. The rest of the park is covered with grass. What is the area of the part that is grass covered?

4. Go to the basketball court and find the area of the following using 130-foot tape. (This is a good place to discuss error.)

a. The court has ____ sq. ft.

b. The center circle has ____ sq. ft.

c. The free throw circles have ____ sq. ft.

The Repetitious Number

Write down any 3 digits; repeat the digits a second time making it a six digit number. Divide your number by 7; divide this quotient by 11; divide this next quotient by 13. Your answer? __________
Cut Out - Fold It - Name It

CUT ON DOTTED LINES

FOLD ON SOLID LINES
I. Surface area of cubes

Exercises

1. Cut a 1" square from paper.
2. How many one inch squares would you need to cover a 1 inch cube?
3. Let's make a cube:
   a. First draw a pattern to make the cube.
   b. Then construct the cube.
   c. In building a house people have different patterns.
   d. Could we make different patterns to use in making a cube?
   e. Can we make a one piece pattern?
   f. How many different one piece patterns can we design?
4. Talk about the cube.
   a. What is the shape of one side?
   b. What is the shape of the top? bottom?
   c. Could the top become a side by changing the position of the cube?
   d. Is there a name that could be used for both top and sides?
   e. What is the area of one face?
   f. Are the faces the same size?
   g. How many faces?
   h. What is the total area of the cube?
J. Surface area of a Rectangular Solid

Exercises

1. Make a rectangular box.
   a. Measure all the faces.
   b. Did you find any the same size?
   c. Can you find the total area of the box?

2. Joe bought a new transistor radio.
   a. The length is 10 inches.
   b. The width is 6 inches.
   c. The depth is 2 inches.

Can you find the total area of the radio?

3. The diagram in Figure A represents a closed wooden box.
   a. Find the number of square feet of lumber required to make four sides, the top, and the bottom of the box.
   b. What is the cost if lumber is 12¢ per sq. ft.?

![Figure A](image)

"Time Killer"

Draw a circle around all the names for 8.

<table>
<thead>
<tr>
<th>2</th>
<th>64</th>
<th>9 - 1</th>
<th>10 - 3</th>
<th>5 + 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2X3) + 2</td>
<td>15 ÷ 3</td>
<td>VIII</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eight</td>
<td>12 - 5</td>
<td>8 + 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 + 2</td>
<td>8.0</td>
<td>6/3 X 2</td>
<td>16/2</td>
<td></td>
</tr>
<tr>
<td>4 + 1</td>
<td>1 + 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
K. Surface area of a cylinder

Exercises

1. Cut a rectangular piece of paper.
   a. Measure the length of the paper.
   b. Measure the width of the paper.
   c. Find the area of the piece of paper.
   d. Tape the widths of the paper together to form a cylinder.
   e. Do you know the circumference of the top of this cylinder without measuring?
   f. Can you find the diameter?
   g. How can you find the area of the top of this cylinder?
   h. Do you know the area of the bottom of this cylinder without measuring?
   i. How can you find the total area of the cylinder?

2. a. Can you find the total surface area of a cylinder which has a diameter of 5 inches and a height of 6 inches?
   b. Now if you had a diameter of 6 inches and a height of 8 inches, could you find the total area of a cylinder?
   c. A grocery store had a game going:
      If you tell the total surface area of a cola can, you are given a case of colas.
      The diameter is 2-1/2 inches.
      The height is 5 inches.
      Will you be able to get a free case of colas?
L. Volume of a Cube

Exercises

1. What dimensions would a wooden cube have if its volume has 27 cubic inches? 64 cu. in? 8 cu. in?

2. If a wooden cube 5 in. x 5 in. x 5 in. was submerged in a can full of water, how much water would it force out of the can?

3. If a lb. of green beans occupied 48 cu. in., how many lbs. could be packed in a cubic box with 36 in. sides?

4. How many 1 in. cubic blocks could be made from a rectangular solid 12 in. x 14 in. x 15 in.?

5. A swimming pool is 25 ft. long, 10 ft. wide and 12 ft. deep. How long would it take to fill the pool, if water flows into the pool at the rate of 50 gallons per half hour? A cubic foot of water is equal to 7.5 gallons.

6. a. Produce truck bed is 4 ft. x 15 ft. x 9 ft. How many pounds of strawberries will the truck carry if it would hold 5.5 lbs. per cu. ft.?

   b. If one bushel weighs 65 pounds, how many bushels could the truck carry?
Special Project

If you have a ten inch cube with top and one side painted red and any two other adjacent sides green, how many one inch cubes can be made from this cube?

Consider these 1 inch cubes:

<table>
<thead>
<tr>
<th>Red</th>
<th>Green</th>
<th>Number of 1 in. cubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>8</td>
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<td>9</td>
</tr>
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<td>0</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
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<td>3</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>17</td>
</tr>
</tbody>
</table>
Practical Application

Northside High School Athletic Department
North 23rd and B Streets
Fort Smith, Arkansas

Athletic Expenses

1. Adhesive tape for the athletic department is delivered in containers packed in boxes which are 6 containers long, 4 containers wide, and 1 container deep.

   a. How many containers are in each box?
   b. How many containers are in 100 boxes?
   c. How many rolls of tape are in 100 boxes if each container holds 4 rolls?
   d. Each roll of tape is 10 yards long. How many yards of tape are in 100 boxes?
   e. How many feet of tape are in the 100 boxes?
   f. Each container of tape costs $2.00. How much will each box of tape cost?
   g. How much will 100 boxes of tape cost?
   h. How much does each roll of tape cost?

2. If the tape in 100 boxes was joined end to end and placed on a road from your city, what is the farthest city or town the tape would reach?
I. Volume of a Cylinder

Exercises

1. Suppose you went to a gas station with a can for gas and the attendant said he would fill it free if you could tell him how many cubic inches were in the can. If the can is 15" tall and 12" in diameter, could you get your gas free?

2. The tank on an oil truck is 7 ft. in diameter and 35 ft. tall (or long). If 1 cubic foot is approximately 7½ gallons, how many gallons of oil will the truck hold?

3. How many cubic yards of dirt must be removed in digging a well 5 ft. in diameter and 54 ft. deep?

Make A Guess

The tanks are the same size.

The water level in each tank is ¼ the height of the tank.

What do you think about the amount of water in the vertical tank compared to the horizontal tank?

Circle one: More, same, less
Practical Application

SOLID STEEL-WALL REDI-POOL WITH ATTACHED VINYL LINER

... just unroll into a circle and add water

... BIG 8 FEET DIAMETER 20 INCHES DEEP

1. Find the surface area of the Splasher Pool. How many gallons of water would it take to fill the pool?

2. Find the total surface area of the file cabinet.
II. Comparing Units of Measure

<table>
<thead>
<tr>
<th>Measurements You Need To Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 fluid ounces = 1 pint</td>
</tr>
<tr>
<td>16 ounces = 1 pound</td>
</tr>
<tr>
<td>2 measuring cups = 1 pint</td>
</tr>
<tr>
<td>16 ounces = 1 pound</td>
</tr>
<tr>
<td>2 pints = 1 quart</td>
</tr>
<tr>
<td>12 units = 1 dozen</td>
</tr>
<tr>
<td>4 quarts = 1 gallon</td>
</tr>
<tr>
<td>8 quarts = 1 peck</td>
</tr>
<tr>
<td>3 teaspoons = 1 tablespoon</td>
</tr>
<tr>
<td>4 pecks = 1 bushel</td>
</tr>
</tbody>
</table>

Exercises

Place the letter to the correct answer in the blank. There are more answers than problems.

1. 4 pecks
   a. 3 pecks; 4 qts.
   k. 4 dozen

2. 12 tablespoons
   b. 100 lbs.
   l. 144 units

3. 1600 ounces
   c. 36 teaspoons
   m. 4 pints

4. 12 quarts
   d. 3 gallons
   n. 146 units

5. 32 pints
   e. 9 tons, 1200 pounds
   o. 17 measuring cups

6. 16 gallons

7. 12 dozen
   f. 23 tablespoons
   p. 2 pints

8. 19,200 pounds
   g. 32 quarts
   q. 19 tons

9. 2 measuring cups
   h. 3 pints
   r. 64 quarts

10. 32 fluid ounces
    i. 15 pecks
    s. 16 fl. oz.

11. 6 pints
    j. 6 tablespoons
    t. 16 quarts

12. 48 units

13. 48 fluid ounces

14. 28 quarts

15. 18 tons
0. Denominate Numbers

--- Exercises ---

Add each set of denominate numbers. Include the units in your answer.

Length
1. 3' 5"
   7' 7"
   4' 11"
   2' 4"

2. 2 yds. 1 ft. 5 in.
   3 yds. 2 ft. 8 in.
   1 yd. 11 in.

Weight
3. 7 lb. 3 oz.
   2 lb. 9 oz.
   4 lb. 5 oz.
   1 lb. 10 oz.

4. 2 tons 450 lbs.
   1 ton 800 lbs.
   3 tons 1400 lbs.
   5 tons 975 lbs.

Dry Measure
5. 2 tablespoons 2 teaspoons
   4 tablespoons 1 teaspoon
   3 tablespoons 1 teaspoon
   5 tablespoons 2 teaspoons

6. 3 bu. 1 peck
   2 bu. 3 pecks
   5 bu. 3 pecks
   1 bu. 3 pecks

7. 1 bu. 2 pecks 3 qts.
   6 pecks 5 qts.
   4 bu. 3 pecks 4 qts.
   2 bu. 2 pecks 1 qt.
Liquid Measure

8. 2 gal. 3 qt. 1 pt.
   1 gal. 1 qt. 3 pt.
   4 gal. 2 qt. 2 pt.
   5 gal. 3 qt. 1 pt.

9. 3 qt. 1 pt. 1 cup
   3 pt. 5 cup
   2 qt. 1 cup

Angle Measurement

10. 37° 15' 47"
    123° 41' 5"
    21° 33' 29"
    87° 59' 13"

11. 23° 17' 57"
    202° 48'
    69° 17'
    50° 42"

12. 13° 6' 9"
    108° 59' 43"
    42° 43' 31"
Subtract the second denominate number from the first and include the units in your answer.

**LENGTH**

1. 17 ft. 2 in.  
   - 8 ft. 7 in.  
   ___________  
   9 ft. 5 in.  

2. 5 yd. 7 in.  
   - 2 yd. 1 ft. 10 in.  
   ___________  
   3 yd. 6 ft. 3 in.  

3. 5 mi. 790 yd.  
   - 1 mi. 880 yd.  
   ___________  
   4 mi. 910 yd.  

**WEIGHT**

4. 6 lb. 10 oz.  
   - 2 lb. 13 oz.  
   ___________  
   4 lb. 7 oz.  

5. 12 lb. 3 oz.  
   - 5 lb. 3 oz.  
   ___________  
   7 lb. 10 oz.  

6. 6 T. 1300 lb.  
   - 3 T. 1575 lb.  
   ___________  
   3 T. 275 lb.  

**DRY MEASURE**

7. 7 tbsp. 1 tsp.  
   - 2 tbsp. 2 tsp.  
   ___________  
   5 tbsp. 1 tsp.  

8. 12 bu. 1 pk.  
   - 5 bu. 3 pk.  
   ___________  
   7 bu. 2 pk.  

9. 8 bu. 1 pk. 5 qt.  
   - 7 bu. 3 pk. 7 qt.  
   ___________  
   1 bu. 2 pk. 2 qt.  

**LIQUID MEASURE**

10. 17 gal. 2 qt. 1 pt.  
    - 4 gal. 3 qt. 3 pt.  
    ___________  
    13 gal. 1 qt. 4 pt.  

11. 9 qt. 1 pt. 1 cup  
    - 2 qt. 3 pt. 2 cup  
    ___________  
    7 qt. 8 pt.  

**ANGULAR MEASURE**

12. 63° 17' 42"  
    - 27° 38' 59"  
    ___________  
    36° 19' 8"  

13. 121° 18"  
    - 69° 19' 31"  
    ___________  
    51° 57' 7"
Exercises

Multiply each pair of denominate numbers and include the units in your answer.

Length
1. 6 ft. 5 in.  x 4
2. 7 yd. 2 ft. 5 in.  x 7
3. 4 mi. 623 yd.  x 3

Weight
4. 14 lb. 7 oz.  x 3
5. 9 lb. 2 oz.  x 9
6. 8 T. 869 lb.  x 3

Dry Measure
7. 11 tbsp. 2 tsp.  x 7
8. 16 bu 3 pk.  x 6
9. 4 bu. 2 pk. 7 qt.  x 5

Liquid Measure
10. 7 gal. 3 qt. 1 pt.  x 7
11. 5 qt. 1 pt. 1 cun  x 4

Angular Measure
12. 70° 0' 51"  x 9
13. 27° 2' 45"  x 8
Exercises

Length
1. 3 6 ft. 9 in. 2. 2 3 mi. 40 yd.
3. 4 3 yd. 2 ft. 4 in.

Height
4. 9 10 lb. 2 oz. 5. 5 4 lb. 11 oz.
6. 8 3 T. 1200 lb.

Dry Measure
7. 4 6 tbsp. 2 tsp. 8. 5 3 bu. 3 pk.
9. 9 5 bu. 2 pk. 4 oz.

Liquid Measure
10. 3 5 gal. 2 qt. 1 pt. 11. 3 6 qt. 1 pt. 1 cup

Angular Measure
12. 7 113° 40' 6" 13. 4 57° 12"
1. Tom started on his homework at 4:30 p.m., and worked until 7:15 p.m. How long did he study?

2. From the time the first bell rings in the morning to the time the last period ends, how long are you in school?

3. We get out of school December 16 and start back on January 2. How many days are we out for Christmas?

4. School started September 5. We are out 2 days for Thanksgiving, 2 days for AEA, 10 days for Christmas, 2 days for spring holiday and school closes on May 26. How many days are we in school?

5. Find the date of maturity of each of the following notes.
   a. 30 day note dated April 9
   b. 4 month note dated March 17
   c. 60 day note dated November 30
   d. 45 day note dated August 14

6. Add:
   a. 6 yr. 2 mo.
   b. 4 wks. 5 da.
   c. 3 hr. 43 min. 28 sec.
   3 yr. 7 mo.
   1 wk. 3 da.
   7 hr. 19 min. 53 sec.
   4 yr. 1 mo.
   2 wk. 6 da.
   5 hr. 52 min. 49 sec.

7. Subtract:
   a. 3 day 9 hr.
   18 hr.
   b. 35 min. 18 sec.
   19 min. 50 sec.
   c. 3 hr. 42 min. 25 sec.
   1 hr. 48 min. 39 sec.

8. Multiply:
   a. 5 da. 2 hr.
   9
   b. 4 hr. 21 min. 34 sec.

9. Divide:
   a. $\frac{5}{15}$ yr. 10 mo.
   b. $\frac{3}{21}$ min. 45 sec.
Exercises

Computing wages:

1. Mr. Fox is paid $3.10 per hour. (a) How much is he paid for an 8-hour day? (b) a 40-hour week?

2. Miss Williams is paid $2.25 an hour. She receives time and a half for any hours worked over 40 per week. Find her pay for a 44-hour week.

3. Barbara, as a baby sitter, received $1.00 an hour before midnight and $1.25 an hour after midnight. If she got a job from 8:00 p.m. to 1:30 a.m. the next day, how much would she earn?

4. Given a time card: Compute the number of hours each day, to the nearest 15 minutes, and the total time for the week. Then find the amount of wages due if the rate was $1.80 per hour.

<table>
<thead>
<tr>
<th>Day</th>
<th>In</th>
<th>Out</th>
<th>In</th>
<th>Out</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon.</td>
<td>8:59</td>
<td>12:10</td>
<td>12:59</td>
<td>5:02</td>
<td></td>
</tr>
<tr>
<td>Tues.</td>
<td>8:56</td>
<td>12:00</td>
<td>12:57</td>
<td>5:00</td>
<td></td>
</tr>
<tr>
<td>Wed.</td>
<td>9:00</td>
<td>12:02</td>
<td>12:58</td>
<td>4:30</td>
<td></td>
</tr>
<tr>
<td>Thurs.</td>
<td>8:59</td>
<td>12:00</td>
<td>12:57</td>
<td>5:00</td>
<td></td>
</tr>
<tr>
<td>Fri.</td>
<td>3:58</td>
<td>12:03</td>
<td>1:00</td>
<td>5:03</td>
<td></td>
</tr>
</tbody>
</table>

5. Use Time Cards
Make out the time cards and compute the week's wages for your week's work if your schedule was as follows:

<table>
<thead>
<tr>
<th>Day</th>
<th>In</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>7:53</td>
<td>4:40</td>
</tr>
<tr>
<td>Tuesday</td>
<td>7:56</td>
<td>4:38</td>
</tr>
<tr>
<td>Wednesday</td>
<td>8:05</td>
<td>4:35</td>
</tr>
<tr>
<td>Thursday</td>
<td>8:00</td>
<td>6:00</td>
</tr>
<tr>
<td>Friday</td>
<td>7:50</td>
<td>6:30</td>
</tr>
</tbody>
</table>

Rate per hour: $2.75

Normal work day begins at 8:00 a.m. and ends at 4:30 p.m.

Unpaid lunch period of 1/2 hour.

Time and a half to be paid for all time to the nearest 1/2 hour in excess of 8 hours per day if time out is circled.

Pay is docked 1/4 hour for each 15 minute period or part of a 15 minute period that the employee is late.
### BI-MONTHLY TIME CARD, WYNNE PUBLIC SCHOOL

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hours Worked</th>
<th>Time</th>
<th>Time</th>
<th>Time</th>
<th>Time</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Started A.M.</td>
<td>Started P.M.</td>
<td>Started P.M.</td>
<td>Started P.M.</td>
<td>HOURS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signed ___________________________     Total Hours Worked This Period ___________________________

### BI-MONTHLY TIME CARD, WYNNE PUBLIC SCHOOL

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hours Worked</th>
<th>Time</th>
<th>Time</th>
<th>Time</th>
<th>Time</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Started A.M.</td>
<td>Started P.M.</td>
<td>Started P.M.</td>
<td>Started P.M.</td>
<td>HOURS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signed ___________________________     Total Hours Worked This Period ___________________________
Exercises

Computing time in days, months and years:

1. How much older is Amy than Ann if they were born the same year and Amy's birthday is January 24 and Ann's is June 3?

2. Find the number of days between the following dates.
   a. May 28 and Sent. 2.
   b. Nov. 28 and Dec. 25.
   c. Sept. 6 and May 28.
   d. May 31 and March 1.
   e. June 13 and July 22.
   f. Dec. 25 and March 22.

3. How many days from:
   - a. Feb 2 to June 15?
   - b. April 5 to November 15?
   - c. August 4, 1966 to April 15, 1968?
   - d. Jan. 10 to May 1?

4. What day is the 133rd day of the year?

5. What was the date of 43 days ago?

6. If you are 14 years, 3 mo. and 2 days old, when were you born?

7. If you went on a 26 day vacation which began June 16, when would you be due back at work?


9. How old is Nancy if she was born August 3, 1955?

10. Find the maturity date of the following notes:
    - a. 45 day note from Jan. 14.
    - b. 174 day note from July 4.
LITTLE JOE

Joe was a general 1__ student who bought a Honda with some extras, including handlebars set at a sharp 2__. He found that there were still some things to work on. He started by 3____ the air pressure of the tires after an 4____ of the amount in each. He found that the tires were 5____ in air pressure. The tail light was shaped like a 6____ (a member of the 7____ family) and the headlight was in the shape of a 3____. The motor of his Honda was "missing" so he decided to 9____ the spark plug and buy a new 10____ of points. Since the 11____ of the gas tank was six 12____ across he figured the 13____ and found it was 1 gallon. After counting his change, he filled her up and was ready to blast off.

He really wouldn't have bought this particular Honda but after much 14____ Joe decided upon the motor with the lowest price and the biggest 15____ he could get. This machine had the lowest gear 16____. After adding the 17____ on to the regular price, Joe decided to make a 18____ 19____ and

"IT'S SUCH A BEAUTIFUL DAY, LET'S ROAR UP 101, BLAST ACROSS 33 TO 99 AND BURN IT BACK TO L.A."
buy it on what is called an 20_____ plan. Even though he has already had to 21_____ the spark plug and a set of 22______, he still feels he bought the best.

The license number was a 23_____ 24_____ and the license plate was a three-sided figure called a 25______.

Joe also liked to eat a large piece of 26______ and strum a few 27_____ on his brother's guitar. Since Joe and his brothers were little boys the grocery bill has 28_____ to a steady 29______. The 30_____ of increase gives his father a headache.

In school Joe disliked using a 31_____ to measure lines but enjoyed using the 32_____ and 33_____ to draw circles. His 34_____ grade is good, but could be better if he wouldn't spend so much time with a certain blonde who has many 35_____ and is quite short in 36______.

******

Fill blanks with words from this list. Use each word only once or not at all.

angle average area calculation chords circle compass counting commutative curves diameter difference discount down estimate height inches increase increased installment mathematics measuring payment per cent pi points protractor quadrilateral quantity rate ratio number replace ruler set square tax sum triangular unequal volume
Name the line segments.
Measure them.
Find their sum.

PERMUTATIONS

The letters A and B can be rearranged as AB and BA. The letters A, B, and C can be rearranged as ABC, ACB, BCA, BAC, CAB, and CBA. Two letters were rearranged two ways, three letters were rearranged six ways. How many ways can you rearrange the four letters A, B, C, and D? Can you find a rule so that if you were given the letters A, B, C, D, and E to rearrange you could tell how many ways this can be done without writing them down?
Q. Board Feet:

--- Exercises ---

How many board feet in each?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1&quot; x 12&quot; x 10'</td>
<td>14</td>
<td>1&quot; x 10&quot; x 16'</td>
</tr>
<tr>
<td>2</td>
<td>2&quot; x 6&quot; x 12'</td>
<td>15</td>
<td>1&quot; x 8&quot; x 12'</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; x 4&quot; x 12'</td>
<td>16</td>
<td>1&quot; x 2&quot; x 6'</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; x 4&quot; x 12'</td>
<td>17</td>
<td>4&quot; x 8&quot; x 16'</td>
</tr>
<tr>
<td>5</td>
<td>1&quot; x 6&quot; x 8'</td>
<td>18</td>
<td>2&quot; x 4&quot; x 8'</td>
</tr>
<tr>
<td>6</td>
<td>2&quot; x 8&quot; x 16'</td>
<td>19</td>
<td>2&quot; x 2&quot; x 8'</td>
</tr>
<tr>
<td>7</td>
<td>4&quot; x 4&quot; x 10'</td>
<td>20</td>
<td>8&quot; x 8&quot; x 16'</td>
</tr>
<tr>
<td>8</td>
<td>2&quot; x 6&quot; x 16'</td>
<td>21</td>
<td>4&quot; x 6&quot; x 12'</td>
</tr>
<tr>
<td>9</td>
<td>1&quot; x 2&quot; x 12'</td>
<td>22</td>
<td>6&quot; x 8&quot; x 6'</td>
</tr>
<tr>
<td>10</td>
<td>2&quot; x 12&quot; x 12'</td>
<td>23</td>
<td>1&quot; x 12&quot; x 8'</td>
</tr>
<tr>
<td>11</td>
<td>2&quot; x 2&quot; x 10'</td>
<td>24</td>
<td>1&quot; x 8&quot; x 8'</td>
</tr>
<tr>
<td>12</td>
<td>1&quot; x 4&quot; x 8'</td>
<td>25</td>
<td>2&quot; x 4&quot; x 10'</td>
</tr>
<tr>
<td>13</td>
<td>1&quot; x 10&quot; x 10'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C
R. Order Relations

Exercises

Fill in each circle with the correct symbol.
Choose from these: =, >, <

1. The number of girls in our class \(\bigcirc\) the number of boys.
2. 1 ft. 8 inches \(\bigcirc\) 19 inches.
3. 1 lb. \(\bigcirc\) 17 ounces.
4. 1 mile \(\bigcirc\) 5283 ft.
5. Number of pounds you weigh \(\bigcirc\) 200 lbs.
6. Your height \(\bigcirc\) 5 ft. 8 in.
7. Number of grains of sand in a quart jar \(\bigcirc\) number of grains of sand in a pint jar.
8. Number of ounces in a lb. \(\bigcirc\) number of ounces in a pint.
9. Number of days in April \(\bigcirc\) number of days in May.
10. Number of days in week \(\bigcirc\) number of days in school week.
11. Price of new Cadillac \(\bigcirc\) price of new Mustang.
12. Distance from your home to Memphis \(\bigcirc\) distance from your home to Little Rock.

Fun

Add me to myself.
Multiply by 4.
When you divide by 8
You'll have me once more.
Who Am I?
Exercises

Fill in the circles with the correct symbols: (>, <, or =).

1. -5 〇  -2
2. 7 〇  3
3. -1 〇  3
4. 3 〇  5
5. 4 〇  -3
6. -6 〇  -8
7. -3 〇  3
8. -7 〇  0
9. \( \frac{11}{4} \) 〇  \( \frac{9}{6} \)
10. \( \frac{-5}{6} \) 〇  \( \frac{-7}{8} \)
11. \( \frac{3}{8} \) 〇  \( \frac{1}{4} \)
12. \( \frac{-19}{7} \) 〇  -2
13. -2 〇  -3 but 〇  -1
14. 4 〇  6 but 〇  3
15. 0 〇  1 but 〇  -3
16. 4 〇  4 but 〇  10
The beginnings or endings of the words listed below were lost. With the help of the given clues, can you find the missing letters?

1. _ _ _ end Number added
   _ _ _ _ end Number divided
   _ _ _ _ _ end Number subtracted

2. _ _ ven Number divisible by 2
   _ _ _ _ ven Lucky number
   _ _ _ _ _ ven Prime number

3. _ _ _ int Unit of liquid measure
   _ _ _ _ _ _ int A location
   _ _ _ _ _ _ _ _ _ int Center of a segment

4. _ _ _ ine Unending straight mark
   _ _ _ _ _ ine Number
   _ _ _ _ _ _ ine To find a solution

5. _ _ _ _ ear Unit of time
   _ _ _ _ _ ear Understandable problem
   _ _ _ _ _ _ ear Type of measure such as a foot
   _ _ _ _ _ _ _ ear Three or more points in a line

6. rat_ Acceleration
   rat_ _ Comparison of two things
   rat_ _ _ Rank
   rat_ _ _ _ Fractional number
7. **Ector**  
- **Ector**  
- **Ector**  
- **Ector**  
  - Directional arrow  
  - Divides into two equal parts  
  - Divides equally into three parts  
  - Line meeting another line

8. **Ent**  
- **Ent**  
- **Ent**  
- **Ent**  
- **Ent**  
- **Ent**  
- **Ent**  
- **Ent**  
  - Part of a line  
  - A member of a set  
  - Line touching a circle only once  
  - Beside or next to  
  - Coinciding or equal  
  - Equal or same as  
  - At same time or place  
  - One of two angles whose sum is 90

9. **Ter**  
- **Ter**  
- **Ter**  
- **Ter**  
- **Ter**  
- **Ter**  
- **Ter**  
- **Ter**  
  - Basic unit of measure  
  - Part of a circle  
  - Method of identifying members of a set  
  - More than  
  - Point where angle bisectors meet  
  - Distance around something  
  - Line in circle  
  - Approx. 2/5 inch

10. **ight**  
- **ight**  
- **ight**  
- **ight**  
- **ight**  
  - Number  
  - Angle of 90°  
  - Mass  
  - Altitude  
  - Not crooked
Find as many of the following mathematical terms as possible. Draw a line through each word found.

1. decimals 11. math 21. subtraction 31. pi
2. invert 12. reduce 22. arithmetic 32. center
3. fraction 13. angle 23. flowchart 33. null
4. set 14. problem 24. integer 34. odd
5. add 15. numerical 25. answer 35. arc
6. times 16. algebra 26. divide 36. ray
7. finite 17. pentagon 27. circle 37. radii
8. space 18. rational 28. square 38. point
9. equal 19. diagram 29. inverse 39. sum
10. graph 20. numerator 30. vertex 40. chart
Unit IX
FINANCE
A. Time Budget

Exercises

1. Give the time for one 24 hour day which you spent on things listed below and others not listed, which you feel should be listed.

   a. T.V.        hrs.    %
   b. Study
   c. Sports
   d. School
   e. Sleeping
   f. Work at home
   g. Recreation
   h. Job away from home

2. If you do not have a job, budget your time so you can have a job away from home.

OR

If you have a job, budget your time so you can have a second job away from home or work longer hours, if possible.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>TIME SPENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td></td>
</tr>
</tbody>
</table>

3. Name one item you would like to buy.
1. Compute the following based on the fact that a job pays $2.83 per hour and the work week is 40 hours.

<table>
<thead>
<tr>
<th>GROSS PAY</th>
<th>Deductions</th>
<th>(Single-1 exemption)</th>
<th>State Income Tax</th>
<th>$1.63</th>
<th>Federal Income Tax</th>
<th>$17.10</th>
<th>Social Security</th>
<th>$4.75</th>
</tr>
</thead>
</table>

**TOTAL DEDUCTIONS**

**NET PAY**

2. Compute the following for a 46 hour week. The man earns $2.83 per hour and is paid time and a half over-time for over 40 hours.

\[
\begin{align*}
\text{GROSS PAY} & = 2.83 \times 40 \\
1.5 \times 2.83 \times & = \\
\text{Deductions} & = 1.72 \\
\text{Federal Income Tax} & = 21.10 \\
\text{Social Security} & = 5.82 \\
\text{TOTAL DEDUCTIONS} & = \\
\text{NET PAY} & = \\
\end{align*}
\]

3. In problems 1 and 2

State Income Tax is what percent of salary?

\[
\begin{align*}
(1) & = (2) \\
\end{align*}
\]

Federal Income Tax is what percent of salary?

\[
\begin{align*}
(1) & = (2) \\
\end{align*}
\]

Social Security is what percent of your salary?

\[
\begin{align*}
(1) & = (2) \\
\end{align*}
\]
### HOW TO FIND YOUR PARCEL POST ZONE FROM MEMPHIS USING YOUR POST OFFICE ZIP CODE NUMBER

Look for the first three numbers of your ZIP CODE on the following chart to determine parcel post zone from Memphis. For example: if you live in Amite, Louisiana and your ZIP CODE number is 70422, the first three (3) numbers 704 indicates your parcel post zone from Memphis is Zone 4.

<table>
<thead>
<tr>
<th>ALABAMA</th>
<th>MISSISSIPPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZIP CODE NUMBERS beginning with:</td>
<td>ZIP CODE NUMBERS beginning with:</td>
</tr>
<tr>
<td>330, 331, 334, 335, 336, 337, 339 area</td>
<td>304, 305, 306 area</td>
</tr>
<tr>
<td>351, 354, 361, 363 area</td>
<td>352, 353 area</td>
</tr>
<tr>
<td>356, 367, 361, 363 area</td>
<td>352, 353 area</td>
</tr>
<tr>
<td>704, 705, 706, 707 area</td>
<td>704, 705, 706, 707 area</td>
</tr>
</tbody>
</table>

### ZIP CODE POST RATE TABLE

<table>
<thead>
<tr>
<th>SHIPPING WEIGHT (16 oz. equal 1 lb.)</th>
<th>Local Zone</th>
<th>Zones 1-3</th>
<th>Zones 4-5</th>
<th>Local Zone</th>
<th>Zones 1-3</th>
<th>Zones 4-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to but not including 16 oz.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>1st oz. to 9 oz.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>10 oz. to 19 oz.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>20 oz. to 29 oz.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>30 oz. to 2 lbs.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>2 lbs. to 26 lbs.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>26 lbs. to 51 lbs.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>51 lbs. to 70 lbs.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
<tr>
<td>70 lbs. to 100 lbs.</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$7.00</td>
</tr>
</tbody>
</table>

### POSTAL MONEY ORDER, AMERICAN EXPRESS AND PARCEL POST C.O.D. FEES

<table>
<thead>
<tr>
<th>C.O.D. FEES</th>
<th>POSTAL MONEY ORDER FEES</th>
<th>AMERICAN EXPRESS MONEY ORDER FEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to $10.00</td>
<td>$3.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>$10.01 to $20.00</td>
<td>$3.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>$20.01 to $50.00</td>
<td>$3.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>$50.01 to $100.00</td>
<td>$3.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>$100.01 to $200.00</td>
<td>$3.00</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

For amounts over $100.00, purchase additional money orders at above rates. American Express money orders can be purchased at any American Express Agency. Postal money orders can be purchased at any post office or through your carrier on rural routes. On C.O.D. orders we bill you for C.O.D. collection fees and money order fees which we must pay the post office.

C. Ordering from a Catalog

**Exercises**

Complete the order blank on the following page. Use your own name and address and the current date.

1. Find the total price of each item.
2. Find the total for goods.
3. What is the tax on the order?
4. How do you want the order shipped?
5. What is the weight of the order in pounds and ounces?
6. What is total weight in pounds?
7. What is your zip code?
8. What is your total cash price?
9. What is the amount of the money order?
10. How much is the money order fee?
11. What postage do you put on the letter?
12. How much cash does it take to pay the money order clerk, including your stamp for letter?
13. What square do you mark in the lower left hand corner if this is a cash order?
14. Would it be cheaper to send a Money Order or Check?
15. What does C.O.D. mean?
16. Which is cheaper, cash or C.O.D.? Why?
### Exercises

Send Mail Orders to:

SEARS, ROEBUCK AND CO.

495 N. Watkins

Memphis, Tennessee 38102

Or, use this handy form when you place your order by phone or in person at Sears Catalog Sales Office, Sears Retail Catalog Dept. or Sears Authorized Catalog Sales Merchant.

PLEASE BE SURE TO INCLUDE ZIP CODE IN YOUR ADDRESS

### State Color or Pattern Choice by Number Where Requested

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>How Many</th>
<th>Name of Item</th>
<th>Color No.</th>
<th>Price</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 7R7211</td>
<td>1</td>
<td>AM radio</td>
<td>Blue</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>2 119R8307</td>
<td>1</td>
<td>Swim trunks</td>
<td>Green 34</td>
<td>7.98</td>
<td>7.98</td>
</tr>
<tr>
<td>3 6 F 2448</td>
<td>1</td>
<td>Football</td>
<td></td>
<td>8.67</td>
<td>8.67</td>
</tr>
<tr>
<td>6F 5057C</td>
<td>2</td>
<td>Bike tires</td>
<td>Black</td>
<td>1.10</td>
<td>1.10</td>
</tr>
</tbody>
</table>

**Total for Goods:**

**Amount for Tax:**

**Total Cash Price:**

**Amount Enclosed:**

Sears Checks

Money Order or Check

### Footnotes

- If credit order, we will charge and bill this to you.
- Enter account number in the space provided above.
- At which Sears store is your account carried?
- Do not send negotiable cash or checks.
- Signers of the
- Head of Housewife

(Note: Do not print)
<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>HOW MANY</th>
<th>NAME OF ITEM</th>
<th>COLOR NO.</th>
<th>STAT</th>
<th>PRICE</th>
<th>TOTAL COST</th>
<th>PRICE</th>
<th>SHIP.</th>
<th>WT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LOUISIANA customers add 5c tax for each dollar of goods.  
LOUISIANA customers also add 1% local tax.  
If required by your city or parish.

ARKANSAS, MISSOURI or TENNESSEE customers add 5c tax for each dollar of goods.  
TENNESSEE customers also add 1% or 1½% county tax if applicable.  
ALABAMA customers add 5c for each dollar of goods.  
KENTUCKY customers add 5c for each dollar of goods.  

The rates based on information available at printing and subject to change.

STATE COLOR OR PATTERN CHOICE BY NUMBER WHERE REQUESTED

PLEASE PRINT PLAINLY ONE LETTER IN EACH SQUARE

NAME -  
MAILING ADDRESS -  
POST OFFICE -  
STATE -  
ZIP CODE -  

PLEASE DO NOT WRITE IN THIS SPACE

SHIP TO ANOTHER ADDRESS? If you want this order shipped to another person or to a different address, freight or express station, give address here:

Name -  
MAILING ADDRESS -  
POST OFFICE -  
STATE -  
ZIP CODE -  

IF YOUR ADDRESS HAS CHANGED since last order, please give your old mailing address here:

NAME -  
MAILING ADDRESS -  
POST OFFICE -  
STATE -  
ZIP CODE -  

TOTAL FOR GOODS -  
AMOUNT FOR TAX -  
POSTAGE -  
TOTAL CASH PRICE -  
AMOUNT ENCLOSED -  

HOW SHALL WE SHIP? Parcel Post □ Express □ Freight (Rail or Truck) □  

Add this order to my REVOLVING CHARGE ACCOUNT □  
EASY PAYMENT PLAN ACCOUNT □  
MODERNIZING CREDIT PLAN ACCOUNT □  

ENTER ACCOUNT NUMBER IN THE SPACE PROVIDED ABOVE,  
AT WHICH SEARS STORE IS YOUR ACCOUNT CARRIED?  

SIGNATURE OF THE  
Account Holder. (WRITE—DO NOT PRINT)
D. Banking

Exercises

Assume your bank balance on the 1st of the month was $328.78. Using pages 207, 208, 209, write the checks, fill out the deposit slips, and check register for the following: Make checks to whomever you please. Be sure to state the reason each check was written.

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Check or Deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>Deposited $50.79</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Checks for $5.06, $10.50, $15.00</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Deposited $210.15, Checks $25.00 and $6.79</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Checks $71.95 and $38.76</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Check $19.95, Deposited $17.64 and $95.00</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Deposited $17.50, Check for $225.00</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Deposited $62.50</td>
</tr>
</tbody>
</table>

What is your bank balance at the end of the month?

How Much Money?

When Bill bought his lunch at school, it cost him half the money that he had brought from home. After school he bought a candy bar for 10 cents, and also had a snack at a diner. The snack cost half the money he had left. He left a five-cent tip at the diner.

Then Bill spent seven-eights of his remaining money on a magazine. When he reached home, he had a nickel in his pocket.

How much money did Bill have when he started out?
Pay to the order of _____________________________ $ _____________________________

For _____________________________ _____________________________

LITTLE RIVER Bank

LEPANTO, ARKANSAS, 81-822 841

207
<table>
<thead>
<tr>
<th>Member FDIC</th>
<th>ENDORSE AND LIST EACH CHECK SEPARATELY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENCY</td>
<td>DOLLARS</td>
</tr>
<tr>
<td>SILVER</td>
<td></td>
</tr>
<tr>
<td>CHECKS AS FOLLOWS:</td>
<td></td>
</tr>
<tr>
<td>DEPOSIT TOTAL $</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Member FDIC</th>
<th>ENDORSE AND LIST EACH CHECK SEPARATELY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENCY</td>
<td>DOLLARS</td>
</tr>
<tr>
<td>SILVER</td>
<td></td>
</tr>
<tr>
<td>CHECKS AS FOLLOWS:</td>
<td></td>
</tr>
<tr>
<td>DEPOSIT TOTAL $</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Member FDIC</th>
<th>ENDORSE AND LIST EACH CHECK SEPARATELY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENCY</td>
<td>DOLLARS</td>
</tr>
<tr>
<td>SILVER</td>
<td></td>
</tr>
<tr>
<td>CHECKS AS FOLLOWS:</td>
<td></td>
</tr>
<tr>
<td>DEPOSIT TOTAL $</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LITTLE RIVER BANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAVINGS DEPARTMENT</td>
</tr>
</tbody>
</table>

DATE ___________ ACCOUNT OF ___________

ACCOUNT NO. ___________

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION
# Exercises

## STATEMENT OF ACCOUNT

U. R. Teck  
711 West Ave. D  
Hope, Ark. 71801

<table>
<thead>
<tr>
<th>Checks</th>
<th>Deposits</th>
<th>Date</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>balance brought forward</td>
<td>$ 395.45</td>
<td>11-1-71</td>
<td></td>
</tr>
<tr>
<td>$ 23.49-</td>
<td></td>
<td>11-2-71</td>
<td></td>
</tr>
<tr>
<td>7.83- 2.93-</td>
<td></td>
<td>11-5-71</td>
<td></td>
</tr>
<tr>
<td>121.23-</td>
<td>101.01+</td>
<td>11-8-71</td>
<td></td>
</tr>
<tr>
<td>40.00-</td>
<td></td>
<td>11-11-71</td>
<td></td>
</tr>
<tr>
<td>12.49- 7.85-</td>
<td></td>
<td>11-15-71</td>
<td></td>
</tr>
<tr>
<td>79.38-</td>
<td>240.38+</td>
<td>11-18-71</td>
<td></td>
</tr>
<tr>
<td>32.45- 16.34-</td>
<td></td>
<td>11-19-71</td>
<td></td>
</tr>
<tr>
<td>11.23-</td>
<td></td>
<td>11-20-71</td>
<td></td>
</tr>
<tr>
<td>236.70-</td>
<td></td>
<td>11-23-71</td>
<td></td>
</tr>
<tr>
<td>78.34-</td>
<td></td>
<td>11-24-71</td>
<td></td>
</tr>
<tr>
<td>4.46-</td>
<td></td>
<td>11-26-71</td>
<td></td>
</tr>
<tr>
<td>38.39- 2.98-</td>
<td></td>
<td>11-28-71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>240.38+</td>
<td>11-30-71</td>
<td></td>
</tr>
</tbody>
</table>

**FIND THE BALANCE AT THE END OF EACH DAY**

---

CITIZENS NATIONAL BANK  
HOPE, ARKANSAS
Balance Your Bank Statement

PERIOD TO

THIS FORM IS PROVIDED TO HELP YOU BALANCE YOUR BANK STATEMENT

<table>
<thead>
<tr>
<th>CHECKS OUTSTANDING</th>
<th>NOT CHARGED TO ACCOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO.</td>
<td>$</td>
</tr>
</tbody>
</table>

BANK BALANCE SHOWN ON THIS STATEMENT $ ____________

ADD:
- DEPOSITS NOT CREDITED IN THIS STATEMENT (IF ANY) $ ____________

TOTAL $ ____________

SUBTRACT:
- CHECKS OUTSTANDING $ ____________

BALANCE $ ____________

Statement of Account - U. R. Took

The bank balance shown on this statement is the one obtained on page 209.

These checks have been written but not cleared:

<table>
<thead>
<tr>
<th>#</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>206</td>
<td>$18.34</td>
</tr>
<tr>
<td>211</td>
<td>$3.09</td>
</tr>
<tr>
<td>212</td>
<td>$53.61</td>
</tr>
<tr>
<td>215</td>
<td>$69.37</td>
</tr>
<tr>
<td>219</td>
<td>$21.63</td>
</tr>
</tbody>
</table>

How much is the new balance?
Exercises

$25 Bond - Maturity Value of Bonds Bought After June 1, 1970

<table>
<thead>
<tr>
<th>PERIOD HELD</th>
<th>REDEMPTION VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 1/2 year</td>
<td>$18.75</td>
</tr>
<tr>
<td>1/2 to 1 year</td>
<td>19.05</td>
</tr>
<tr>
<td>1 year to 1 1/2 year</td>
<td>19.51</td>
</tr>
<tr>
<td>1 1/2 year to 2 years</td>
<td>19.95</td>
</tr>
<tr>
<td>2 years to 2 1/2 years</td>
<td>20.40</td>
</tr>
<tr>
<td>2 1/2 years to 3 years</td>
<td>20.88</td>
</tr>
<tr>
<td>3 years to 3 1/2 years</td>
<td>21.39</td>
</tr>
<tr>
<td>3 1/2 years to 4 years</td>
<td>21.93</td>
</tr>
<tr>
<td>4 years to 4 1/2 years</td>
<td>22.53</td>
</tr>
<tr>
<td>4 1/2 years to 5 years</td>
<td>23.16</td>
</tr>
<tr>
<td>5 years to 5 1/2 years</td>
<td>23.82</td>
</tr>
<tr>
<td>5 1/2 years to 5 years 10 months</td>
<td>24.51</td>
</tr>
<tr>
<td>5 years 10 months from issue date</td>
<td>25.73</td>
</tr>
</tbody>
</table>

Note: "E" Bonds have a 1/2% bonus rate added if held to maturity, raising the yield to 5 1/2% from issue date to maturity.

You are saving $6.25 per month on a payroll savings plan.

1. How many months until you can buy a $25 savings bond?

2. In 2 years how much would you have saved?

3. If you started on January 1, 1971, when will you buy your first bond?

4. (a) Find the number of years and months from time bought to January 1, 1973 for each bond bought.
   (b) Find the accumulated value of each of these bonds you have bought using the redemption value table.

<table>
<thead>
<tr>
<th>Date Bought</th>
<th>Years and Months to Jan. 1, 1973</th>
<th>Accumulated Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1, 1971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1, 1971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 1, 1971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 1, 1971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1, 1972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1, 1972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 1, 1972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 1, 1972</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. How much interest has been earned?
Exercises

You put $6.25 into a savings account on the first of each month for 2 years starting January 1, 1971

How dividends are computed:

\[
\begin{align*}
6.25 \times 0.0475 \times \frac{6}{12} &= 0.148437 \\
6.25 \times 0.0475 \times \frac{5}{12} &= 0.123697 \\
6.25 \times 0.0475 \times \frac{4}{12} &= 0.098958 \\
6.25 \times 0.0475 \times \frac{3}{12} &= 0.074218 \\
6.25 \times 0.0475 \times \frac{2}{12} &= 0.049479 \\
6.25 \times 0.0475 \times \frac{1}{12} &= 0.024739 \\
\end{align*}
\]

Do not round off dividends until after you add.

1. What is the rate of dividend?
2. Amount of dividend earned for March deposit?
3. Total dividends first six mo.

Continue finding dividends on deposits through December 31, 1972 and record on next page.

4. Second six months
5. Third six months.
6. Fourth six months

What is "first month's balance after deposit" for:

7. July, 1971
8. January, 1972
10. What is my balance after dividend for:
    December, 1972
11. What was total earnings on savings account?
12. Which earned more--savings account or savings bond?
13. How much more?
<table>
<thead>
<tr>
<th>Date</th>
<th>Memo.</th>
<th>Earnings Dividend</th>
<th>Withdrawals</th>
<th>Savings Added</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jan. 1, 71</td>
<td></td>
<td>$6.25</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
</tr>
<tr>
<td>2 Feb. 1, 71</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
<td>12.50</td>
<td></td>
</tr>
<tr>
<td>3 Mar. 1, 71</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
<td>18.75</td>
<td></td>
</tr>
<tr>
<td>4 April 1, 71</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
<td>25.00</td>
<td></td>
</tr>
<tr>
<td>5 May 1, 71</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
<td>31.25</td>
<td></td>
</tr>
<tr>
<td>6 June 1, 71</td>
<td></td>
<td>6.25</td>
<td>6.25</td>
<td>37.50</td>
<td></td>
</tr>
<tr>
<td>7 June 30, 71</td>
<td>Dividend 4 3/4%</td>
<td>$.52</td>
<td></td>
<td>38.02</td>
<td></td>
</tr>
<tr>
<td>8 July 1, 71</td>
<td></td>
<td>6.25</td>
<td></td>
<td>44.27</td>
<td></td>
</tr>
<tr>
<td>9 Aug. 1, 71</td>
<td></td>
<td>6.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Sept. 1, 71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Oct. 1, 71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Nov. 1, 71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Dec. 1, 71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Dec. 31, 71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Jan. 1, 72</td>
<td>Dividend 4 3/4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Feb. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Mar. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 April 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 May 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 June 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 June 30, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 July 1, 72</td>
<td>Dividend 4 3/4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23 Aug. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 Sept. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 Oct. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 Nov. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 Dec. 1, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 Dec. 31, 72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
E. Car Expenses

Cost of Operating a Second Hand Car

Don Jones:
1967 Buick Wildcat
11825 miles

Expenses:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>947 gal. gas</td>
<td></td>
<td>$339</td>
</tr>
<tr>
<td>43 qts. oil</td>
<td></td>
<td>.55</td>
</tr>
<tr>
<td>9 lube jobs</td>
<td></td>
<td>1.50</td>
</tr>
<tr>
<td>2 oil filters</td>
<td></td>
<td>2.85</td>
</tr>
<tr>
<td>1 air filter</td>
<td></td>
<td>3.65</td>
</tr>
<tr>
<td>2 head lamps</td>
<td></td>
<td>.88</td>
</tr>
<tr>
<td>1 muffler</td>
<td></td>
<td>9.88</td>
</tr>
<tr>
<td>1 tail pipe</td>
<td></td>
<td>5.25</td>
</tr>
<tr>
<td>8 spark plugs</td>
<td></td>
<td>1.03</td>
</tr>
<tr>
<td>2 sets points</td>
<td></td>
<td>1.05</td>
</tr>
<tr>
<td>2 tires</td>
<td></td>
<td>21.45</td>
</tr>
<tr>
<td>1 battery</td>
<td></td>
<td>18.95</td>
</tr>
<tr>
<td>2 battery cables</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>4 spinner hubcaps</td>
<td></td>
<td>7.95</td>
</tr>
<tr>
<td>2 rear view mirrors</td>
<td></td>
<td>3.25</td>
</tr>
<tr>
<td>License - State</td>
<td></td>
<td>$19.00</td>
</tr>
<tr>
<td>City</td>
<td></td>
<td>5.00</td>
</tr>
<tr>
<td>Driver's</td>
<td></td>
<td>2.00</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>$450.00</td>
</tr>
<tr>
<td>Interest on bank loan</td>
<td></td>
<td>$1000 at 5.5% $55.00</td>
</tr>
<tr>
<td>Insurance - Comprehensive (5-10-5)</td>
<td>$208.00</td>
<td></td>
</tr>
<tr>
<td>Repair - minor wreck</td>
<td></td>
<td>$98.47</td>
</tr>
<tr>
<td>Seven flats at $1.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total

Average cost per mile
Use the Dealer Statement of Transaction blank to complete the papers for the purchase of a car based on the following facts.

a. Down payment $550
b. Trade in $1450 - (68 Mustang)
c. Comprehensive insurance $335
d. Finance charges and credit life is 5.8% of the principal amount financed
e. 3% sales tax and $19.00 license
ACCOUNT NO.

ARKANSAS AUTOMOBILE RETAIL INSTALMENT CONTRACT

Buyer (and Co-Buyer) - Name and Address (Include - County and Zip Code)  Seller - Name and Address

Buyer (which means the undersigned Buyers and Co-Buyers, jointly and severally) having been quoted both a time sale price and a lesser cash price hereby purchases from Seller on a time price basis, upon the terms and conditions set forth on the face and reverse sides hereof, the following property (hereinafter called the "Property") delivery and acceptance of which in good order hereby are acknowledged by Buyer.

<table>
<thead>
<tr>
<th>New or Used</th>
<th>Year and Make</th>
<th>Series</th>
<th>Body Style</th>
<th>No. Cyl.</th>
<th>H.T. Gross Capacity</th>
<th>Manufacturer's Serial Number</th>
<th>Use For Which Purchased</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Personal</td>
</tr>
</tbody>
</table>

INCLUDINC:

☐ Radio ☐ Air Conditioner ☐ Automatic Transmission ☐ Power Steering ☐ Power Brakes ☐ Power Seats ☐ Power Windows

DESCRIPTION OF TRADE IN

<table>
<thead>
<tr>
<th>Year and Make</th>
<th>Gross Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Amount Owning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

OPTIONAL INSURANCE

Buyer authorizes Seller to obtain the following insurance coverages:

(a) Automobile Physical Damage Insurance: Coverage checked below for a term of _____ months (or for such shorter term as the insurer to whom Seller shall apply therefor will provide for the amount included herein) from the date hereof, payable to Buyer or Seller as interests may appear:

☐ Comprehensive ☐ Fire-Steal & Combined - $  
Deductible, Towing & Labor Costs ☐ $  
☐ Collision ☐ $  

(b) Credit Life Insurance on the life of [Insured Person]

Provided under Ford Life Insurance Company's Group Policy No. 2200 in accordance with the "Credit Life Insurance Eligibility" section below:

Provided by [Insurer] ☐ in accordance with the separate Application, Notice, Certificate or Policy delivered to Buyer this date.

Credit Accident and Health Insurance provided by

in accordance with the separate Application, Notice, Certificate or Policy delivered to Buyer this date $  

OTHER INSURANCE

(See Opposite)

Total Other Charges $  

NOTICE TO BUYER: (1) You are not required to obtain the Credit Life and/or Credit Accident and Health Insurance for which a charge is indicated above and such is not a factor in the Seller's approval of this credit. (2) You have the right to choose the person through whom the Automobile Physical Damage Insurance required under this contract is to be obtained. ACKNOWLEDGING the foregoing, BUYER requests and authorizes SELLER to obtain each insurance coverage for which an amount is included above.

(Insured Person) ☐

Date

(Cost of Insurance to be included only if signed and dated by Buyer)
## Exercises

**Computing the cost of operating a new car**

**Name:** Sam Bennett  
**Kind of Car:** Plymouth Duster  
**Miles driven:** 10,725

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1440 gallons gas at $ .339</td>
<td></td>
</tr>
<tr>
<td>36 quarts oil at .75</td>
<td></td>
</tr>
<tr>
<td>9 lube jobs at 1.50</td>
<td></td>
</tr>
<tr>
<td>2 oil filters at 2.70</td>
<td></td>
</tr>
<tr>
<td>1 air filter at 4.10</td>
<td></td>
</tr>
<tr>
<td>License--State $19.00</td>
<td></td>
</tr>
<tr>
<td>Sales tax $75.00</td>
<td></td>
</tr>
<tr>
<td>Driver's license 2.00</td>
<td></td>
</tr>
<tr>
<td>Depreciation $850.00</td>
<td></td>
</tr>
<tr>
<td>Interest on bank loan $2500 at 5.8%</td>
<td></td>
</tr>
<tr>
<td>Insurance--comprehensive 10-20-5 (male--under 25) $233.40</td>
<td></td>
</tr>
</tbody>
</table>

**Total**

**Average cost per mile:**
<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape Juice</td>
<td>$1.00</td>
</tr>
<tr>
<td>Meat Pies</td>
<td>8 for $1.00</td>
</tr>
<tr>
<td>Whole Kernel Corn</td>
<td>4 for $0.89</td>
</tr>
<tr>
<td>Okra</td>
<td>6 for $1.00</td>
</tr>
<tr>
<td>Peanut Butter</td>
<td>39¢</td>
</tr>
<tr>
<td>Sausage</td>
<td>4 for $0.89</td>
</tr>
<tr>
<td>Orange Juice</td>
<td>3 for $0.49</td>
</tr>
<tr>
<td>Treet</td>
<td>12 oz. 49¢</td>
</tr>
</tbody>
</table>

Exercise:
- How many items are advertised on this page?
- What is the price of 1 meat pie?
- What is the price of 1 can of corn?
- What is the price of 1 can of vienna sausage?
- What is the price of 1 bottle of grape juice?
- What is the price per ounce of Treet?
- What is the price per ounce of okra?
- What is the price per ounce of peanut butter?

One item is shown at two prices. At which price would it cost less per item?
<table>
<thead>
<tr>
<th>Quantity and size</th>
<th>Item</th>
<th>Cost</th>
<th>Retail Cost Per Unit</th>
<th>Mark up Per Unit</th>
<th>% of Mark up</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/5#</td>
<td>C &amp; H Sugar</td>
<td>$6.01</td>
<td>.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/10#</td>
<td>C &amp; H Sugar</td>
<td>5.90</td>
<td>1.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48/tall</td>
<td>Pet Milk</td>
<td>7.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/qt.</td>
<td>Soap Powder</td>
<td>6.60</td>
<td>.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/1#</td>
<td>Folgers Coffee</td>
<td>18.80</td>
<td>.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/8oz.</td>
<td>Pillsbury Biscuits</td>
<td>1.72</td>
<td>3/.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1/2 gal.</td>
<td>Foremost Milk</td>
<td></td>
<td></td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>24/4oz.</td>
<td>Gerber Baby Food</td>
<td>3.20</td>
<td>5/.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/5#</td>
<td>Pillsbury Flour</td>
<td>5.90</td>
<td>.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/2oz.</td>
<td>Martha White Corn</td>
<td>1.92</td>
<td>.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/6ct.</td>
<td>Can Coca Cola</td>
<td>2.40</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/6ct.</td>
<td>One Way Pepsi</td>
<td>1.80</td>
<td>.55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exercises
Circle the better buys.

1. "Cokes" 16 oz. 53¢ ctn.
   10 oz. 43¢ ctn.
   6 oz. 37¢ ctn.

2. Lucerne Milk 1/2 gal. ctn. 53¢
   1 gal. ctn. 99¢

3. Folger's Inst. Coffee 10 oz. $1.79
   6 oz. .99
   2 oz. .49

4. Town House Orange Juice 18 oz. 5/1.00
   1 qt. 14 oz. .39

5. Morrell Canned Ham 5 lb. $5.49
   3 lb. 3.39

6. Domino Sugar 5 lb. .65
   10 lb. 1.19

7. Hiway Peaches 1 lb. can 4/1.00
   1 lb 13 oz. can 3/1.00
<table>
<thead>
<tr>
<th></th>
<th>Item Description</th>
<th>Size/Package</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Mrs. Wright's Biscuits</td>
<td>8 oz. can</td>
<td>3/25¢</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 oz. can</td>
<td>2/15¢</td>
</tr>
<tr>
<td>9.</td>
<td>Nabisco Crackers</td>
<td>1/2 lb. box</td>
<td>27¢</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 lb. box</td>
<td>35¢</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 lb. box</td>
<td>67¢</td>
</tr>
<tr>
<td>10.</td>
<td>Hormel Weiners</td>
<td>12 oz. pkg.</td>
<td>59¢</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 lb. pkg.</td>
<td>69¢</td>
</tr>
<tr>
<td>11.</td>
<td>Campbell's Pork and Beans</td>
<td>1 lb. 6/1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 lb. 12 oz.</td>
<td>3/1.00</td>
</tr>
<tr>
<td>12.</td>
<td>Pride of Illinois Corn</td>
<td>15 oz.</td>
<td>2/45¢</td>
</tr>
<tr>
<td></td>
<td>Highway Cream Corn</td>
<td>15 oz.</td>
<td>5/1.00</td>
</tr>
<tr>
<td>13.</td>
<td>Mrs. Wright's Bread</td>
<td>20 oz.</td>
<td>3/73¢</td>
</tr>
<tr>
<td></td>
<td>Holsum Bread</td>
<td>1 lb.</td>
<td>31¢</td>
</tr>
<tr>
<td>14.</td>
<td>Bel Air Frozen Corn</td>
<td>2 lbs.</td>
<td>59¢</td>
</tr>
<tr>
<td></td>
<td>Hills-of-Home Frozen Corn</td>
<td>1-1/2 lbs.</td>
<td>39¢</td>
</tr>
<tr>
<td>15.</td>
<td>Wrigley's Gum</td>
<td></td>
<td>5/19¢</td>
</tr>
<tr>
<td></td>
<td>Dentyne Gum</td>
<td></td>
<td>6/23¢</td>
</tr>
</tbody>
</table>
**Exercises**

Cost of Feeding a Family

1. This table shows the cost of feeding a family in the South for one week. Using the table and the adjustments, find the cost of feeding your family.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Low Cost</th>
<th>Medium Cost</th>
<th>High Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHILDREN UNDER 1 YEAR</td>
<td>2.80</td>
<td>3.50</td>
<td>3.90</td>
</tr>
<tr>
<td>1 - 3 years</td>
<td>3.40</td>
<td>4.20</td>
<td>4.90</td>
</tr>
<tr>
<td>4 - 6 years</td>
<td>3.90</td>
<td>5.10</td>
<td>6.20</td>
</tr>
<tr>
<td>7 - 9 years</td>
<td>4.70</td>
<td>6.10</td>
<td>7.10</td>
</tr>
<tr>
<td>10 - 12 years</td>
<td>5.40</td>
<td>7.30</td>
<td>8.50</td>
</tr>
<tr>
<td>GIRLS 13 - 15 years</td>
<td>5.70</td>
<td>7.70</td>
<td>9.00</td>
</tr>
<tr>
<td>16 - 19 years</td>
<td>5.80</td>
<td>7.70</td>
<td>9.10</td>
</tr>
<tr>
<td>BOYS 13 - 15 years</td>
<td>6.20</td>
<td>8.40</td>
<td>9.80</td>
</tr>
<tr>
<td>16 - 19 years</td>
<td>7.20</td>
<td>9.80</td>
<td>11.30</td>
</tr>
<tr>
<td>WOMEN 20 - 34 years</td>
<td>4.80</td>
<td>6.70</td>
<td>7.90</td>
</tr>
<tr>
<td>35 - 54 years</td>
<td>4.70</td>
<td>6.50</td>
<td>7.70</td>
</tr>
<tr>
<td>55 - 74 years</td>
<td>4.40</td>
<td>6.20</td>
<td>7.30</td>
</tr>
<tr>
<td>75 &amp; over</td>
<td>4.30</td>
<td>5.80</td>
<td>6.80</td>
</tr>
<tr>
<td>MEN 20 - 34 years</td>
<td>6.30</td>
<td>8.50</td>
<td>9.90</td>
</tr>
<tr>
<td>35 - 54 years</td>
<td>5.90</td>
<td>8.00</td>
<td>9.10</td>
</tr>
<tr>
<td>55 - 74 years</td>
<td>5.60</td>
<td>7.60</td>
<td>8.70</td>
</tr>
<tr>
<td>75 &amp; over</td>
<td>5.40</td>
<td>7.30</td>
<td>8.40</td>
</tr>
</tbody>
</table>

**IF YOU ARE USING A FAMILY OF 1 ADD**

1. **20%**
2. **10%**
3. **5%**
4. **USE AS IS**
5. **SUBTRACT 5%**
6. **OR MORE SUBTRACT 10%**

223
2. Using a merchandising list, make up a grocery list for feeding a family of four for one week. Use a family of 4 including a father, mother, teen-ager, and one baby girl. Find the total cost.

3. Using the merchandising list on page 220, determine if it is always, sometimes, or never cheaper to buy the economy size.

---

Record Party

Time: 8:00 p.m.  Limited to 9 couples
Place: Betty's house  Refreshments: cokes and spudnuts

Betty figures 2 cokes and 3 spudnuts per person. If cokes cost $1.72 per case and spudnuts cost 59¢ a dozen, what is the expected total cost of the party and how much is each person's share of the cost?
A. Congruent Angles

--- Exercises ---

Construct an angle congruent to each given angle.

\begin{center}
\includegraphics[width=\textwidth]{angle_construction}
\end{center}
B. Angle Bisector

Exercises

Bisect each given angle

C. Perpendicular Bisector

Exercises

Construct a perpendicular bisector of each line segment.
Exercises

C Construct the perpendicular bisectors of all three sides of the triangles. Then use the point of intersection as the center and circumscribe circles about the triangles.
D. Equal Line Segments

Exercises

Divide the lines into specified equal segments.

A ______ B
   (2)

C ______ D
   (3)

C ______ E
   (5)

G ______ H
   (8)
E. Perpendicular Lines

Exercises

Construct a perpendicular line through the given point or points to the given line.

A

B

C

D

F

G

P

R

1

2

3

4

5
Exercises

Construct lines perpendicular to each given line through the given points.
F. Parallel Lines

EXERCISES

1. Construct a line parallel to the given line by constructing equal alternate interior angles.

2. Construct a line parallel to the given line by constructing equal corresponding angles.

3. Construct a parallel line one inch from the given line by constructing a perpendicular to a perpendicular. (1" apart)

4. By construction, locate the center stripe of Arkansas Highway 1.

Highway 1
UNIT XI
STATISTICS

A. Probability

EXERCISES

1. Drop 4 circular discs on the table (one side red, one side blue).
   a. List all the different ways they can fall.
   b. List all the ways you get three red and one blue.
   c. What is the ratio of b. to a.?

2. What determines the number of possibilities?

3. Can you suggest a rule to go by to determine the expected number of possibilities?

4. Refer back to problem one. Find the probability of the event:
   a. "Four reds and no blues"
   b. "Two reds and two blues"
   c. "One red and three blues"
   d. "No reds and four blues"
   e. Compare the chances of events a., b., c., d.

5. A box contains 40 slips of paper. The slips are numbered from 1 through 40. A slip is drawn. What is the probability that the slip drawn will be marked with:
   a. A number less than 15?
   b. A number greater than 30?
   c. An off number?
   d. An even number?
   e. A multiple of 5?
   f. A multiple of 6?
   g. A number greater than 20?
   h. A number less than 5?
   i. The square of a counting number?
   j. A number ending in 5?
   k. A multiple of 18?
   l. A number which ends in 0?
   m. A number which is divisible by 12?
   n. A prime number?
Exercises

1. In a bowl of 12 red and 15 blue marbles, if one marble drawn, replaced, and one marble again selected, what is the probability that:

a. Both marbles are blue?
b. Both marbles are red?
c. The two marbles have different colors?
d. The two marbles have the same color?
e. The first marble is blue and the second red?
f. The first marble is red and the second blue?
g. Either marble is red?

2. Your football team is scheduled to play team A & team B. It is estimated that the probability of winning over A is 1/3 and over B is 3/4. Which is the stronger opponent?

Who is favored in the game with A? Game with B? What is the probability of your team:

a. Losing the second game?
b. Losing the 1st game?
c. Losing the 1st game and winning the second?
d. Winning the 1st game and losing the second?
e. Losing both games?
f. Winning either game?

3. Basket contains 10 oranges and 6 apples.

a. What are the chances of drawing an apple first draw?
b. If you drew an apple the 1st draw and ate it, what is the chance of drawing an apple on the second draw?
c. What is the probability of drawing an apple the first draw and an orange on the second draw, after replacing the apple? What about the probability of drawing an apple on the first draw and an orange on the second draw after the apple was eaten?
B. Charts and Graphs

Example:
Take 5 cubes where each cube has 2 faces red, 2 faces blue, 1 face green, 1 face orange. Shake the five cubes and let them fall on the table. Record the number of each colored face that appears upward. Repeat your throw 20 times, giving a total of 100 faces recorded. There are several different ways to record this information.

Cube Throwing Chart

| Trials | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Total | %  |
|--------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|     |    |
| Red    | 1 | 2 | 3 | 2 | 0 | 1 | 1 | 1 | 0 | 3 | 2 | 1 | 1 | 4 | 2 | 1 | 2 | 0 | 1 | 2 | 30 | 30% |
| Blue   | 4 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 0 | 1 | 4 | 1 | 2 | 1 | 2 | 35 | 35% |
| Orange | 0 | 2 | 1 | 0 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 1 | 0 | 18 | 18% |
| Green  | 0 | 0 | 1 | 1 | 0 | 2 | 3 | 3 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 17 | 17% |

Note: The purpose of the chart is to organize and compare information.

Horizontal Bar Graph

<table>
<thead>
<tr>
<th>%</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The purpose of a bar graph is to organize the information in picture form so that it may be compared visually.
1. Refer to the example problem and make 30 throws instead of 20 throws. Make a chart - compare the per cent of each color to the example. Can you make a bar graph?

2. Make a chart, titled integers 1 to 100, showing how many even numbers, prime numbers, perfect numbers, Fermat primes, numbers evenly divisible by six, and Merseene primes. (Note: For the above numbers we are interested in only how many. Try the library for any of these you do not know.) Make a line graph.

3. Go to a parking lot and count the number of Fords, Chevrolets, Oldsmobiles, and Plymouths.
   a. Chart the number of each make of car.
   b. Make a circle graph.
Make a seating chart for your classroom.

Name each desk with this symbol (□ △) where the number in the position of the square shows the column and the letter in the position of the triangle shows the row.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>(5,d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>(1,b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>(1,a)</td>
<td>(2,a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Let each desk be represented by a rectangle in the above chart.

1. Write each desk's name in the lower part of the rectangle.
2. Write the student's name in the upper part.
3. a. Who sits in desk (3,d)?
   b. Who sits in desk (1,a)?
4. Mark an X through desk (4,f).
Reading the Arkansas State Withholding Tax chart, find the rate of state withholding for each of the following:

1. Semi-monthly income $212.00
2. Weekly income 94.75
3. Monthly income 510.30
4. Bi-weekly income 260.52
5. Weekly income 82.74
6. Bi-weekly income 700.10
7. Monthly income 1500.65

**FORMULA 4**

**FORMULA FOR CALCULATING ARKANSAS STATE WITHHOLDING TAX**

<table>
<thead>
<tr>
<th>Net Taxable Weekly Income</th>
<th>Net Taxable Bi-weekly Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>Thru</td>
</tr>
<tr>
<td>.00</td>
<td>60.32</td>
</tr>
<tr>
<td>30.33</td>
<td>71.17</td>
</tr>
<tr>
<td>71.18</td>
<td>82.87</td>
</tr>
<tr>
<td>82.88</td>
<td>95.55</td>
</tr>
<tr>
<td>95.56</td>
<td>117.97</td>
</tr>
<tr>
<td>117.98</td>
<td>127.72</td>
</tr>
<tr>
<td>127.73</td>
<td>137.47</td>
</tr>
<tr>
<td>137.48</td>
<td>147.22</td>
</tr>
<tr>
<td>147.23</td>
<td>161.85</td>
</tr>
<tr>
<td>151.86</td>
<td>178.42</td>
</tr>
<tr>
<td>170.43</td>
<td>192.07</td>
</tr>
<tr>
<td>132.08</td>
<td>212.55</td>
</tr>
<tr>
<td>212.56</td>
<td>226.20</td>
</tr>
<tr>
<td>226.21</td>
<td>239.85</td>
</tr>
<tr>
<td>239.86</td>
<td>253.50</td>
</tr>
<tr>
<td>253.51</td>
<td>263.25</td>
</tr>
<tr>
<td>263.26</td>
<td>273.00</td>
</tr>
<tr>
<td>273.01</td>
<td>292.50</td>
</tr>
<tr>
<td>292.51</td>
<td>312.00</td>
</tr>
<tr>
<td>312.01</td>
<td>331.00</td>
</tr>
<tr>
<td>331.01</td>
<td>350.00</td>
</tr>
<tr>
<td>350.01</td>
<td>375.00</td>
</tr>
<tr>
<td>375.01</td>
<td>400.00</td>
</tr>
</tbody>
</table>
"FORMULA #5"
FORMULA FOR CALCULATING
ARKANSAS STATE WITHHOLDING TAX

<table>
<thead>
<tr>
<th>Net Taxable Semi-monthly income</th>
<th>Net Taxable Monthly income</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>Thru</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>.00</td>
<td>130.65</td>
</tr>
<tr>
<td>130.66</td>
<td>122.35</td>
</tr>
<tr>
<td>142.36</td>
<td>165.75</td>
</tr>
<tr>
<td>165.76</td>
<td>191.10</td>
</tr>
<tr>
<td>191.11</td>
<td>235.95</td>
</tr>
<tr>
<td>235.96</td>
<td>255.45</td>
</tr>
<tr>
<td>255.46</td>
<td>274.95</td>
</tr>
<tr>
<td>274.96</td>
<td>294.45</td>
</tr>
<tr>
<td>294.46</td>
<td>323.70</td>
</tr>
<tr>
<td>323.71</td>
<td>356.85</td>
</tr>
<tr>
<td>356.86</td>
<td>384.15</td>
</tr>
<tr>
<td>384.16</td>
<td>425.10</td>
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<td>425.11</td>
<td>452.40</td>
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<td>452.41</td>
<td>479.70</td>
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<td>479.71</td>
<td>507.00</td>
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<tr>
<td>507.01</td>
<td>526.50</td>
</tr>
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<td>526.51</td>
<td>546.00</td>
</tr>
<tr>
<td>546.01</td>
<td>585.00</td>
</tr>
<tr>
<td>585.01</td>
<td>624.00</td>
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<tr>
<td>624.01</td>
<td>662.00</td>
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<tr>
<td>662.01</td>
<td>700.00</td>
</tr>
<tr>
<td>700.01</td>
<td>750.00</td>
</tr>
<tr>
<td>750.01</td>
<td>800.00</td>
</tr>
</tbody>
</table>

Code Messages

Examine the code table and the decoded messages at the right.

```
0 1 2 3 4 5 6 7 8 9 8 5 7 8 3 6 == 7 4 7 4
a b c d e f g h i j S P R I N G I S H E R E
k l m n o p q r s t 1 8 2 9 4 7 4 == 4 0 7 8
u v w x y z V I C T O R Y I S O U R S
```

Any letter or digit in one of the columns may stand for any other letter or digit in the same column.
To decode a message, list all possible replacements under each numeral, then select those letters that form words. Can you decipher these messages?

1. 7083 = 249 2. 54024 = 507024039 3. WYNIO = PAD
A. Base Eight

1. Count from 51 through 100 in base eight. Write the names for these numbers in base eight.

2. The following names for numbers are written in decimal form (base 10). Rename each using base eight notation.

   a. 37
   b. 79
   c. 143
   d. 465
   e. 1304

3. Each of the following is a name for a number in a base eight system. Rename each as a decimal number (base 10).

   a. 174
   b. 75
   c. 44
   d. 203
   e. 777
Exercises

1. Add the following in base 3 notation.

\[
\begin{array}{cccccc}
35 & 126 & 724 & 470 & 203 \\
+61 & +403 & +454 & +217 & +546 \\
\end{array}
\]

\[
\begin{array}{cccccc}
eight & eight & eight & eight & eight \\
\end{array}
\]

Check your results using decimals (base ten).

2. Subtract the following in base 3 notation.

\[
\begin{array}{cccccc}
76 & 53 & 204 & 629 & 712 \\
-34 & -27 & -65 & -256 & -305 \\
\end{array}
\]

\[
\begin{array}{cccccc}
eight & eight & eight & eight & eight \\
\end{array}
\]

---

Weird Operations

Can you work these problems? Study the four examples of each operation.

<table>
<thead>
<tr>
<th>* operation</th>
<th>( \bigtriangleup ) operation</th>
<th>( \Box ) operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 * 4 = 4</td>
<td>2 ( \bigtriangleup ) 3 = 7</td>
<td>14 ( \Box ) 3 = 1</td>
</tr>
<tr>
<td>10 * 16 = 16</td>
<td>5 ( \bigtriangleup ) 3 = 18</td>
<td>40 ( \Box ) 6 = 8</td>
</tr>
<tr>
<td>3 * 1 = 1</td>
<td>15 ( \bigtriangleup ) 2 = 32</td>
<td>26 ( \Box ) 5 = 3</td>
</tr>
<tr>
<td>89 * 72 = 72</td>
<td>0 ( \bigtriangleup ) 5 = 5</td>
<td>64 ( \Box ) 10 = 12</td>
</tr>
<tr>
<td>1. 22 * 0</td>
<td>6. 7 ( \bigtriangleup ) 11 = 11</td>
<td>11. 3 ( \Box ) 1 =</td>
</tr>
<tr>
<td>2. 3 * 51</td>
<td>7. 4 ( \bigtriangleup ) 14 = 14</td>
<td>12. 18 ( \Box ) 4 =</td>
</tr>
<tr>
<td>3. 14 * 5</td>
<td>3. 12 ( \bigtriangleup ) 1 = 13</td>
<td>13. 20 ( \Box ) = 6</td>
</tr>
<tr>
<td>4. 6 * 34</td>
<td>9. ( \bigtriangleup ) 2 = 20</td>
<td>14. ( \Box ) 7 = 20</td>
</tr>
<tr>
<td>5. 2 * 2</td>
<td>10. 1 ( \bigtriangleup ) 1 = 15</td>
<td>15. 4 ( \Box ) 1 =</td>
</tr>
</tbody>
</table>
Exercises

The following problems are in base eight notation. Find the product and write your answer in base eight notation.

1. $7 \times_6 8$
2. $26 \times_{22} 8$
3. $34 \times_{70} 8$
4. $63 \times_{47} 8$
5. $205 \times_{62} 8$
6. $417 \times_{135} 8$
7. $673 \times_{55} 8$
8. $100 \times_{100} 8$

Squaring A Cross

Can you draw four straight lines that divide the cross into five pieces which can be rearranged to form a square?
B. Base Two

EXERCISES

1. Write the names of the numbers from ten to thirty inclusive in binary numerals.
2. What base ten numbers are represented by these binary numerals?
   a. 1101    c. 100011    e. 111110    g. 11001    i. 111011
   b. 1011    d. 11000    f. 111011    h. 10111    j. 111101

3. Using suggested short cut methods, rename these base ten numbers using binary numerals.
   a. 83    b. 104    c. 41    d. 213    e. 59

4. Add:
   a. 11011
   b. 111111
   c. 100011
   d. 11100
   
   \[
   \begin{array}{c}
   \text{two} \\
   \text{two} \\
   \text{two} \\
   \text{two}
   \end{array}
   \]
   e. 11011
   
   \[
   \begin{array}{c}
   \text{two}
   \end{array}
   \]
   
   Check your accuracy in base ten.

5. Subtract:
   a. 11011
   b. 111111
   c. 100011
   d. 11100
   
   \[
   \begin{array}{c}
   \text{two} \\
   \text{two} \\
   \text{two} \\
   \text{two}
   \end{array}
   \]
   e. 11011
   
   \[
   \begin{array}{c}
   \text{two}
   \end{array}
   \]

6. Multiply:
   a. 111
   b. 1001
   c. 1110
   d. 110111
   
   \[
   \begin{array}{c}
   \text{two} \\
   \text{two} \\
   \text{two}
   \end{array}
   \]
   e. 11101
   
   \[
   \begin{array}{c}
   \text{two}
   \end{array}
   \]
C. Base Five

EXERCISES

1. Count from 50 to 100 using base 5 numerals.

2. What decimal numbers are represented by the following base 5 numerals?
   a. 31  b. 24  c. 420  d. 12  e. 103
      five  five  five  five  five
   f. 2133
      five

3. Rename the following decimals with base 5 numerals:
   a. 73  b. 124  c. 346  d. 47  e. 625  f. 160

4. Add:
   \[
   \begin{array}{cccccc}
   & 30 & 42 & 123 & 403 & 341 \\
   +24 & +13 & +422 & +241 & +123 \\
   \hline
   & five & five & five & five & five
   \end{array}
   \]

5. Subtract:
   \[
   \begin{array}{cccccc}
   & 32 & 40 & 204 & 341 & 4024 \\
   -23 & -14 & -112 & -123 & -1231 \\
   \hline
   & five & five & five & five & five
   \end{array}
   \]

6. Multiply:
   \[
   \begin{array}{cccccc}
   & 40 & 32 & 242 & 312 & 223 \\
   \times 24 & \times 14 & \times 32 & \times 103 & \times 341 \\
   \hline
   & five & five & five & five & five
   \end{array}
   \]
UNIT XIII
REFUELING THE BRAIN

A. Whole numbers and fractions

In each problem show the number of times both the denominator and numerator are exactly divisible by the numbers 2, 3, 5, and 7, and then write the fractions in lowest terms.

1. Divisible

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Divisible</th>
<th>Lowest Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\frac{12}{16})</td>
<td>2</td>
<td>1/2</td>
</tr>
<tr>
<td>b. (\frac{18}{36})</td>
<td>2</td>
<td>1/2</td>
</tr>
<tr>
<td>c. (\frac{24}{42})</td>
<td>2</td>
<td>4/7</td>
</tr>
<tr>
<td>d. (\frac{54}{135})</td>
<td>2</td>
<td>2/5</td>
</tr>
<tr>
<td>e. (\frac{128}{224})</td>
<td>3</td>
<td>4/7</td>
</tr>
<tr>
<td>f. (\frac{70}{245})</td>
<td>3</td>
<td>2/7</td>
</tr>
</tbody>
</table>

2. Change the following to fractions in lowest terms.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Lowest Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\frac{27}{6})</td>
<td>(\frac{9}{2})</td>
</tr>
<tr>
<td>b. (\frac{14}{35})</td>
<td>(\frac{2}{5})</td>
</tr>
<tr>
<td>c. (\frac{10}{16})</td>
<td>(\frac{5}{8})</td>
</tr>
<tr>
<td>d. (\frac{77}{10})</td>
<td>(\frac{77}{10})</td>
</tr>
</tbody>
</table>

3. Solve:

<table>
<thead>
<tr>
<th>Expression</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (7 \frac{2}{3} + 9 \frac{3}{4} + 11 \frac{1}{2})</td>
<td>(25 \frac{1}{2})</td>
</tr>
<tr>
<td>b. (\frac{9}{10} + \frac{7}{12} + \frac{5}{4} + \frac{2}{3})</td>
<td>(4 \frac{11}{60})</td>
</tr>
<tr>
<td>c. (12 \frac{1}{12} + 24 \frac{1}{24} + 36 \frac{1}{36})</td>
<td>(38 \frac{1}{2})</td>
</tr>
<tr>
<td>d. (8 + \frac{7}{4} + \frac{8}{3} + \frac{7}{2})</td>
<td>(16 \frac{1}{12})</td>
</tr>
<tr>
<td>e. (14 \frac{3}{4} + 30 \frac{1}{2} + 4)</td>
<td>(50 \frac{7}{4})</td>
</tr>
<tr>
<td>f. (\frac{4}{5} + \frac{5}{6} + \frac{7}{10})</td>
<td>(2 \frac{5}{30})</td>
</tr>
</tbody>
</table>
4. A golfer drives a ball 180 3/4 yds., 253 7/8 yds., 33 1/3 yds., and then putts 2 5/8 yds. How many yards was the ball played?

5. Find the difference of the sum of 7 7/8 and 3 3/4, and the sum of 2 1/5 and 4 1/2.  
   a. sum
   b. sum
   c. difference

6. A fountain pen and pencil set sells for $7.50. The pen sells for 2/3 of the price of the set.  
   a. What fractional part does the pencil sell for?  
   b. How much does the pencil sell for?

7. How much will 55 1/2 feet of wire cost at 3/40 per foot?

6. Solve each:  
   a. 6 x 2/3 = ____________  d. 6 7/8 x 22 = ____________  
   b. 5/8 x 4/15 = ____________  e. 4 2/4 x 5 1/4 = ____________  
   c. 8 5/8 x 2/3 = ____________  f. 3/5 x 2/3 x 5/8 = ____________

9. A man drove 220 miles in 6-2/3 hours. What was his average speed per hour?

10. Solve:  
    a. Divide 7/8 by 7/16 = ____________  
    b. Divide 4 1/16 into 15 = ____________  
    c. 4 1/2 + 6 1/4 = ____________

11. A reciprocal of a number is one divided by that number.  
    Give the reciprocal of:  
    a. 12 =  
    b. 2 1/2 =  
    c. 1/6 =  
    d. 5/4 =  
    e. 3 1/3 =

12. Find the difference between 3 1/3 and its reciprocal.
1. Write in decimal form
   a. One hundred fifty-six millionths
   b. Nineteen ten thousandths
   c. Forty-five and sixty-five hundredths

2. Match the items in Column A with the items in Column B.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>.1</td>
</tr>
<tr>
<td>b.</td>
<td>3/4</td>
</tr>
<tr>
<td>c.</td>
<td>7/8</td>
</tr>
<tr>
<td>d.</td>
<td>.625</td>
</tr>
<tr>
<td>e.</td>
<td>.125</td>
</tr>
<tr>
<td>f.</td>
<td>5/6</td>
</tr>
<tr>
<td>g.</td>
<td>.16</td>
</tr>
<tr>
<td>h.</td>
<td>2/5</td>
</tr>
<tr>
<td>i.</td>
<td>.50</td>
</tr>
<tr>
<td>(1)</td>
<td>.875</td>
</tr>
<tr>
<td>(2)</td>
<td>5/8</td>
</tr>
<tr>
<td>(3)</td>
<td>.4</td>
</tr>
<tr>
<td>(4)</td>
<td>1/6</td>
</tr>
<tr>
<td>(5)</td>
<td>.833</td>
</tr>
<tr>
<td>(6)</td>
<td>1/2</td>
</tr>
<tr>
<td>(7)</td>
<td>1/10</td>
</tr>
<tr>
<td>(8)</td>
<td>1/8</td>
</tr>
<tr>
<td>(9)</td>
<td>.75</td>
</tr>
</tbody>
</table>

3. Change each decimal to a fraction. Show your work.
   a. .34 = __________
   b. .285 = __________
   c. .005 = __________
   d. .375 = __________
   e. .0013 = __________

4. Change each fraction to a decimal and round off the result to thousandths.
   a. 4/9 = __________
   b. 7/24 = __________
   c. 7/12 = __________
   d. 2/15 = __________
   e. 3/32 = __________
5. Round off the following:
   a. 35.635 to hundredths
   b. 58.063 to tenths
   c. .0071 to thousandths

6. Solve:
   a. $87 + 362.23 + 23.5 + 316.07 = $
   b. $8.62 + .123 + 7.5 + 75 = $
   c. From 293.3 take 24.61 =
   d. Subtract .917 from 1.1654 =
   e. Take 4.578 from 10.39 =

7. Multiply:
   a. 545 by 39.06
   b. 57.98 by 56
   c. .054 by 1283
   d. .82 and 39.98

8. Divide: Round off to hundredths
   a. 22 by 26
   b. 33.52 by 116
   c. .72 by .9
   d. 87.5 into 76.32

9. Give the following answer in decimal form:
   $14\frac{1}{6} + 12.5 + 128.675 + 15\frac{7}{8} + .50 = $
C. Number Sequence

Exercises

Find the next two terms in each sequence.

1. a. 1 3 5 7 9 ______  ______
    b. 2 4 6 8 10 ______  ______
    c. 45 50 65 70 85 90 ______  ______
    d. 24 23 22 21 20 ______  ______
    e. 75 72 69 66 ______  ______
    f. 1 3 6 10 15 21 ______  ______
    g. \(\frac{1}{2}\) \(\frac{1}{3}\) \(\frac{1}{4}\) \(\frac{1}{5}\) \(\frac{1}{6}\) ______  ______
    h. \(\frac{11}{12}\) \(\frac{12}{13}\) \(\frac{13}{14}\) \(\frac{14}{15}\) ______  ______
    i. \(\frac{25}{4}\) \(\frac{22}{6}\) \(\frac{19}{8}\) \(\frac{16}{10}\) ______  ______
    j. \(\frac{3}{4}\) \(\frac{6}{7}\) \(\frac{12}{10}\) \(\frac{24}{13}\) \(\frac{48}{16}\) ______  ______

2. Find the sum of the first 6 terms of the above sequences:
   a. c. e.
   b. d. f.

Note: A sequence in which each term is obtained by adding or subtracting the same number to the previous term is an arithmetic progression.

3. Which of the sequences above are arithmetic progressions?
Exercises

List the next 2 terms of the following "special" progressions.

1. a. 2, 4, 8, 16, 32, 64, ...
   b. 3, 9, 27, 81, ...

2. Find 2 more terms at the beginning and 2 at the end of each "special" progression.
   a. ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ___,__
D. Percentage

Exercises

1. Change the following decimals to per cents.
   a. .03
   b. .2
   c. .0025
   d. .0825
   e. .004
   f. .076
   g. .125
   h. .2468
   i. .005
   j. .004

2. Change the following per cents to fractions.
   a. 7 1/2%
   b. 125%
   c. 5%
   d. 8.1%
   e. 1/4%
   f. 309%
   g. _____
   h. 7 3/7%

3. Jack puts 1/4 of his allowance into savings bonds each week. What % of his allowance does he save? ______________

4. Jerry got 4/5 of his math test correct. John got 85% on his test. a. Which had the higher mark? ______________
   b. What was Jerry's mark? ______________

5. Find:
   a. 7% of 152
   b. 15% of 90
   c. 20% of $65
   d. 40% of 2.5
   e. 125% of 1264 ft.
   f. 200% of $560
   g. 18% of 4.15
   h. 3.2% of 193
   i. 1/4% of 800
   j. 3/11% of 300

6. Find what per cent one number is of another.
   a. 12 is _____ % of 16.
   b. 32 is _____ % of 48.
   c. 88 is _____ % of 160.
   d. 36 is _____ % of 192.
   e. 13 lbs. is _____ % of 175 lbs.
7. Find the whole number when a per cent is known:
   a. \(24 = \frac{1}{3}\% \text{ of } \)______
   b. \(46 \text{ is } 10\% \text{ of } \)______
   c. \(72 \text{ is } 60\% \text{ of } \)______
   d. \(45 \text{ is } 50\% \text{ of } \)______
   e. \(100 \text{ is } 10\% \text{ of } \)______

8. Fill in the blanks.
   a. On a test Joe got 12 examples correct out of 15. The percent of examples he got correct was ______%.
   b. A seaman was told that he was 20\% overweight. If he weighs 180 lbs., he must lose ______ lbs. before he is acceptable.
   c. A dealer's commission on an automobile was 27\% of its sale price. The dealer earned ______ by selling a car for $1452.
   d. A salesman earned $58 a week when working on a commission of 35\% of his sales. His total sales were ________.
   e. A study showed that an important firm was 20\% overstaffed. If it employed 720 people, the firm would have to dismiss ______ employees.
   f. During a recent year a hardware store collected all but 9/10\% of its total sales of $95,000 dollars. _______ amount of money was not collected.
   g. A clerk's weekly salary was raised from $20 to $24. This was a ______ percent increase.
   h. Of $690 collected for charity, 7/8\% was used to pay expenses. ______ was actually used for charity.
   i. A camera priced at $27.50 was sold for 80\% of this price, the camera sold for ______.
   j. The price of eggs increased from $ .26 per dozen to $ .54 per dozen, which was a ______ percent increase.
9. One of the answers is correct. Put the number which corresponds to the correct answer in space provided at left.

   a. The sugar content of strawberries is equal to 52.7% of their weight. 50 lbs. of strawberries would have a sugar content of: (1) 264% (2) 26.3 1/2% (3) 2.63% (4) 2635% (5) None

   b. During a sale a merchant sold 159 shirts or 75% of the shirts in stock. The number of shirts he had before the sale was: (1) 2.12 (2) 12100 (3) 21.2 (4) 212 (5) None

   c. If 35% of a number is 70, the number is: (1) .200 (2) 200 (3) 2.00 (4) 20 (5) None

   d. It was found that 5 out of each 1000 ships which were convoyed in the Pacific were sunk. The percentage sunk was: (1) .5% (2) 5% (3) .005% (4) 500% (5) None

   e. While at target practice a gunner made 27 hits out of 32 shots. The percentage of hits was: (1) 84 4/9% (2) .84% (3) 8.4% (4) .084% (5) None

   f. In an insurance company which employs 2700 people 165 absentees were reported one day. The percent of absentees reported on that day was: (1) .6 1/9% (2) 6 1/9% (3) .06 1/9% (4) .05 5/9% (5) None

   g. There are 960 pupils in Childress School. 55% can swim. The number that can swim is: (1) 528 (2) .528 (3) 5.28 (4) 52.8 (5) None

   h. The average price of tomatoes last fall was $3.20 per bushel. This year it is $2.30 per bushel. The percent of decrease is (1) .028% (2) .28% (3) 28 1/8% (4) 2.8% (5) None

   i. A bank charged .2% to collect a bill of $1680. The cost of collection was: (1) $33.60 (2) $.33 (3) $37. (4) $3.36 (5) None

   j. A student practiced shooting fouls in basketball. If he shot 14 out of 24 shots, the percent of his successful shots was: (1) 58 1/3% (2) 33 1/3% (3) 66 2/3% (4) 50 2/3% (5) None
E. Sharpie Section

Exercises

1. Can you place ten trees in ten rows, each row having three trees and each tree in three different rows?

2. Draw 4 straight lines through 9 dots (as shown) so as to cross out every dot. No dot can be crossed out twice, no line retraced, nor can the pencil be lifted from the paper until all 9 dots have been crossed out.

```
   .
  .  .
 .    .
```

3. Cut it out then answer the questions.

```
2"  2"  1"
```

Can you make a square using all 5 pieces?
Can you make a square using only 4 pieces?

4. Multiply:

\[
\begin{align*}
12345679 \times 9 &= \\
12345679 \times 18 &= \\
12345679 \times 27 &= \\
12345679 \times 36 &= \\
12345679 \times 45 &= \\
12345679 \times 54 &= \\
12345679 \times 63 &= \\
12345679 \times 72 &= \\
12345679 \times 81 &= \\
\end{align*}
\]

Is there anything unusual about the answers you get? How are they related to the multiplier in each case?

5. 

\[
\begin{align*}
1 + 2 + 1 &= 2^2 \\
1 + 2 + 3 + 2 + 1 &= 3^2 \\
1 + 2 + 3 + 4 + 3 + 2 + 1 &= 4^2 \\
\end{align*}
\]

Can you continue this pattern until you reach $10^2$? Can you explain the pattern and its relation to the result?
6. 123456789 x 3 =
    123456789 x 30 =
    123456789 x 57 =
    123456789 x 6 =
    123456789 x 33 =
    123456789 x 60 =
    123456789 x 12 =
    123456789 x 39 =
    123456789 x 66 =
    123456789 x 21 =
    123456789 x 48 =
    123456789 x 75 =

Multiply these problems.
Is there anything unusual about the answers?
Find the sum of the answers in each group and compare answers to multipliers.

7. Biblical Arithmetic:
   a. Take the number of commandments.
   b. Add the number of letters in the name of the man who received them.
   c. Subtract the number of Jacob's sons.
   d. The result will be the number of patriarchs.

8. Political Arithmetic:
   a. Take the number of states in U.S.
   b. Subtract the number of Senators from each state.
   c. Subtract the number of original colonies.
   d. Produces the number of Presidents of U.S. to date.

9. Sporty Arithmetic:
   a. Take the number of men on a football team.
   b. Add the number of men on a baseball team.
   c. Divide by the number of men on a basketball team.
   d. Add the number of men on an ice hockey team.
   e. Your answers will be the number of men on a softball team.

10. Arrange the following units of measure in order of length from the smallest to the largest:
    a. inch  b. cable
    c. fathom  d. furlong  e. yard  f. rod  g. hand
    h. centimeter  i. nautical mile  j. cable length.
11. Use all of the elements of the set \( \{1, 2, 3, \ldots, 9\} \). Arrange them around the triangle so that there is exactly 4 numbers on each side that total 17 in any direction. Do not repeat a number. (Can you find more than one solution?)

A farmer wants to plant a tree in a square plot. He wants it planted 30' from one corner, 40' from another corner, and 50' from another corner. How big is the square?

13. Provide the answers to the last three problems based on the pattern shown in the first three.

\[
\begin{array}{ccc}
11 & 111 & 1111 \\
\times11 & \times111 & \times1111 \\
121 & 1234,321 & 11111,111111
\end{array}
\]