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ABSTRACT Reflecting concern with the nationwide decline in basic skills mastery, the 1975 statewide basic skills tests of the New Jersey Educational Assessment Program (NJEAP) were used to assess the relative performance of college bound seniors. The results of a random 10% sample of the 55,000 students in college preparatory programs were compared with the results of the 93,000 students taking the test statewide. College preparatory student results were higher than the total state scores for all reading and mathematics items and approximated the results in the school districts with the highest socioeconomic status. The results indicated that college preparatory students mastered most of the basic skills concepts in reading and mathematics as measured by the statewide tests. However, the NJEAP may not be a good predictor of college performance, since other tests administered by New Jersey colleges to their students show that 30-50% of college students are deficient in the basic skills of reading and mathematics. (Author/CP)

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ED146234

# BASIC SKILLS MASTERY OF NEW JERSEY'S COLLEGE BOUND STUDENTS

# Occasional Papers in Education

BY:

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE, NATIONAL INSTITUTE OF EDUCATION

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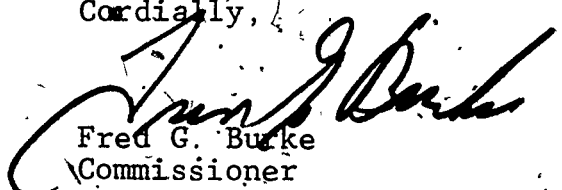
## PREFACE

I am pleased to present the first in a series of papers to be published by the New Jersey State Department of Education. Entitled "Occasional Papers in Education," this publication will concern itself with topics pertinent to the education community.

For the first paper in the series, we have selected "Basic Skills Mastery of College Prep Students." This report deals with the much publicized topic of the reading and mathematics basic skills mastery levels of those New Jersey high school seniors who are in College Preparatory programs. This paper is particularly interesting and timely in light of the enactment of both the Thorough and Efficient and Minimum Standards Legislation.

I hope that this paper and the entire "Occasional Papers in Education" series will prove to be beneficial and informative for everyone concerned with education.

Cordially,



Fred G. Burke  
Commissioner

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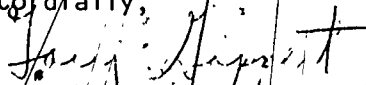
Dear Colleague:

One facet of the role of the Research, Planning, and Evaluation Division of the New Jersey State Department of Education is aimed at initiating and generating thoughtful and thought provoking ideas concerning education.

With this goal in mind the "Occasional Paper in Education" series has been developed. Papers to be included in this series will touch on the major issues facing education today--the "Thorough and Efficient" educational act, curriculum innovations, basic skills, future thoughts, etc.

I am certain that the members of the educational community will find this "Occasional Papers in Education" informative and interesting. I welcome your comments, suggestions and, most of all, papers for inclusion in this series.

Cordially,

  
Gary Gappert  
Assistant Commissioner  
Division of Research, Planning  
and Evaluation.

## Executive Summary

The decline in basic skills mastery has raised some serious doubts concerning the academic abilities of college bound twelfth grade students.

To determine how twelfth grade students in New Jersey public schools were performing on the 1975 Educational Assessment Program's Statewide Tests in reading and mathematics, the results of a completely random 10% sample of students in College Prep programs were compared with the results of all students throughout the state taking the test.

In general, the College Prep group performed at a superior level to the remainder of the state. The College Prep results were higher than the State scores for all reading and mathematics items, and approximated the results of students in the highest socioeconomic grouping of school districts.

The results indicate that the College Prep group of students are mastering most of the basic skills concepts in reading and mathematics as measured by the Statewide tests.

The decline in basic skills mastery has raised some serious doubts concerning the academic abilities of college bound twelfth grade students.

Much research has evidenced the fact that there has been a drastic decline in basic skills mastery during the past decade. In 1974-75, the mean Scholastic Aptitude Test (SAT) scores in verbal and mathematics were 10 and 8 points lower, respectively, than scores attained by seniors the previous year, and 44 and 30 points lower, respectively, than those earned by SAT takers in 1963. The 1974-75 SAT mean scores reflected the largest total decline in two decades. For New Jersey SAT test takers, the 1974-75 mean math SAT score (454) was 18 points lower than the national mean (472). The mean verbal score for New Jersey SAT takers (424) was 10 points lower than the national mean (434) for that same year.

Fullilove (1976) concluded from the decline in SAT scores that 1) because the drop was present among all groups of SAT takers (women, men, whites, blacks, low as well as high socioeconomic status (SES) students), the losses were the result of a general decline in the verbal and mathematical reasoning abilities of high school students; 2) because the SAT purports to measure verbal and mathematics skills, low SAT scores may be symptomatic of a possible skills deficiency; 3) because of the overabundance of low SAT scoring college bound students, public institutions would not be able to avoid enrolling large numbers of low SAT scorers.



However, the Scholastic Aptitude Test is but one means by which basic skills mastery can be measured. Many other national and statewide instruments exist that effectively measure basic skills knowledge. In New Jersey, the Educational Assessment Program's Statewide testing program (NJEAP) is used to determine basic skills mastery in reading and mathematics. The NJ Statewide tests are administered annually to all public school children in grades 4, 7, and 10, and every three years in grade 12. The results of this statewide test can be used as another indicator of the strength and weaknesses of New Jersey's college bound twelfth grade students.

Each student taking the twelfth grade Statewide Test is asked a series of general information questions concerning the student's past educational experiences, the amount of mathematics preparation the student has had, and the student's present high school program. From the general information questions on the 1975 NJEAP twelfth grade test, 55,167 twelfth grade students (59.3% of the 93,039 students who were administered the instrument) reported that they were in College Preparatory type academic programs.

To determine how this group of College Preparatory students fared on the 1975 twelfth grade Statewide test, the results of a completely random 10% sample of the College Prep students were compared with the results of all students throughout the state taking the test.

Further, to determine to which socioeconomic status (SES) group the college prep students performed equivalently,

the results of the College Prep group were compared to each of the SES groupings established for the N.J. school districts. The school districts of New Jersey have been previously categorized into ten homogeneous groups based on socioeconomic status. These groups, called District Factor Groups (DFG) range from A, the lowest group, to J, the highest group. Two other DFG groups were also established - V containing all Vocational-Technical School districts and Z containing all school districts for which no 1970 census information was available (and hence for which no measure of SES was attainable).

All comparisons were made on an item-by-item basis, as the Statewide test is a criterion referenced test. All results from the test are presented as the percent of students in the particular group who correctly answered each particular item.

The College Prep, total state and DFG reading and mathematics results are presented in Appendix A.

The Statewide tests are arranged according to "clusters" of homogeneous items. The twelfth grade reading test contains three clusters, word recognition, reading comprehension and study skills. The mathematics test has six clusters - whole numbers, fractions, decimals and percent, algebra, geometry and measurement, and problem solving.

Table I (reading) and Table 2 (mathematics) present the frequency of item percent correct for each cluster for the College Prep group.



TABLE I

Frequency of Percent Correct Scores by Clusters  
for College Prep Students  
for Reading<sup>1</sup>

Percent Correct	Word Recognition	Reading Comprehension	Study Skills
100	0	0	0
95-99	5	5	5
90-94	8	5	8
85-89	5	6	2
80-84	2	5	1
75-79	0	7	1
70-74	0	5	0
65-69	0	3	3
60-64	0	1	0
55-59	0	0	0
50-54	1	1	0
45-49	1	0	0

TABLE 2

Frequency of Percent Correct Scores by Clusters  
for College Prep Students  
for Mathematics

Percent Correct	Whole Numbers	Fractions	Decimals/ Percent	Algebra	Geometry/ Measurement	Problem Solving
100	0	0	0	0	0	0
95-99	8	1	1	2	2	3
90-94	4	3	3	7	3	5
89-89	0	4	2	1	3	1
80-84	2	2	2	3	2	2
79-79	0	0	1	2	1	1
70-74	0	5	6	0	2	1
69-69	0	0	1	0	2	2
60-64	0	0	0	0	0	1
59-59	0	0	0	0	0	0
50-54	0	0	0	0	0	0
45-49	0	0	0	1	0	0

<sup>1</sup> The entries in Table 1 to Table 4 are the number of items. For example, in Table 1, 90-94% of the College Prep sample correctly answered eight of the Word Recognition items; 80-84% of the students correctly answered 2 Word Recognition items. The information in Table 2-4 is described similarly.

In general, the College Prep group performed very well. For 36 of 80 (45%) reading questions and 40 of 90 (44.4%) mathematics items, the percentage correct for the College Prep group was 90% or greater. For only 10 reading questions (12.5%) and 7 mathematics items (7.8%) was the percentage correct less than 70%.

In all 80 reading items and 90 mathematics items, the College Prep percentages were higher than the State percentages.

Table 3 (reading) and Table 4 (mathematics) list further breakdowns of the results of the college preparatory group. These tables list, by cluster, the frequency by which each College Prep group item percentage correct surpassed that of the Statewide item percentage (In all items, the College prep result was higher than statewide). For example, for 11 items in Reading Comprehension, the College Prep percentage exceeded the statewide percentage by 9-10 points.

TABLE 3.

Frequency by Which College Prep Percentages Exceed State Percentages for Reading

Difference in Percent	Word Recognition	Reading Comprehension	Study Skills
1-2	3	2	1
3-4	3	3	7
5-6	5	5	5
7-8	4	11	5
9-10	4	11	0
11-12	3	6	1
13-14	0	0	1
15-16	0	0	0
17-18	0	0	0
19-20	0	0	0
> 20	0	0	0
TOTAL	22	38	20

TABLE 4

Frequency by Which College Prep Percentages  
Exceed State Percentages for Mathematics

Difference in Percent	Whole Numbers	Fractions	Decimals/Percent	Algebra	Geometry/Measurement	Problem Solving
1-2	4	0	0	0	1	2
3-4	6	0	0	1	0	2
5-6	2	2	1	1	0	3
7-8	2	0	4	1	3	2
9-10	0	2	3	5	2	2
11-12	0	6	6	2	3	3
13-14	0	4	0	0	0	1
15-16	0	1	2	3	2	1
17-18	0	0	0	1	1	0
19-20	0	0	0	2	0	0
> 20	0	0	0	0	1	0
TOTAL	14	15	16	16	13	16

For 46 reading items (52.5%) and 65 mathematics items (72.2%) the College Prep result exceeded the State result by more than 6 percentage points. For 11 reading items (13.8%) and 39 mathematics items (43.3%), the difference was greater than 10 points.

When comparing the college prep results to that of each DFG's results, it was determined that for 76 of the 80 reading items (95%) and 72 of the 90 mathematics items (80%), the College Prep percentage more similarly reflected the percentage of DFG J, the highest SES group and also, the highest achieving group. The four reading items which did not approximate DFG J were most similar to DFG I, the next highest group. Of the 12 mathematics items 10 were most similar to DFG I and the other two to DFG H (the third highest group).

Table 5 presents the average cluster percentages for both the College Prep group and the state as a whole. The figures in the table represent the average percent correct for all of the items within a cluster. For example, for the College Prep group, on the average, 88.7% of the students correctly answered each item within the Word Recognition cluster.

It is readily apparent from Table 5 that the mastery levels of the College Prep group are much superior to the statewide mastery levels. The only mastery level below 80% for the College Prep students was in the area of Decimals/ Percents. The students performed best in Whole Numbers, Word Recognition and Study Skills.

Appendix B presents an item analysis of the results of the College Prep group for reading and mathematics.

TABLE 5  
College Prep and Statewide Mastery Levels

Cluster	College Prep	Statewide
Word Recognition	88.7%	82.1%
Reading Comprehension	81.6%	73.6%
Study Skills	88.6%	82.7%
Whole Numbers	93.1%	89.3%
Fractions	82.9%	71.6%
Decimals/Percent	79.9%	70.3%
Algebra	85.6%	73.1%
Geometry/Measurement	81.9%	70.5%
Problem Solving	84.1%	76.3%

In general, the result of the 1975 Statewide Testing program for those students who are pursuing College Prep programs and are for the most part those students who will be attending college in the Fall, 1976, are not supportive of the claim that there is a deficiency in basic skills mastery. The College Prep results clearly indicate that this group of students are mastering most of the basic skills concepts in reading and mathematics as measured by the NJEAP. These students are exhibiting a greater mastery level in all areas than statewide (and in some instances by a great deal), and in most cases, their results are comparable to those of the highest SES group.

However, the colleges in New Jersey have used both commercial and internally developed tests to assess their students. The results of these tests indicate that from approximately 30-50% of the students are deficient in basic skill areas of reading and mathematics.

An explanation for the contradictory results between the college administered tests and the NJEAP may concern that which the NJEAP measures. The NJEAP reading and mathematics tests measure minimum skills achievement levels which may be below the level required for satisfactory performance in college. The NJEAP may not be a good prediction of college performance.

There will be initiated within the coming year a joint effort by the New Jersey Department of Education and the Department of Higher Education to analyze the relationship between the NJEAP and college performance in New Jersey.

Additionally, as a consequence of the enactment of the law establishing minimum standards, the content of the NJEAP will be scrutinized and possibly changed for the coming years.



A P P E N D I X A .

STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: WORD RECOGNITION

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP	
1	Synonyms	90	79	86	90	92	92	93	93	93	95	96	85	93	96	
2		89	80	86	88	89	89	91	91	92	93	93	81	86	94	
3		86	79	83	85	86	86	88	87	89	91	92	80	84	93	
4		85	71	80	83	84	85	88	87	90	91	92	74	85	91	
5		74	58	67	72	75	73	76	77	80	81	84	60	70	82	
55	Antonyms	84	65	78	82	85	85	88	88	89	92	93	72	84	93	
56		71	60	66	68	69	70	73	72	75	78	80	59	65	81	
57		80	66	75	77	79	80	83	84	84	86	89	90	66	82	91
58		82	72	78	81	81	82	84	84	86	88	89	72	80	90	
59	Analogies	43	34	38	40	42	43	44	46	46	51	54	34	33	51	
6		79	58	72	75	80	80	84	83	86	89	90	65	79	89	
7		89	75	87	89	91	92	93	93	93	92	94	94	86	93	
8		91	83	88	89	92	92	91	93	92	93	94	94	84	92	95
9		75	56	69	70	75	75	75	80	78	79	84	85	63	74	85

STATE OF NEW JERSEY DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: WORD RECOGNITION (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
28	Context clues	95	89	94	94	96	96	96	96	97	97	97	92	95	97
29		95	93	95	94	95	95	96	96	96	96	97	93	93	97
30		93	85	91	92	94	94	95	95	96	96	97	87	90	98
31		95	91	93	94	95	95	96	96	96	97	98	90	93	98
32		87	78	83	86	88	87	89	89	90	91	92	79	81	93
33		88	78	85	87	89	88	91	90	92	93	94	77	86	95
34		88	86	88	88	87	88	88	88	88	89	90	85	89	90
35		48	35	42	41	45	46	50	50	54	58	63	36	48	59

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STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: READING COMPREHENSION

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
17	Identify main idea	75	61	69	72	75	74	78	78	80	83	85	60	79	85
23		70	61	66	68	71	70	73	71	72	75	77	61	69	88
43		80	69	77	78	81	79	82	82	83	85	88	70	76	87
49		69	63	67	68	69	69	71	70	70	74	77	62	65	79
68		76	64	73	73	76	76	80	79	80	82	85	63	74	85
75		66	56	63	63	66	66	68	67	69	71	72	55	65	73
15	Supporting details	94	89	92	93	95	94	95	95	95	96	96	91	93	97
16		92	86	91	91	93	92	94	94	94	95	95	90	90	95
18		92	91	92	91	92	92	93	93	93	93	94	89	92	94
21		83	74	80	81	83	83	85	84	86	87	89	75	82	90
24		62	58	62	62	62	63	65	62	63	64	66	55	65	67
26		59	45	54	55	57	59	62	61	63	67	71	44	54	71
44		91	87	89	89	90	90	92	91	92	93	94	84	87	96
45		86	79	83	84	85	85	87	87	88	89	92	76	79	93
50		74	62	70	72	74	74	76	76	78	81	84	61	75	85

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STATE OF NEW JERSEY, DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: READING COMPREHENSION (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
51	Supporting details	73	60	69	70	73	73	76	75	77	80	82	61	74	84
52		73	63	69	71	72	73	75	76	77	80	82	61	69	83
76		61	52	57	58	59	60	64	63	64	66	69	46	63	69
77		84	78	83	83	83	84	87	87	86	88	90	72	79	93
78		81	75	79	79	80	81	83	83	83	85	88	70	75	89
25	Make inferences	53	41	48	49	51	51	55	54	56	60	64	41	50	63
46		78	69	76	75	77	78	80	80	81	82	85	69	76	85
69		67	58	65	64	67	66	69	69	70	73	77	56	66	77
80		65	59	62	61	62	63	67	67	67	69	71	53	59	73
48	Drawing conclusions	48	40	46	47	49	49	49	50	50	53	53	41	45	53
73		75	63	71	71	74	75	77	78	78	80	85	62	71	84
79		57	46	51	53	56	56	59	59	60	64	67	43	51	67
19	Sequence of events	61	45	57	58	61	61	65	63	66	68	70	48	54	72
20		86	80	83	84	86	85	87	87	88	88	90	78	81	91

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STATE OF NEW JERSEY DEPARTMENT OF EDUCATION

Division of Research, Planning and Evaluation

Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: READING COMPREHENSION (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
53	Sequence of events	72	60	68	69	71	73	74	74	76	79	83	61	68	84
71		62	50	58	58	62	63	66	65	65	69	72	48	59	73
27	Recognize tone	91	87	90	89	91	92	92	92	92	93	94	86	89	95
47		77	66	73	75	77	77	80	80	81	81	83	69	74	84
54		68	61	64	65	67	67	69	70	71	73	75	62	66	75
22	Applying information	70	56	66	68	70	69	73	73	75	77	79	61	68	79
74		67	54	63	64	66	67	70	70	71	74	78	53	66	79
70	Cause, effect	89	83	87	87	89	88	90	90	91	92	94	80	87	95
72		69	59	65	66	68	69	71	70	72	75	78	56	62	79

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STATE OF NEW JERSEY DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: STUDY SKILLS

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
10	Dictionary skills	63	55	62	62	63	65	66	64	64	65	67	59	65	67
11		86	75	84	84	88	87	89	89	88	91	92	79	87	93
66	Reference books	77	59	69	73	77	78	79	81	83	86	89	60	74	88
67		89	82	86	86	89	89	90	90	91	92	93	83	88	94
60	Card catalog	83	80	82	82	84	83	84	84	85	85	85	82	80	87
61		61	46	57	56	59	61	63	64	68	70	71	45	63	69
62		54	35	44	49	51	54	58	57	62	66	71	34	50	67
36	Chart	94	88	93	93	94	94	96	95	95	96	96	89	90	97
37		90	84	88	88	90	89	91	91	91	92	93	86	87	94
38		92	88	91	91	93	93	94	93	93	94	94	90	90	95
39		86	75	83	85	88	87	89	89	89	91	92	78	83	93
12	Map	73	63	70	71	73	74	76	75	75	78	78	69	76	78
13		86	72	83	83	88	87	89	88	89	91	92	82	87	92
14		95	91	95	95	96	96	96	96	96	97	97	94	95	98

STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - READING

CLUSTER: STUDY SKILLS (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
63	Index	86	78	84	84	87	87	88	88	89	90	91	79	82	92
64		86	77	84	84	86	87	88	88	89	91	92	76	81	94
65		75	66	73	72	76	76	76	76	77	79	81	63	74	83
40	Table of contents	97	94	97	96	97	98	98	98	98	98	98	96	97	99
41		94	89	93	94	95	95	96	96	96	97	97	92	93	98
42		87	78	84	84	87	88	90	88	90	91	92	81	84	93

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Division of Research, Planning and Evaluation

Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: WHOLE NUMBERS

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
1	Addition with no carrying	96	96	96	96	96	96	97	97	97	97	97	95	97	97
61	Addition with carrying	88	87	88	88	88	88	88	88	89	88	89	85	89	90
65		93	91	92	92	93	93	93	94	93	94	94	89	92	95
3	Subtraction with no borrowing	97	96	96	97	97	97	97	97	97	97	97	96	96	98
34	Subtraction with borrowing	93	91	92	92	93	93	93	94	94	94	95	89	92	96
37		92	89	90	91	92	92	93	93	93	93	93	86	91	95
32	Multiplication of two and three-digit numbers	89	88	88	88	89	89	90	89	90	91	91	82	81	94
6	Multiplication: zero	91	88	90	90	92	92	92	92	92	93	93	88	92	96
36	Division: one-digit divisor with no remainder	93	90	91	92	93	93	93	93	93	94	95	87	93	97
47	Division: two-digit divisor with no remainder	72	69	71	72	72	73	73	72	72	74	75	64	66	80
75	Division: one and two-digit divisor with remainder	90	86	88	89	90	90	91	92	90	92	93	84	91	94
2	Properties odd, even	93	86	91	93	94	94	95	95	95	96	96	89	92	97
13	Prime factor multiple	72	62	69	69	72	72	75	74	75	77	78	62	68	80

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STATE OF NEW JERSEY · DEPARTMENT OF EDUCATION

Division of Research, Planning and Evaluation  
Educational Assessment Program

GRADE: TWELVE · MATHEMATICS

CLUSTER: WHOLE NUMBERS (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
8	Rounding	91	82	89	90	93	92	93	93	93	94	94	87	93	91

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STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: FRACTIONS

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
33	Equivalent fractions	78	66	73	75	78	79	80	81	82	84	85	68	79	88
51	Least common denominator	76	67	72	74	76	77	79	77	80	83	83	66	72	87
62	Relative size	88	77	85	86	89	88	90	91	90	92	93	82	88	94
11	Addition and subtraction of proper fractions in vertical format	78	68	72	75	78	78	79	79	81	85	85	66	72	90
66		84	79	81	82	85	85	86	85	86	88	89	78	83	93
4	Addition and subtraction of proper fractions in horizontal format	90	85	89	87	91	89	90	91	91	92	93	86	90	95
49		74	61	67	70	73	74	77	77	79	83	84	61	75	88
78	Addition and subtraction of improper fractions in vertical format	76	68	72	74	76	76	78	78	79	82	83	65	72	88
83	Addition and subtraction of improper fractions in horizontal format	67	52	61	62	65	66	70	70	72	77	79	50	65	82
16	Addition and subtraction of mixed fractions in vertical format	59	48	55	57	61	60	61	61	61	65	67	49	56	71
43		57	45	53	55	58	59	59	59	61	64	66	47	55	70
15	Multiplication and division of whole number by proper fraction	56	46	49	52	55	54	58	58	60	65	67	40	47	70

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STATE OF NEW JERSEY DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: FRACTIONS (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
80	Multiplication and division of whole number by mixed number	69	59	65	67	69	69	71	71	73	75	77	56	67	81
18	Multiplication and division of proper fraction by proper fraction	63	57	58	61	64	62	64	64	65	69	71	49	53	74
85	Multiplication and division of proper fraction by improper fraction	59	49	54	55	58	58	60	61	62	67	69	44	56	72

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STATE OF NEW JERSEY DEPARTMENT OF EDUCATION  
Division of Research, Planning and Evaluation  
Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: DECIMALS/PERCENT

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
14	Equivalence of fractions to decimals	53	36	46	47	51	53	57	56	59	65	67	42	47	69
31	Equivalence of decimals to fractions	82	73	79	80	83	83	85	84	85	87	88	77	83	90
46	Addition of decimals	80	68	74	76	80	81	82	83	84	87	87	73	74	90
74	Subtraction of decimals	74	62	69	69	75	75	76	77	78	81	83	65	67	85
35	Multiplication of decimals	90	85	88	89	91	90	91	91	90	92	92	87	88	95
9	Multiplication of decimals: zero	74	67	69	71	75	74	75	75	76	79	79	68	69	84
77	Division of decimal by whole number	78	74	76	77	77	79	80	80	79	82	83	69	77	86
21	Division of decimals with quotient less than one	64	61	62	61	62	63	64	64	65	67	68	55	67	71
52	Division of decimals by a multiple of ten	63	50	58	60	62	63	65	65	67	70	72	53	59	74
59	Rounding	59	44	54	55	58	59	61	61	63	67	70	50	59	70
40	Conversion of percent to decimal	64	58	61	61	63	64	68	65	65	68	70	59	61	71
81		60	45	55	55	61	61	65	63	64	68	73	51	57	72
63	Conversion of percent to fraction	84	76	80	82	85	85	86	86	86	88	90	79	82	90

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STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: DECIMALS/PERCENT (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
29	Percent of a number	68	58	63	64	66	67	70	69	73	75	77	59	63	79
57	Proportion percent	59	45	52	54	58	59	62	62	64	69	71	50	60	71
90	Whole number from a percent	72	60	68	68	71	72	76	75	76	79	81	62	71	82

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STATE OF NEW JERSEY · DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: ALGEBRA

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
45	Real number line	84	74	79	81	85	85	86	87	89	91	91	72	84	93
50	Operations	82	65	76	78	82	82	85	86	87	90	90	69	82	91
76		74	62	65	68	72	74	76	78	81	86	87	52	70	92
41	Square roots	85	76	79	81	82	84	86	87	90	91	92	75	87	96
24	Integer exponents	81	66	73	76	81	81	85	84	87	91	91	64	82	96
20	Operation principles	67	56	60	62	65	67	69	70	72	78	80	45	62	85
87		64	45	57	58	63	65	68	69	72	77	79	38	61	83
12	Identity elements: one and zero	89	81	86	88	89	90	90	91	91	93	93	82	88	93
26		82	75	78	78	81	82	84	84	86	88	89	70	79	92
82	Additive and multiplicative inverses	36	27	33	32	33	35	38	38	40	44	47	27	40	46
19	Formulas	61	41	53	54	58	61	64	65	69	74	76	40	54	80
53	First degree equations	89	81	87	87	89	89	91	91	92	93	93	83	89	94
89	Combining terms	63	48	57	56	61	63	66	66	70	73	76	44	60	78
30	Words to symbols	69	55	65	65	68	70	73	72	74	78	78	53	70	81

STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: ALGEBRA (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
58	Simple word problems	80	67	76	77	80	80	83	84	85	87	88	70	82	90
23	Points in a plane	63	51	54	56	61	63	66	65	70	74	76	40	63	79

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STATE OF NEW JERSEY · DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE MATHEMATICS

CLUSTER: GEOMETRY/MEASUREMENT

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
27	Conversion of units within the same system	82	70	78	80	82	83	84	84	86	88	88	74	78	90
44		81	70	78	81	82	81	83	82	83	84	84	79	80	88
79	Addition of denominate numbers with regrouping	74	57	69	73	76	76	79	77	78	81	82	66	84	85
17	Subtraction of denominate numbers with regrouping	73	61	69	72	75	73	77	75	76	78	81	65	77	84
7	Angle measurement	67	48	58	61	64	68	69	71	75	79	82	52	67	84
48	Area measurement	54	33	43	45	50	54	57	57	63	68	70	43	55	70
86	Perimeter	64	48	57	58	61	64	67	67	69	73	76	53	65	74
54	Area and circumference	49	35	42	42	46	50	52	51	56	59	63	38	46	65
72	Types of angles	83	70	76	78	83	83	85	86	88	91	92	75	88	95
73		78	68	74	72	77	78	79	80	81	85	86	70	75	87
10	Geometric relations	96	92	95	94	96	96	96	97	97	97	97	95	95	98
67	Sum angles of triangle	57	37	47	49	53	57	60	62	67	72	76	37	58	79
56	Pythagorean theorem	58	43	54	52	56	57	61	59	63	67	69	47	53	66

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STATE OF NEW JERSEY - DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: PROBLEM SOLVING

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
5	Money	90	87	90	90	91	90	92	91	91	92	92	87	91	94
42		86	79	85	85	87	87	88	88	88	89	90	80	89	92
22	Temperature	90	84	88	89	91	90	92	92	91	93	93	85	90	95
25	Average	83	70	79	81	83	84	85	85	87	88	89	73	82	91
55	Ratio-proportion	70	56	65	68	70	71	74	73	75	77	79	60	66	81
68	) Interpretation of data	63	50	57	59	62	62	66	66	69	71	75	51	57	75
38		89	86	88	87	88	88	89	89	90	90	91	85	87	92
39		48	24	40	41	47	48	53	53	57	61	65	31	46	63
69		96	94	98	96	97	96	97	97	97	97	98	95	97	98
70		94	90	93	93	94	94	95	95	95	95	96	91	96	96
71		78	68	76	75	79	78	81	81	81	82	84	74	79	86
88	Consumer mathematics: interest	65	54	63	62	63	65	68	67	68	71	74	57	65	74
84	Consumer mathematics: sales tax	86	76	84	84	86	87	89	89	88	89	91	78	86	92
60	Consumer mathematics: discount	58	47	53	54	56	58	61	59	62	64	66	47	53	67

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STATE OF NEW JERSEY DEPARTMENT OF EDUCATION  
 Division of Research, Planning and Evaluation  
 Educational Assessment Program

GRADE: TWELVE - MATHEMATICS

CLUSTER: PROBLEM SOLVING (Cont.)

ITEM NO.	CLUSTER	TOTAL	A	B	C	D	E	F	G	H	I	J	V	Z	CP
28	Consumer mathematics: buying	70	60	67	68	70	71	73	73	73	75	78	59	69	81
64		54	38	49	50	53	54	58	57	60	63	67	40	52	68

A P P E N D I X B

CULL PREP (10% SAMPLE)

(\* INDICATES THE CORRECT RESPONSE)  
(CHOICES: 0=OMIT 1=A 2=B 3=C 4=D)

ITEM ANALYSIS (PERCENTAGES)

SUBJECT: READ

GRADE: 12

STUDENTS TESTED: 5463

ITEM NUMBER

CHOICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.2
1	95.8*	1.4	93.0*	4.2	0.8	0.2	5.0	1.4	85.2*	88.7*	0.8	78.1*	1.2	0.5	1.9	1.4	7.1	2.4
2	0.8	1.7	0.7	91.2*	3.1	89.4*	93.0*	0.8	0.9	30.1	93.2*	7.0	2.5	97.5*	0.8	2.2	0.0	1.3
3	1.0	3.1	2.7	2.2	82.0*	3.7	0.8	2.3	12.4	2.0	2.7	9.4	4.4	0.9	0.6	95.1*	84.8*	94.3*
4	2.1	93.5*	3.3	1.8	7.2	0.8	1.0	95.4*	1.4	0.4	3.2	5.4	91.9*	0.9	96.7*	1.2	1.8	1.7

ITEM NUMBER

CHOICE	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0	0.2	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.4	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.7	0.0
1	10.1	1.7	2.4	4.3	1.9	87.4*	15.7	5.2	1.7	1.4	97.4*	97.5*	0.8	2.2	3.2	3.2	2.0	1.4
2	13.9	4.8	98.3*	10.3	2.3	8.4	14.0	70.8*	95.2*	0.5	1.1	0.9	0.7	93.1*	1.0	2.5	58.9*	90.8*
3	1.0	2.4	1.9	79.0*	78.1*	21.3	7.1	0.0	1.2	0.7	0.8	0.7	0.4	1.5	1.1	90.3*	4.9	1.4
4	7.2*	91.2*	3.2	8.2	17.3	2.4	82.8*	17.3	1.5	97.4*	0.9	0.9	98.2*	2.9	94.8*	4.0	33.7	0.4

ITEM NUMBER

CHOICE	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
0	0.4	0.1	0.3	0.1	0.3	0.2	0.3	0.2	0.1	0.3	0.2	0.4	0.4	0.2	0.4	0.3	0.5	0.5
1	3.0	4.2	93.0*	0.8	0.8	0.7	87.3*	2.0	4.1	1.8	53.3*	24.8	2.2	5.9	12.3	4.6	3.0	75.2*
2	2.2	0.4	1.2	0.3	97.5*	0.4	3.7	0.9	1.6	85.4*	3.5	52.8*	2.2	1.2	2.9	8.8	3.3	1.8
3	93.0*	95.0*	3.2	0.5	0.9	93.0*	1.4	1.0	92.9*	81.4*	4.0	1.8	78.9*	7.3	83.5*	83.2*	83.8*	7.1
4	0.9	0.3	2.4	98.5*	0.3	5.8	7.3	95.9*	1.3	1.8	8.8	20.2	16.3	85.3*	0.9	2.9	9.6	5.8

ITEM NUMBER

CHOICE	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
0	0.4	0.8	0.8	0.8	0.8	0.2	0.3	0.3	0.4	0.3	0.4	0.8	0.1	0.5	0.2	0.3	0.4	0.4
1	1.7	80.7*	4.8	90.1*	4.3	1.8	8.8	24.2	1.7	0.9	82.5*	3.8	3.6	8.7	18.8	2.1	72.8*	2.3
2	2.7	10.8	2.1	5.4	21.3	89.5*	89.3*	4.5	4.2	1.1	10.5	88.1*	0.8	85.3*	77.0*	2.0	1.9	78.8*
3	2.4	5.7	90.9*	2.2	30.0*	8.4	18.4	67.4*	91.8*	93.5*	3.9	0.7	93.5*	1.3	3.2	94.8*	1.8	14.1
4	92.8*	2.1	1.7	1.4	23.8	3.2	5.4	3.8	1.9	4.3	2.7	1.8	2.0	4.2	1.8	1.1	23.4	4.8

ITEM NUMBER

CHOICE	73	74	75	76	77	78	79	80
0	0.4	0.8	0.5	0.5	0.5	0.8	0.8	0.8
1	84.3*	9.4	14.4	10.9	92.8*	2.9	1.8	18.8
2	0.9	78.9*	72.7*	89.3*	3.8	3.4	8.8	72.5*
3	6.4	4.8	8.3	4.2	2.8	3.9	21.7	8.8
4	2.1	8.4	8.2	15.1	1.3	9.2*	87.1*	4.8

	ITEM NUMBER																	
CHOICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.0	0.7	0.4	0.6	1.1	0.4	1.4
1	1.4	0.0	0.1	1.9	0.0	1.1	7.1	1.0	4.7	0.4	89.5*	0.8	4.1	20.7	7.0	70.7*	1.3	74.2*
2	97.2*	1.4	1.4	1.0	93.7*	2.3	3.0	94.2*	83.7*	1.1	1.4	92.9*	80.1*	2.5	0.8	15.7	5.0	14.6
3	0.7	90.5*	98.2*	94.5*	4.8	95.0*	83.9*	2.8	7.5	0.3	5.2	5.9	9.3	68.5*	15.2	7.4	85.9*	3.7
4	0.0	1.3	0.1	1.8	0.8	0.9	5.1	1.9	3.9	98.1*	3.7	0.4	5.8	7.8	70.4*	5.1	9.4	6.0

	ITEM NUMBER																	
CHOICE	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0	0.5	0.3	0.0	0.1	0.3	0.2	0.2	0.4	0.3	0.6	1.0	0.4	0.2	0.3	0.7	0.1	0.2	0.1
1	44.8	0.8	4.2	2.0	70.9*	0.4	3.2	1.5	2.8	9.3	2.4	81.2*	3.5	2.7	3.5	0.8	0.5	0.5
2	13.9	0.0	3.2	94.9*	1.0	2.0	4.0	4.2	1.9	5.6	0.4	10.9	89.5*	1.0	87.9*	2.2	94.7*	1.0
3	80.0*	1.4	20.0	1.0	17.4	0.9	90.5*	1.0	89.0*	4.0	11.3	6.2	5.8	2.2	3.3	90.1*	4.0	1.3
4	0.7	24.0*	71.3*	1.3	1.0	90.0*	2.1	92.4*	5.2	80.5*	78.9*	1.3	0.9	93.8*	4.6	0.6	0.6	97.1*

	ITEM NUMBER																	
CHOICE	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
0	0.7	0.1	0.2	4.3	0.2	0.4	0.9	0.4	0.1	0.2	0.4	0.3	0.3	0.2	0.0	0.5	0.3	2.0
1	1.0	0.7	62.8*	8.1	95.7*	1.5	7.1	87.7*	93.4*	3.3	80.4*	3.9	8.6	4.2	1.7	7.1	1.4	5.4
2	95.4*	0.0	34.8	70.7*	1.9	1.9	6.5	5.2	2.7	3.2	3.8	1.0	1.9	91.4*	80.6*	74.3*	3.7	23.5
3	0.9	0.7	0.9	15.9	1.0	91.7*	15.9	1.9	0.5	3.5	14.2	24.0	87.7*	2.1	4.4	12.3	94.2*	64.5*
4	2.5	92.1*	1.3	3.9	1.3	4.5	69.0*	4.8	3.4	89.8*	1.3	70.2*	1.5	2.1	6.7	5.6	0.4	4.7

	ITEM NUMBER																	
CHOICE	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
0	0.4	0.0	1.3	0.0	0.7	1.0	0.1	0.2	0.2	2.0	0.1	0.4	0.3	0.4	0.1	0.1	0.3	0.3
1	11.3	4.2	10.9	89.7*	5.4	8.1	0.0	93.9*	4.8	68.1*	1.5	2.4	11.2	75.0*	0.3	0.7	85.0*	1.8
2	2.0	0.4	15.7	2.7	10.5	07.4*	8.0	3.5	90.3*	9.4	95.4*	1.3	0.1	5.7	0.5	90.3*	1.0	1.3
3	4.8	20.1	70.6*	5.0	70.4*	22.2	89.9*	1.9	2.0	11.0	2.3	3.0	3.7	15.4	98.4*	2.4	11.0	1.5
4	81.0*	0.4	1.4	1.2	12.9	1.3	1.4	0.5	2.8	9.5	0.7	92.8*	78.8*	3.4	0.7	0.5	0.9	95.1*

	ITEM NUMBER																	
CHOICE	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
0	0.4	0.4	0.4	0.1	0.4	0.7	0.4	0.0	0.4	0.9	0.0	0.4	1.2	0.5	0.6	1.4	0.7	0.0
1	7.1	85.3*	2.0	91.7*	1.0	88.1*	3.0	4.4	2.8	2.2	1.0	0.4	1.2	0.5	0.6	1.4	0.7	0.0
2	40.9*	0.3	94.4*	1.0	7.1	2.9	10.0	0.0	72.2*	42.8*	12.1	91.9*	13.9	13.5	4.9	10.1	70.4*	12.1
3	4.0	3.1	2.1	4.4	4.7	0.0	85.3*	7.1	23.4	44.4	4.3	3.4	7.2	74.2*	3.2	73.5*	9.8	82.0*
4	1.0	4.0	1.1	2.0	80.2*	2.3	1.3	81.2*	1.2	7.0	82.0*	2.9	5.3	7.1	83.1*	7.0	0.4	2.9

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1. Educational Assessment Program State Report 1975-1976  
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2. Fullilove, R.E.; III. The SAT score declines and their  
impact on admissions in New Jersey public colleges. New  
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