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Peter P. Spawn

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**A COMPARISON OF THE ARITHMETIC BACKGROUND OF SEVENTH GRADE
PUPILS WHO HAVE RECEIVED THEIR FIRST SIX YEARS OF
SCHOOLING IN RURAL SCHOOLS WITH THOSE WHO HAD
RECEIVED THEIR FIRST SIX YEARS OF SCHOOLING
IN THE PIPESTONE CITY SCHOOLS**

By

Peter P. Spawn

A problem submitted
in partial fulfillment of the requirements for the
degree Master of Science at South Dakota
State College of Agriculture
and Mechanic Arts
(Plan B)

August, 1957

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P. P. S.

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I. INTRODUCTION

JUSTIFICATION OF THE STUDY

In the past five years, there has been a trend in Pipestone County, Minnesota, to close the one-room country schools and send these rural children to consolidated town schools. Up to about five years ago, there were many rural schools in the county educating these young children up through the sixth grade, then the children would start Junior High School in one of the four towns in the county with high school facilities; namely, Ruthton, Jasper, Edgerton and Pipestone. The program went on this way for many years, but now the closing of these rural schools is about eighty per cent completed. The rural children, who would have been going to the one-room country school now if the change had not come about, are instead getting their elementary training in the four town schools mentioned above.

In view of these developments, there has been considerable discussion about the merits of the rural schools and the town schools. Many of these discussions are based on the opinion of the person and not on any factual material.

Having taught mathematics in two of the aforementioned Junior High Schools, this writer formed the opinion that the town pupils had received a better background in mathematics than had the rural school pupils. In order to determine if this opinion was justified, the following study was carried out.

This study was made to determine if there was a statistical difference in mathematical achievement of the two groups: the town school

pupils and the rural school pupils entering the seventh grade of the Pipestone Junior High School.

STATEMENT OF THE PROBLEM

The aim of this study was to compare the mathematical background or achievement of seventh grade pupils who had received their first six years of schooling in the Pipestone County rural schools with those pupils who had received their first six years of schooling in the Pipestone city school, to see if the rural pupils in the six years had achieved as much in arithmetic as the town pupils.

REVIEW OF THE LITERATURE PERTAINING TO THE PROBLEM

William V. Hass¹ made a study in 1948: comparing the educational proficiency of the one-room rural school graduates and the town elementary school graduates in the freshman and sophomore classes of six east central high schools in South Dakota. In his study, he compared the pupils in six subject matter areas: science, English, history, geography, social studies, and arithmetic. In this study he computed the mean I. Q. of the rural group of pupils and the mean I. Q. of the town group of pupils. It was then found that there was no statistical difference in the I. Qs. of the two groups. Next he administered a series of tests to all pupils in the different subject matter areas and compared these

¹William V. Hass, A Study Comparing the Educational Proficiency of the One-Room Rural School Graduates and the Town Elementary School Graduates Found in the Freshman and Sophomore Classes of Six East Central High Schools in South Dakota, (Thesis submitted to faculty at South Dakota State College), 1948.

results statistically to see if the rural students compared favorably to the town students in these six subject matter areas. From his conclusions in the arithmetic section of his study, he found that there was no statistical difference existing at the five per cent level of significance between the scores of the one-room rural school graduates and those of the town elementary school graduates in either arithmetic reasoning or arithmetic computation.

Another source of information was a research study conducted by Floyd A. Johnson² in 1955, in which he compared the background in science of ninth grade pupils receiving their first eight years of schooling in rural schools nearby with those educated in the Brookings city schools. In this study, Mr. Johnson obtained seventy-five pairs of pupils. Each pair was composed of a town pupil and a rural pupil with the same intelligence quotient. He then obtained the scores from the science section of the Iowa Every Pupil Test, and compared the pairs statistically to determine if there was a significant difference in the two groups. From his conclusions, he found that, ". . . it is apparent that the Brookings city students have obtained a better background in science during their first eight years of education than students who have attended Brookings County rural schools for eight years."

M. J. Van Wagenen³ made a study in 1929 in which he compared pupil

²Floyd A. Johnson, A Comparison of the Scientific Background of Ninth Grade Students Who Have Received Their First Eight Years of Schooling in Rural Schools With Those Educated in the Brookings City Schools, (Research Problem, 1955), p. 19.

³M. J. Van Wagenen, Comparative Pupil Achievement in Rural, Town, and City Schools, (The University of Minnesota Press, 1929).

achievement in rural, town, and city schools in Minnesota. This study covered five subject matter areas: reading, American history, geography, spelling ability-English composition, and arithmetic.

From the arithmetic section of his study, it was definitely found that the town pupils were ahead of the rural pupils in both the fundamental operations and the arithmetic problems.

II. PROCEDURES

RESEARCH DESIGN

In this problem, there are two groups of pupils: those who have received their first six years of schooling in rural schools in Pipestone County and those who have received their first six years of schooling in the Pipestone city elementary school. A pupil was taken from each group to make a pair, each pair having the same or a one-point difference in I. Q. These pairs were then given three tests: the Arithmetic Reasoning section of the Stanford Achievement Test, the Arithmetic Computation section of the Stanford Achievement Test, and a teacher-prepared arithmetic test. Each set of test results was then compared to see if there was a statistical difference in the rural and town school students.

DATA AND DATA-GATHERING TECHNIQUES

To gather information necessary to compare the rural pupils with the town pupils, tests were administered to both groups. The tests administered were the Otis Quick Scoring Mental Ability Test: New Edition, Beta Test Form EM. (See Appendix A for a copy of the Otis Test). This test was administered during the third week of school to all seventh graders. The intelligence quotients taken from this test were the I. Qs. used in this problem. The next tests used were the Arithmetic Reasoning and the Arithmetic Computation sections of the Stanford Achievement Test, Form JM. (See Appendix B for copies of these tests). These tests were administered during the thirty-third week of school to all seventh graders.

The other test used was the teacher-prepared test on mathematical ability, administered during the fourth week of school to all seventh graders.

SELECTING AND PAIRING THE GROUPS

There were two groups of pupils used in this problem. They are the rural school educated group and the Pipestone city school educated group. The town group attended Pipestone city school for all six years of elementary school, prior to entering the Pipestone Junior High School. This group included ninety-one pupils. Those transferring from other schools, localities, and parochial schools were disregarded. The rural group attended various rural schools in Pipestone County during the six years prior to enrolling at Pipestone Junior High School. This group includes sixty-three pupils who have had their entire elementary training in rural schools. Those transferring to rural schools from other schools, localities, and parochial schools were disregarded.

Pupils when entering the seventh grade at Pipestone Junior High School are given the Otis Mental Ability Tests, and all pupils included in this study were given that test. The intelligence quotients taken from this test were the I. Qs. used in this problem for pairing the groups.

The groups were paired by listing the I. Q. for the town pupils in one column, starting with the highest, and then listing the I. Q. for the rural pupils in the second column, starting with the highest, as shown in the sample Table I, which shows the first part of the columns used.

After these columns were completed for the ninety-one town pupils and the sixty-three rural pupils, the pairs were distinguished according

Table I. Intelligence Quotients of Town and Rural Pupils.

Town	Rural
133	-
129, 129, 129	-
127	127
126	-
125	125
124, 124	124
.....
117	116

to the I. Qs. Each pupil in pair number one for the study had an I. Q. of 127. (See Table I). For pair number two, each pupil had an I. Q. of 125. For pair number three, each pupil had an I. Q. of 124, and they were paired on down the column in a similar manner. As in the case of pair number three, where two town pupils had an I. Q. of 124, that half of the pair was selected at random. Eight pairs selected did not have identical I. Qs., but they were within one point of each other, for example, as shown at the bottom of sample Table I, the rural pupil with an I. Q. of 116 was paired with the town pupil with an I. Q. of 117 to get pair number six. In four of these latter cases, the town pupil had the one point advantage, and in four cases the rural pupil had the one point advantage. To start with, there were ninety-one town pupils used in the study, and sixty-three rural pupils. By pairing them and selecting in this manner, the writer was able to obtain fifty-one pairs of pupils for use in the study.

III. TREATMENT OF THE DATA

After the fifty-one pairs of pupils were selected, the investigator compared the pupils in each pair on three tests: The Arithmetic Reasoning and the Arithmetic Computation sections of the Stanford Achievement Test, and the teacher-prepared test on mathematical ability. In each of the following Tables, II, III, and IV, the reader sees the pairs listed in Column 1, the scores for town pupils in Column 2, the scores for rural pupils in Column 3, the amount the town was above the rural or difference in Column 4, and the differences squared in Column 5.

CONVERTING STANDARD TEST SCORES TO GRADE-SCORE

The Stanford Achievement Test was in two parts, arithmetic reasoning and arithmetic computation. Table II shows the arithmetic reasoning section, and Table III shows the arithmetic computation section. From the number correct, of a possible raw score of 45 on the reasoning section and a possible raw score of 44 on the computation section, the investigator figured the grade-scores from a scale on the answer sheet. This scale shows the number of problems right on top and the grade-score for each number right directly below. You determine the number right on the test, then by looking at the scale you can obtain the grade-score. This grade-score shows the grade level of a pupil in that particular subject. For example, a grade-score of 83 on arithmetic reasoning would show that the pupil rates in the eighth grade, third month for that subject. The scores shown in Tables II and III, under the town and rural columns, are these grade-score scores. The scores shown in Table IV are the number right on a possible thirty-one problems.

FINDING THE BASIC MEASURES IN THE PARTS OF THE PAIRS

To compare the arithmetic achievement of the rural educated and town educated pupils, we can look at Tables II, III, and IV, and the accompanying formulas found with the tables. From Table II, on the Arithmetic Reasoning section of the Stanford Achievement Test, the reader will note that the mean grade-score for the rural pupils (M_r) is 79.51. The mean for the town pupils (M_t) is 83.37. The mean difference (M_D) is 3.86, or 3.86 months favoring the town pupils. From Table III, on the Arithmetic Computation section of the Stanford Achievement Test, the reader will note that the mean for the rural pupils (M_r) is 80.35. The mean for the town pupils (M_t) is 80.43. This gives a mean difference (M_D) of only .08, which shows .08 of a month difference favoring the town pupils. For the teacher-made arithmetic test used the highest possible score was 31. This teacher-prepared test shows raw scores, and not grade-scores as shown on the Stanford Achievement test. From Table IV, on this test on arithmetic, the mean for the rural pupils (M_r) is 22.76. The mean for the town pupils (M_t) is 23.18. This gives a mean difference (M_D) of .41, which means an average of .41 of a problem more correct for the town pupils.

APPLYING THE "t" SCORE TECHNIQUE

Whether or not these three mean differences are significant remains to be determined by testing the "null hypothesis," using the "t" test of significance. To evaluate the difference between the means of the two groups statistically, the null hypothesis is assumed. The term "null

hypothesis" means that you assume the difference between the means (M_D) is zero. That is, any observed difference in the group means is due to chance or sample fluctuations. This is used since we want to determine whether the observed difference between the means of the rural and city groups is a real difference.⁴

Fischer's "t" test was used in this investigation because it is recommended for the comparison of the performance of different groups under similar situations.⁵ The formulas used in the computation of the "t" value may be evaluated from the table for the values of "t" at the 5% level of confidence, Table V. The degrees of freedom column refers to the number of pairs that are free to vary independently. The number of degrees of freedom is equal to $N - 1$, where N is the number of pairs observed, and in this problem the number of degrees of freedom is $51 - 1$, or 50.

If the difference in means is significant at the 5% level of confidence, there is one chance in twenty that the difference could have been caused by sampling error alone. If the computed "t" value is equal to or greater than the tabular "t" value for the 5% level of confidence, the difference is considered significant. If the computed "t" value is less than the tabular "t" value for the 5% level of confidence, the difference is not considered significant.⁶

⁴Johnson, op. cit., p. 16.

⁵Helen M. Walker, Elementary Statistical Methods, (New York: Henry Holt and Company, 1949), p. 286.

⁶Allen L. Edwards, Statistical Methods for the Behavioral Sciences, (New York: Rinehart and Company, Inc., 1954), p. 278-281.

The computation of the three different "t" scores in this problem are found on the right margins of Tables II, III, and IV and the "t" values at the 5% level of significance is shown in Table V. The underlining of 50 degrees of freedom with "t" score of 2.008 indicates the one applying to this problem.

TABLE II. Scores on the Stanford Achievement Test, Arithmetic Reasoning Section

PAIR	TOWN	RURAL	DIFFERENCE	D ²
1	117	120	- 3	9
2	123	107	16	256
3	107	98	9	81
4	101	120	-19	361
5	92	95	- 3	9
6	86	92	- 6	36
7	110	92	18	324
8	69	77	- 8	64
9	89	92	- 3	9
10	73	74	- 1	1
11	95	98	- 3	9
12	75	98	-23	529
13	98	89	9	81
14	79	81	- 2	4
15	81	73	8	64
16	95	84	11	121
17	101	73	28	704
18	60	71	-11	121
19	89	73	16	256
20	101	65	36	1296
21	92	113	-21	441
22	75	113	-38	1444
23	89	63	26	676
24	86	61	25	625
25	75	61	14	196
26	89	79	10	100
27	110	104	6	36
28	92	77	15	225
29	110	81	29	841
30	81	101	-20	400
31	63	65	- 2	4
32	69	61	8	64
33	81	71	10	100
34	77	89	-12	144
35	69	73	- 4	16
36	98	75	23	529
37	77	86	- 9	81
38	61	75	-14	196
39	73	58	15	225
40	63	89	-26	676
41	92	67	25	625
42	69	95	-26	676
43	71	75	- 4	16
44	81	61	20	400
45	67	61	6	36
46	69	56	13	169
47	67	61	6	36
48	65	57	8	64
49	63	59	4	16
50	81	42	39	1521
51	56	54	2	4

$$M_T = \frac{\sum T}{N} = 83.37$$

$$M_R = \frac{\sum R}{N} = 79.51$$

$$M_D = \frac{\sum D}{N} = 3.86$$

$$\sum d^2 = \sum D^2 - \frac{(\sum D)^2}{N} = 14156$$

$$S.D. = \sqrt{\frac{\sum d^2}{N}} = 16.66$$

$$S_{xt} - \bar{x}_r = \frac{S.D.}{\sqrt{N}} = 2.33$$

$$t = \frac{M_t - M_r}{S_{xt} - \bar{x}_r} = 1.657$$

N=51 $\sum T=4252$ $\sum R=4055$ $\sum D=197$ $\sum D^2=14917$

TABLE III. Scores on the Stanford Achievement Test, Arithmetic Computation Section

PAIR	TOWN	RURAL	DIFFERENCE	D ²
1	96	111	-15	225
2	100	111	-11	121
3	96	96	0	0
4	100	104	-4	16
5	81	69	12	144
6	76	100	-24	576
7	111	92	19	361
8	70	79	-9	81
9	72	92	-20	400
10	78	71	7	49
11	81	92	-11	121
12	76	92	-16	256
13	84	92	-8	64
14	79	104	-25	625
15	81	89	-8	64
16	86	84	2	4
17	100	78	22	484
18	64	81	-17	289
19	86	76	10	100
20	89	70	19	361
21	89	100	-11	121
22	81	92	-11	121
23	96	81	15	225
24	86	66	20	400
25	59	74	-15	225
26	79	76	3	9
27	111	93	18	324
28	72	89	-17	289
29	100	66	34	1156
30	78	96	-18	324
31	72	76	-4	16
32	86	72	14	196
33	79	78	1	1
34	74	86	-12	144
35	79	64	15	225
36	92	74	18	324
37	74	81	-7	49
38	84	74	10	100
39	62	72	-10	100
40	67	89	-22	484
41	84	78	6	36
42	78	74	4	16
43	70	72	-2	4
44	76	70	6	36
45	57	62	-5	25
46	72	57	15	225
47	69	66	3	9
48	57	47	10	100
49	62	69	-7	49
50	81	70	11	121
51	70	51	19	361

$$M_T = \frac{\sum T}{N} = 80.43$$

$$M_R = \frac{\sum R}{N} = 80.35$$

$$M_D = \frac{\sum D}{N} = .08$$

$$\sum d^2 = \sum D^2 - \frac{(\sum D)^2}{N} = 10155.7$$

$$S.D. = \sqrt{\frac{\sum d^2}{N}} = 14.11$$

$$S_{\bar{x}_t - \bar{x}_r} = \frac{S.D.}{\sqrt{N}} = 1.98$$

$$t = \frac{M_T - M_R}{S_{\bar{x}_t - \bar{x}_r}} = .040$$

N=51 $\sum T=4102$ $\sum R=4098$ $\sum D=4$ $\sum D^2=10156$

TABLE IV. Scores on the Investigator Prepared Test on Arithmetic.

PAIR	TOWN	RURAL	DIFFERENCE	D ²
1	27	27	0	0
2	26	27	-1	1
3	26	28	-2	4
4	25	27	-2	4
5	24	24	0	0
6	20	29	-9	81
7	25	28	-3	9
8	19	24	-5	25
9	26	28	-2	4
10	29	24	5	25
11	28	26	2	4
12	23	24	-1	1
13	26	24	2	4
14	21	25	-4	16
15	20	25	-5	25
16	23	24	-1	1
17	28	24	4	16
18	20	26	-6	36
19	27	25	2	4
20	22	21	1	1
21	22	29	-7	49
22	24	28	-4	16
23	25	18	7	49
24	28	19	9	81
25	19	18	1	1
26	19	23	-4	16
27	24	25	-1	1
28	23	24	-1	1
29	29	22	7	49
30	24	26	-2	4
31	13	24	-11	121
32	23	18	5	25
33	23	20	3	9
34	23	24	-1	1
35	25	22	3	9
36	26	16	10	100
37	26	25	1	1
38	21	25	-4	16
39	22	23	-1	1
40	21	27	-6	36
41	22	19	3	9
42	22	24	-2	4
43	23	23	0	0
44	25	18	7	49
45	19	18	1	1
46	22	12	10	100
47	26	20	6	36
48	19	9	10	100
49	20	17	3	9
50	26	21	5	25
51	13	14	-1	1

$$M_T = \frac{\sum T}{N} = 23.18$$

$$M_R = \frac{\sum R}{N} = 22.76$$

$$M_D = \frac{\sum D}{N} = .41$$

$$\sum d^2 = \sum D^2 - \frac{(\sum D)^2}{N} = 1172.3$$

$$S.D. = \sqrt{\frac{\sum D^2}{N}} = 4.45$$

$$S_{\bar{x}_t - \bar{x}_r} = \frac{S.D.}{\sqrt{N}} = .62$$

$$t = \frac{M_t - M_r}{S_{\bar{x}_t - \bar{x}_r}} = .677$$

N=51 $\sum T=1182$ $\sum R=1161$ $\sum D=21$ $\sum D^2=1181$

TABLE V. Values of "t" at the 5% Level of Significance*.

Degrees of Freedom	5%	Degrees of Freedom	5%
1	12.706	32	2.037
2	4.303	34	2.032
3	3.182	36	2.027
4	2.776	38	2.025
5	2.571	40	2.021
6	2.447	42	2.017
7	2.365	44	2.015
8	2.306	46	2.012
9	2.262	48	2.010
10	2.228	50	2.008
11	2.201	55	2.005
12	2.179	60	2.000
13	2.160	65	1.998
14	2.145	70	1.995
15	2.131	80	1.990
16	2.120	90	1.987
17	2.110	100	1.984
18	2.101	125	1.979
19	2.093	150	1.976
20	2.086	200	1.972
21	2.080	300	1.968
22	2.074	400	1.966
23	2.069	500	1.965
24	2.064	1000	1.962
25	2.060	∞	1.960
26	2.056		
27	2.052		
28	2.048		
29	2.045		
30	2.042		

*Table V has been taken from Table C of Edwards' Statistical Analysis for Students in Psychology and Education, (Ronshart and Company, Inc., New York, 1946), p. 330.

IV. FINDINGS AND CONCLUSIONS

The computed "t" score for the Arithmetic Reasoning section of the Stanford Achievement Test was 1.657, which can be found on Table II. According to Table V, a table for the values of "t" at the 5% level of confidence, the computed "t" would have to be 2.008 or larger to have been significant. Since the "t" was only 1.657, there is no significant difference on this test. The computed "t" score for the Arithmetic Computation section of the Stanford Achievement test was .040, as shown in Table III. According to Table V, the computed "t" would again have to be 2.008 or larger to have been significant. Since the computed "t" was only .040, there is no significant difference on this test. The computed "t" for the teacher prepared test on arithmetic was .677, as shown in Table IV. According to Table V, the computed "t" would again have to be 2.008 or larger to be significant. Here the computed "t" is only .677, so again there is no significant difference on this test.

There is no statistical difference between the means of the rural pupils and the town pupils on any of the three tests. The conclusion to be drawn then, is that there was no statistical difference in arithmetic achievement between the rural educated and town educated pupils entering the seventh grade of Pipestone Junior High School for the 1956-57 school year. Although by casual inspection the mean scores indicated apparent differences between the rural and town pupils, favoring the town pupils in all three tests, it was found that no statistical difference existed between them at the 5% level of confidence. The greatest difference between the two groups in this study was found on the

arithmetic reasoning test, where there was almost a four month grade-equivalent advantage, held by the town pupils. Since there was practically no difference on the arithmetic computation scores, it would seem that the rural pupils have as good a background in computation but reasoning has not been stressed as much.

V. RECOMMENDATIONS

The investigator recommends that more studies of this nature be carried on to obtain more facts about the merits of the rural school as compared to the town school. There are no recommendations which can be conclusive on the basis of this study, but some of the following suggestions should be considered.

(1) For studies in fields other than mathematics it is quite possible that more conclusive results would be shown than in this investigation on mathematics in as much as the arithmetic reasoning and arithmetic computation tests have in them many problems similar in nature to the mental ability test.

(2) If a similar study dealing with mathematics was to be carried out, it would be a good idea to give the standardized test in the fall. In this study the standard achievement test was not given until the thirty-third week of the seventh year, and thus, all pupils in the study had the advantage of those thirty-three weeks of schooling under similar circumstances, tending to even out the achievement of the groups.

(3) Since there was found to be almost a four month advantage held by the town pupils in arithmetic reasoning, it may be well for the rural schools to concentrate more on this aspect of arithmetic.

(4) When a teacher-prepared test is used in this type of study, the investigator should consider the fact that it is not as valid and reliable as the standardized test used.

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Otis Quick-Scoring Mental Ability Tests: New Edition

BETA TEST: FORM EM

BETA
EM

by Arthur S. Otis

Do not open this booklet, or turn it over, until you are told to do so.
Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name..... Grade..... Boy..... Girl.....
First name Initial Last name

Date of birth..... How old are you now?.....
Month Day Year

Date..... 19..... School..... City and state.....

Read these directions. Do what they tell you to do.

This is a test to see how well you can think. It contains questions of different kinds. Under each question there are four or five possible answers. You are to read each question and decide which of the answers below it is the right answer. Do not spend too much time on any one question. Here are three sample questions.

Sample a: Which one of the five things below is soft?

- (1) glass (2) stone (3) cotton (4) iron (5) ice

The right answer, of course, is *cotton*. The word *cotton* is No. 3. Now look at the "Answer Spaces for Samples" at the right. In the five spaces after the Sample "a," a heavy mark has been made, filling the space under the 3. This is the way to answer the questions.

Try the next sample question yourself. Do not write the answer; just put a heavy mark in the space under the number corresponding to the right answer.

Sample b: A robin is a kind of —

- (6) plant (7) bird (8) worm (9) fish (10) flower

The answer is *bird*, which is answer 7; so you should answer Sample "b" by putting a heavy mark in the space under the 7. Try the Sample "c."

Sample c: Which one of the five numbers below is larger than 55?

- (11) 53 (12) 48 (13) 29 (14) 57 (15) 16

The correct answer for Sample "c" is 57, which is No. 14; so you would answer Sample "c" by making a heavy black mark that fills the space under the number 14. Do this now.

Read each question carefully and decide which one of the answers is best. Notice what number your choice is. Then, on the answer sheet, make a heavy black mark in the space under that number. In marking your answers, always be sure that the question number on the answer sheet is the same as the question number in the test booklet. Erase completely any answer you wish to change, and be careful not to make stray marks of any kind on your answer sheet or on your test booklet. When you finish a page, go on to the next page. If you finish the entire test before the time is up, go back and check your answers. Work as rapidly and as accurately as you can.

The test contains 80 questions. You are not supposed to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to start. Try to get as many questions right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this booklet until you are told to begin.

ANSWER SPACES
FOR SAMPLES

	1	2	3	4	5
a	⋮	⋮	■	⋮	⋮
	6	7	8	9	10
b	⋮	⋮	⋮	⋮	⋮
	11	12	13	14	15
c	⋮	⋮	⋮	⋮	⋮

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64	61	62	63	64	65
65	66	67	68	69	70
66	71	72	73	74	75
67	1	2	3	4	5
68	6	7	8	9	10
69	11	12	13	14	15
70	16	17	18	19	20
71	21	22	23	24	25
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80	66	67	68	69	70

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46	46	47	48	49	
47	51	52	53	54	55
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49	61	62	63	64	65
50	66	67	68	69	
51	71	72	73	74	75
52	1	2	3	4	5
53	6	7	8	9	10
54	11	12	13	14	15
55	16	17	18	19	20
56	21	22	23	24	25
57	26	27	28	29	30
58	31	32	33	34	35
59	36	37	38	39	40
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62	51	52	53	54	
63	56	57	58	59	

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29	46	47	48	49	50
30	51	52	53	54	55
31	56	57	58	59	60
32	61	62	63	64	65
33	66	67	68	69	70
34	71	72	73	74	75
35	76	77	78	79	80
36	81	82	83	84	85
37	1	2	3	4	5
38	6	7	8	9	10
39	11	12	13	14	15
40	16	17	18	19	20
41	21	22	23	24	25
42	26	27	28	29	30
43	31	32	33	34	35
44	36	37	38	39	40

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



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9	41	42	43	44	45
10	46	47	48	49	50
11	51	52	53	54	55
12	56	57	58	59	60
13	61	62	63	64	65
14	66	67	68	69	70
15	71	72	73	74	75
16	76	77	78	79	
17	81	82	83	84	85
18	86	87	88	89	90
19	91	92	93	94	95
20	1	2	3	4	5
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23	16	17	18	19	20
24	21	22	23	24	25

IQ _____

SCORE _____

AGE _____
Years Months





- 1 The opposite of weak is —
(1) poor (2) sick (3) tall (4) strong (5) young
- 2 Which of the five words below comes first in the dictionary?
(6) brown (7) black (8) blown (9) break (10) blend
- 3 Which answer tells best what a teakettle is?
(11) a tool (12) a weapon (13) a utensil (14) a thing (15) a machine
- 4 An eggshell is to an egg the same as an orange skin is to —
(16) a lemon skin (17) an orange (18) an orange seed (19) a hen (20) a clamshell
- 5 Ruth is prettier than Sadie but not so pretty as Mabel. Therefore, Mabel is (?) Sadie.
(21) not so pretty as (22) just as pretty as (23) cannot say which (24) prettier than
- 6 The mayor is to a city as the governor is to —
(26) a nation (27) a president (28) a state (29) a council (30) an office
- 7 A stove is to heat as a refrigerator is to —
(31) a kitchen (32) cold (33) electricity (34) gas (35) food

- 8 Three of the four designs at the right are alike in some way. Which one is not like the other three?
(36)  (37)  (38)  (39)  →
- 9 Northwest is to southeast as up is to —
(41) north (42) higher (43) northeast (44) down (45) under

- 10 The opposite of clockwise is —
(46) backward (47) counterclockwise (48) right (49) left (50) round
- 11 Which of the five words below comes first in the dictionary?
(51) times (52) stand (53) ruled (54) grand (55) quill
- 12 Which of the five persons below is most like a carpenter, a plumber, and a bricklayer?
(56) a postman (57) a lawyer (58) a truck driver (59) a doctor (60) a painter

- 13 Which of the following sentences tells best what an arm is? →
(61) It goes in the coat sleeve. (62) You can put it around something.
(63) It carries the hand. (64) It is the part of the body attached to the shoulder.
(65) We have two of them.

- 14 Four of the following things are alike. Which one is different from the other four?
(66) a beet (67) a peach (68) a radish (69) an onion (70) a potato
- 15 What is to hearing as an eye is to sight?
(71) glasses (72) voices (73) a sound (74) an ear (75) an earphone

- 16 Three of the four designs at the right are alike in some way. Which one is not like the other three?
(76)  (77)  (78)  (79) 

- 17 Which of the five things below is most like the moon, a balloon, and a ball?
(81) sky (82) a cloud (83) a marble (84) an airplane (85) a toy
- 18 Fur is to a rabbit as feathers are to —
(86) a pillow (87) a bird (88) a hair (89) an animal (90) a nest








- 19 What is the most important reason for using screens at windows? →
(91) They are easy to paint. (92) They improve the looks of the windows.
(93) They keep out flies but let in the breeze. (94) They keep out burglars.
(95) They are easier to keep clean than windows are.





- 20 Which of the five words below comes last in the dictionary?
(1) front (2) local (3) lemon (4) floor (5) knoll
- 21 The moon (?) around the earth. (Which of the following words completes the sentence best?)
(6) turns (7) goes (8) moves (9) revolves (10) spins





- 22 Printing is to a book as writing is to —
(11) talking (12) a letter (13) a pen (14) a friend (15) reading
- 23 Which of the five things below is most like a chimney, a roof, and a door?
(16) a chair (17) a bed (18) a stove (19) a window (20) a desk

- 24 The ground is to an automobile as water is to —
(21) a train (22) gasoline (23) the engine (24) a ship (25) a river

- 64 The one of two objects that is not so good as the other is said to be —
 (61) **unsuitable** (62) **lesser** (63) **single** (64) **inferior** (65) **unnecessary**
- 65 If the following words were rearranged to make the best sentence, the *last* word of the sentence would begin with what letter?
fall clouds from the raindrops dark
 (66) **f** (67) **d** (68) **t** (69) **c** (70) **r**.....
- 66 An object or institution that is not likely to move or change is said to be —
 (71) **fundamental** (72) **stable** (73) **temporary** (74) **solid** (75) **basic**.....
- 67 Worst is to bad as (?) is to good.
 (1) **more** (2) **better** (3) **best** (4) **very good** (5) **excellent**.....
- 68 If the following persons were arranged in order, which one would be in the middle?
 (6) **grandfather** (7) **grandson** (8) **brother** (9) **uncle** (10) **nephew**.....
- 69 A man who buys and sells when there is considerable danger of loss is said to —
 (11) **transact** (12) **stipulate** (13) **contract** (14) **speculate** (15) **bargain**.....
- 70 Which tells best what a refrigerator is?
 (16) **a piece of kitchen furniture** (17) **a place to store food**
 (18) **an electrical device for the kitchen** (19) **a large white box**
 (20) **a cabinet for keeping food cold**.....
- 71 There is a saying, "A bird in the hand is worth two in the bush." It means — (21) **Two birds are worth more than one**
 (22) **Something you are sure of is twice as good as something doubtful.**
 (23) **Your own bird is worth two that belong to others.**
 (24) **It is hard to catch birds that are in bushes.**.....
- 72 When the time by a clock was 14 minutes past 9, the hands were interchanged. The clock then said about —
 (26) **14 minutes past 3** (27) **14 minutes of 10** (28) **14 minutes past 2**
 (29) **14 minutes of 3**.....
- 73 One number is wrong in the following series. What should that number be?
 1 9 2 8 3 9 4 8 5 9 6 8 7 9 8 9
 (31) **9** (32) **7** (33) **8** (34) **6** (35) **5**.....
- 74 The boy deserves (?) for his effort and perseverance.
 (36) **condemnation** (37) **censure** (38) **scholarship** (39) **commendation**
 (40) **a medal**.....
- 75 One number is wrong in the following series. What should that number be?
 1 2 4 8 16 32 48 128
 (41) **96** (42) **6** (43) **64** (44) **12** (45) **24**.....
- 76 If I have a large box with 4 smaller boxes in it and 3 very small boxes in each small box, how many boxes do I have in all?
 (46) **7** (47) **12** (48) **13** (49) **16** (50) **17**.....
- 77 If each 3 in the following series were changed to a 2 and if each 1 were dropped out, the seventh 2 would be followed by what number? (Do not mark the paper.)
 1 2 5 2 3 1 5 2 3 4 2 3 1 3 4 2 2 2 5
 (51) **1** (52) **3** (53) **2** (54) **4** (55) **5**.....
- 78 There is a saying, "An ounce of prevention is worth a pound of cure." It means —
 (56) **Prevention is a good cure.** (57) **Prevention and cure can be purchased by the same price.**
 (58) **It is much better to prevent something than to cure it.**
 (59) **It is much better to cure something than to prevent it.**.....
- 79 Which of the five words below is most like heavy, blue, and nice?
 (61) **weight** (62) **round** (63) **sky** (64) **color** (65) **weather**.....
- 80 In a foreign language, *boli deta kipo* means *very good weather*; *boli cora* means *bad weather*; and *deta sedu* means *very good weather*.
 What word means good?
 (66) **boli** (67) **deta** (68) **cora** (69) **kipo** (70) **sedu**.....

- 45 A chair is most likely to have —
 (41) rockers (42) upholstery (43) legs (44) a seat (45) arms.....
- 46 A boy has three dogs. Their names are Rover, Spot, and Fido. Rover is larger than Spot and Spot is larger than Fido. Therefore, Rover is (?) Fido.
 (46) smaller than (47) larger than (48) the same size as (49) cannot say which
- 47 Wood is to box as wire is to —
 (51) iron (52) electricity (53) doorbell (54) screen (55) fire.....
- 48 There is a saying, "It is a long road that has no turning." It means —
 (56) Most long roads are straight. (57) Things are bound to change sooner or later.
 (58) Most short roads have turns. (59) It is a bad idea to turn around on the road...
- 49 Which of the five things below is most like a sheet, a towel, and a handkerchief?
 (61) a blanket (62) a coat (63) a napkin (64) a carpet (65) a mattress.....
- 50 Three of the four designs at the right are alike in some way. Which one is not like the other three?
 (66)  (67)  (68)  (69)  
- 51 If the following were arranged in order, which one would be in the middle?
 (71) foundation (72) walls (73) ceiling (74) roof (75) floor.....
- 52 Which one of these series contains a wrong number?
 (1) 2-4-6-8-10 (2) 1-3-5-7-9 (3) 3-6-9-12-15 (4) 1-4-7-10-12
 (5) 2-5-8-11-14.....
- 53 A pair of trousers always has —
 (6) a belt (7) cuffs (8) pockets (9) a crease (10) seams.....
- 54 One number is wrong in the following series. What should that number be?
 8 1 8 2 8 3 8 4 8 5 8 6 8 7 8 9
 (11) 9 (12) 7 (13) 6 (14) 8 (15) 5..... 
- 55 A machine that works rapidly and well is said to be —
 (16) fluent (17) revolutionary (18) novel (19) automatic (20) efficient.....
- 56 What letter in the following series appears a third time nearest the beginning?
 A C E B D D E A B C B E C A D A B C D E
 (21) A (22) C (23) D (24) E (25) B.....
- 57 The stomach is to food as the heart is to —
 (26) a man (27) the lungs (28) blood (29) a pump (30) beating.....
- 58 In the alphabet, which letter follows the letter that comes next after Q?
 (31) O (32) S (33) P (34) T (35) R.....
- 59 Most persons prefer automobiles to buses because —
 (36) it is always cheaper to use an automobile. (37) the bus carries too many persons.
 (38) an automobile gets you where you want to go when you want to go.
 (39) automobiles are easier to park. 
- 60 The opposite of contract is —
 (41) explode (42) detract (43) expend (44) die (45) expand.....
- 61 In a certain row of trees one tree is the fifth one from either end of the row. How many trees are there in the row?
 (46) 5 (47) 8 (48) 10 (49) 9 (50) 11.....
- 62 There is a saying, "Honesty is the best policy." It means —
 (51) Honesty is more important than generosity.
 (52) In the long run it pays to be honest. (53) Honest people become wealthy.
 (54) You can never tell what a dishonest person will do.....

- 63 Three of the four designs at the right are alike in some way. Which one is not like the other three?
 (56)  (57)  (58)  (59) 

- 25 If grapefruit are 4 for a quarter, how much will two dozen cost?
 (26) 23¢ (27) 60¢ (28) 96¢ (29) \$1.50 (30) \$1.00.....
- 26 The author is to a book as the inventor is to a —
 (31) machine (32) bookmark (33) discoverer (34) writer (35) magazine.....
- 27 Which of the following tells best what a kitchen is?
 (36) a room in which to cook (37) a place to keep knives and forks
 (38) a part of a house (39) a room with a table and chairs
 (40) a room next to the dining room.....
- 28 If the following words were rearranged to make the best sentence, with what letter would the *last* word of the sentence begin?
 wood made often of are floors
 (41) a (42) m (43) w (44) f (45) o.....
- 29 Which of the five things below is most like tea, milk, and lemonade?
 (46) water (47) vinegar (48) coffee (49) olive oil (50) mustard.....
- 30 Three of the four designs at the right are alike in some way.
 Which one is not like the other three?
 (51)  (52)  (53)  (54) 
- 31 Which of the sentences below tells best what a kitten is?
 (56) It has whiskers. (57) It is a small animal that drinks milk.
 (58) It is a playful animal. (59) It is afraid of dogs. (60) It is a young cat.....
- 32 If the following were arranged in order, which one would be in the middle?
 (61) pint (62) barrel (63) cup (64) quart (65) gallon.....
- 33 If Tom is brighter than Dick and Dick is just as bright as Harry, then Harry is (?) Tom.
 (66) brighter than (67) not so bright as (68) just as bright as (69) cannot say.....
- 34 Count each 4 that has a 2 next after it in this row.
 2 4 1 4 2 3 5 4 6 2 4 7 5 2 4 4 2 3 9 4 3 2 8 7 8 4 2 2 4 5 5 2 2 4 2
 How many are there?
 (71) 1 (72) 2 (73) 3 (74) 4 (75) 5.....
- 35 The opposite of ignorance is —
 (76) beauty (77) knowledge (78) goodness (79) honesty (80) truth.....
- 36 Four of the following words have something in common. Which one is not like the other four?
 (81) cowardly (82) dishonest (83) poor (84) stingy (85) rude.....
- 37 A photograph is 3 inches wide and 5 inches long. If it is enlarged to be 12 inches wide, how long will it be?
 (1) 8 in. (2) 20 in. (3) 14 in. (4) 15 in. (5) 60 in.....
- 38 The opposite of spend is —
 (6) give (7) earn (8) money (9) take (10) use.....
- 39 Which of the following sentences tells best what an airplane is?
 (11) It flies. (12) It is something to travel in. (13) It is a flying conveyance.
 (14) It has wings and a tail. (15) It is a mechanical bird.....
- 40 A man drove 9 miles east from his home, and then drove 4 miles west. He was then (?) of his home.
 (16) 5 miles east (17) 5 miles west (18) 13 miles east (19) 13 miles west.....
- 41 If the following words were rearranged to make the best sentence, with what letter would the *last* word of the sentence begin?
 men deep the a trench dug long
 (21) d (22) l (23) t (24) s (25) m.....
- 42 A pitcher is to cream as a bowl is to —
 (26) baseball (27) a saucer (28) coffee (29) sugar (30) a dish.....
- 43 If the following words were rearranged to make the best sentence, the *last* word of the sentence would begin with letter?
 cook the pie a made apple deep
 (31) c (32) p (33) a (34) d (35) m.....
- 44 A very strong feeling of affection is called —
 (36) sympathy (37) pity (38) admiration (39) love (40) esteem.....

TEST 5 *Arithmetic Reasoning* PART I

11 →

DIRECTIONS: Work an example, and then compare your answer with the answers which follow it. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If you do not find the correct answer, mark the space under the letter for not given.

SAMPLES: ⁵¹ How many balls are 3 balls and 4 balls?

a 3 b 4 c 7 d 12 e not given.....⁵¹

⁵² How many books are 3 books and 2 books?

f 2 g 3 h 4 i 6 j not given.....⁵²

- ¹ Judy has 16 jacks and Hazel has 9. How many more jacks has Judy than Hazel?
a 7 b 9 c 16 d 25 e not given.....¹
- ² Mother bakes 24 rolls at a time. How many pans will she need if she bakes 6 in a pan?
f 4 g 18 h 24 i 30 j not given.....²
- ³ A strip of paper 19 inches long is to be cut so that one piece will be a foot long. How long will the other piece be?
a 5 in. b 12 in. c 19 in. d 31 in. e not given.....³
- ⁴ A cake costs 73 cents. How much change will Mother get back if she gives the baker two half dollars?
f 23¢ g 27¢ h 37¢ i \$1.00 j not given.....⁴
- ⁵ A lock for the clubhouse will cost \$1.35. What will be each boy's share if 9 boys share equally?
a 9¢ b 14¢ c 15¢ d \$12.15 e not given.....⁵
- ⁶ Ruth weighs 78 pounds, Helen weighs 54, and Ann weighs 67. How many pounds will Ann have to gain to weigh as much as Ruth?
f 11 g 13 h 24 i 78 j not given.....⁶
- ⁷ Ann bought 6 yards of ribbon to tie two packages. For one package she used 3 yards and 2 feet. How much ribbon was left for the other package?
a 3 yd. b 3 yd. 1 ft. c 3 yd. 2 ft. d 9 yd. 2 ft. e not given.....⁷
- ⁸ You know how much a man is paid per hour. You know how many hours he worked in a week. To find his earnings for the week, what would you do?
f add g subtract h multiply i divide j not given.....⁸
- ⁹ How much would Steve get in all for selling 11 papers at 7¢ each and 3 magazines at 20¢ each?
a 27¢ b 77¢ c \$1.27 d \$1.37 e not given.....⁹
- ¹⁰ Each class in a school agreed to collect $\frac{1}{6}$ of 300 cans of food for Thanksgiving baskets. How many cans would each class have to collect?
f 50 g 60 h 180 i 240 j not given.....¹⁰
- ¹¹ Tom runs errands for 15¢ each. If he averages 15 errands a month, what is his monthly income?
a 15¢ b 30¢ c \$1.50 d \$2.25 e not given.....¹¹
- ¹² The heights of five boys are 60 inches, 67 inches, 66 inches, 62 inches, and 60 inches. If they lined up according to height, how tall would the middle boy be?
f 60 in. g 62 in. h 63 in. i 66 in. j not given.....¹²
- ¹³ Candy eggs are 2 for 5¢. How many can be bought for 50¢?
a 10 b 20 c 25 d 30 e not given.....¹³
- ¹⁴ For a picnic, a class bought 4 dozen buns at 22¢ a dozen and 3 packages of marshmallows at 32¢ a package. How much did the buns and marshmallows cost all together?
f 88¢ g 96¢ h \$1.74 i \$1.84 j not given.....¹⁴

TEST 5 Arithmetic Reasoning (Continued)

- 15 When the Smiths go to the movies, Jane takes care of their baby and earns 50¢ an hour. How much should she receive for staying one evening from 7 P.M. to 10:30 P.M.?
 a 50¢ b \$1.50 c \$1.75 d \$2.50 e not given .15
- 16 A pancake recipe for 6 persons calls for $2\frac{1}{2}$ cups of pancake mix. How many cups will it take for 3 persons?
 f $1\frac{1}{4}$ g $1\frac{1}{2}$ h $2\frac{1}{2}$ i $3\frac{3}{4}$ j not given16
- 17 Bill jumped 13 feet 5 inches on Tuesday. On Thursday he jumped 11 feet 9 inches. How much farther did he jump on Tuesday than on Thursday?
 a 1 ft. 2 in. b 1 ft. 4 in. c 1 ft. 6 in. d 2 ft. 4 in.
 e not given17
- 18 A Scout troop bought 24 uniforms for \$194.40. What was the cost per uniform?
 f \$8.10 g \$8.95 h \$9.92 i \$9.95 j not given .18
- 19 Pine City is 120 miles from Milton. To go from Pine City to Milton by bus takes 4 hours and by train only $2\frac{3}{4}$ hours. How many hours less does it take to go by train?
 a $1\frac{1}{4}$ b $1\frac{3}{4}$ c $2\frac{1}{4}$ d $6\frac{3}{4}$ e not given19
- 20 How many 1-inch by 2-inch pieces of candy can be cut in a pan which is 8 inches by 10 inches?
 f 20 g 36 h 50 i 80 j not given20
- 21 Dan says there are 2 quart and 2 pint packages of ice cream for the party. How many people will all of it serve if a pint serves 4 people?
 a 4 b 12 c 16 d 24 e not given21
- 22 A scale drawing reads "1 inch = 12 inches." A line $3\frac{1}{4}$ inches long on this drawing represents how many actual inches?
 f 12 g $15\frac{1}{4}$ h 27 i 39 j not given22 **12** →
- 23 The butcher says to cook a turkey 20 minutes for each pound. At what hour should a 15-pound turkey be started in order to be done at 12 o'clock noon?
 a 6 A.M. b 8 A.M. c 9 A.M. d 10 A.M. e not given23
- 24 If campers start 2000 forest fires each year and tobacco smokers start 5000, how many times as many fires are started by tobacco smokers as by campers?
 f $\frac{2}{5}$ g $2\frac{1}{2}$ h 5 i 10 j not given24
- 25 George wants to buy a board to saw into 8 pieces $1\frac{3}{4}$ feet long. If he ignores the waste in sawing, how long will the board have to be?
 a $9\frac{3}{4}$ ft. b 14 ft. c 16 ft. d 56 ft. e not given25
- 26 Mr. Wilson is going to buy 60 pounds of mixed grass seed. He says the mixture should be 1 part clover, 2 parts bluegrass, and 3 parts rye. How many pounds of the mixture will be bluegrass seed?
 f 6 g 10 h 20 i 30 j not given26
- 27 A club has an income of \$50. Of this, \$20 is budgeted for food. What per cent does the club budget for food?
 a 10 b 20 c 25 d 40 e not given27
- 28 If the sales tax is 3%, what is the tax, to the nearest cent, on a coat which costs \$27.60?
 f 81¢ g 83¢ h 84¢ i 92¢ j not given28
- 29 If a man earns \$80 in a week and has deductions of 1% for unemployment insurance, $1\frac{1}{2}$ % for old-age security, and \$12 for income tax, how much does he have left?
 a \$65.50 b \$66 c \$67.80 d \$67.97 e not given29
- 30 The speed of sound is about 1100 feet per second. Bob sees lightning and then hears it thunder 20 seconds later. To the nearest mile, how many miles away was the lightning?
 f 4 g 6 h 8 i 10 j not given30

TEST 5 Arithmetic Reasoning PART II

DIRECTIONS: The answer to each of these examples can be thought out without doing any figuring on paper. You are to think out the answer and mark the answer space that is lettered the same as your choice.

- 31 Without working the examples, choose the one in which the quotient will be largest.
 a $19\overline{)938}$ b $19\overline{)940}$ c $19\overline{)934}$ d $19\overline{)937}$ 31
- 32 In which number is the 8 in the hundreds position?
 e 1089 f 1980 g 9801 h 1908 32
- 33 Which is the smallest fraction?
 a $\frac{1}{10}$ b $\frac{1}{50}$ c $\frac{1}{100}$ d $\frac{1}{5}$ 33
- 34 Without measuring, tell how many inches long this line is. _____
 e 1 f 2 g 3 h 4 34
- 35 How much is 19.7 rounded off to the nearest whole number?
 a 19 b $19\frac{7}{10}$ c 20 d 197 35
- 36 A loan which has real estate to guarantee its payment is —
 e interest f stock g capital h a mortgage 36
- 37 A kind of insurance which protects against lawsuits for damage is —
 a annuity b liability c theft d marine 37
- 38 By estimation, choose the example which will have the smallest product.
 e $\begin{array}{r} 806 \\ \times 4.50 \\ \hline \end{array}$ f $\begin{array}{r} 8.06 \\ \times 45.0 \\ \hline \end{array}$ g $\begin{array}{r} 80.6 \\ \times 4.50 \\ \hline \end{array}$ h $\begin{array}{r} 8.06 \\ \times 4.50 \\ \hline \end{array}$ 38
- 39 $\sqrt{64} =$ a 8 b 32 c 64 d 4096 39
- 40 How much is 150% of 20?
 e 3 f 7.5 g 30 h 75 40
- 41 Which line is horizontal?
 a $\left| \right.$ b \diagup c \diagdown d --- 41
- 42 If b is the base of a triangle and a is its altitude, the area of the triangle is —
 e $\frac{1}{2}ab$ f ab g $a + b$ h $2ab$ 42
- 43 17.5% is equal to the decimal —
 a .175 b 1.75 c 17.05 d 17.50 43
- 44 By estimation, choose the example whose quotient will be smaller than 1.
 e $126\overline{)127}$ f $138\overline{)137.2}$ g $156.3\overline{)157}$ h $125\overline{)125}$ 44
- 45 Which is the same as "4 less than 5 times a number = 21"?
 a $4 - 5 = 21N$ b $\frac{5N}{4} = 21$ c $21 \times 5 - 4 = N$
 d $5N - 4 = 21$ 45

Stop. 13 ➡

TEST 6 Arithmetic Computation

DIRECTIONS: Work each example. Then compare your answer with the answers given at the right of the example. If your answer is one of those given, mark the answer space that has the same letter as your answer. Sometimes the correct answer is not given. If the correct answer is not given, mark the answer space under the letter for **not given**. Look carefully at each example to see what it tells you to do. If you need to do any figuring, use a separate sheet of paper.

14 →

1 Multiply $\begin{array}{r} 450 \\ 7 \end{array}$ *a* 3050 *b* 3100 *c* 3150 *d* 3157 *e* not given... 1

2 Add $\begin{array}{r} \$4.80 \\ 9.65 \end{array}$ *f* \$13.45 *g* \$13.55 *h* \$14.55 *i* \$15.45 *j* not given... 2

3 Subtract $\begin{array}{r} \$5.00 \\ 4.48 \end{array}$ *a* \$.52 *b* \$.62 *c* \$1.48 *d* \$1.52 *e* not given... 3

4 $43\overline{)86}$ *f* 2 *g* 3 *h* 11 *i* 20 *j* not given... 4

5 Add $\begin{array}{r} 854 \\ 759 \\ 47 \\ 36 \end{array}$ *a* 1686 *b* 1696 *c* 1706 *d* 1796 *e* not given... 5

6 Multiply $\begin{array}{r} 75 \\ 14 \end{array}$ *f* 89 *g* 1010 *h* 1040 *i* 10,520 *j* not given... 6

7 Subtract $\begin{array}{r} 871,653 \\ 396,785 \end{array}$ *a* 474,868 *b* 475,868 *c* 484,968 *d* 485,868 *e* not given... 7

8 $34\overline{)748}$ *f* $19\frac{2}{34}$ *g* 22 *h* $24\frac{15}{17}$ *i* 112 *j* not given... 8

9 Multiply $\begin{array}{r} 310 \\ 203 \end{array}$ *a* 613 *b* 7130 *c* 62,930 *d* 64,960 *e* not given... 9

10 Subtract $\begin{array}{r} 8\frac{1}{10} \\ 7\frac{5}{6} \end{array}$ *f* $1\frac{4}{15}$ *g* $1\frac{7}{10}$ *h* $1\frac{14}{15}$ *i* $15\frac{14}{15}$ *j* not given... 10

11 Add $\begin{array}{r} \frac{1}{6} \\ \frac{1}{6} \end{array}$ *a* $\frac{1}{12}$ *b* $\frac{1}{3}$ *c* 1 *d* 2 *e* not given... 11

12 $\frac{1}{4} \times \frac{3}{4} =$ *f* $\frac{1}{4}$ *g* $\frac{1}{3}$ *h* $\frac{3}{8}$ *i* $\frac{3}{4}$ *j* not given... 12

13 $6 \div \frac{2}{5} =$ *a* $\frac{1}{15}$ *b* $\frac{3}{5}$ *c* 3 *d* 15 *e* not given... 13

14 4% of \$800 = *f* \$32 *g* \$200 *h* \$320 *i* \$804 *j* not given... 14

15 Add $\begin{array}{r} \frac{3}{4} \\ \frac{1}{3} \\ 2\frac{1}{12} \end{array}$ *a* $2\frac{1}{6}$ *b* $2\frac{5}{12}$ *c* $3\frac{1}{6}$ *d* $3\frac{1}{2}$ *e* not given... 15

16 $.2 \times .12 =$ *f* .024 *g* .06 *h* .6 *i* 24 *j* not given..... 16

17 Add $\begin{array}{r} 4474.59 \\ 7668.98 \\ 90.67 \\ \hline 698.56 \end{array}$ *a* 12,022.80 *b* 12,822.90 *c* 12,931.80
d 12,932.80 *e* not given..... 17

18 $6\overline{)5424}$ *f* 84 *g* 94 *h* 904 *i* 940 *j* not given..... 18

19 Selling Price = \$250 *a* \$10 *b* \$100 *c* \$240 *d* \$254
 Rate of Commission = 4% *e* not given..... 19
 Commission = ?

20 $8\overline{)16}$ *f* .002 *g* .2 *h* 2 *i* 20 *j* not given..... 20

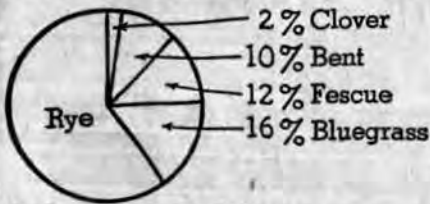
21 Subtract $\begin{array}{r} 3\frac{2}{3} \\ 3\frac{1}{5} \\ \hline \end{array}$ *a* 0 *b* $\frac{1}{3}$ *c* $\frac{7}{15}$ *d* $6\frac{13}{15}$ *e* not given..... 21

22 $4\frac{2}{3} \times 3\frac{3}{4} =$ *f* $7\frac{1}{2}$ *g* 12 *h* $12\frac{1}{2}$ *i* 15 *j* not given..... 22

23 If $d + 5 = 15$, $d =$ *a* 3 *b* 10 *c* 20 *d* 75 *e* not given..... 23

24 $\frac{5}{8} \div \frac{3}{10} =$ *f* $\frac{3}{16}$ *g* $\frac{4}{9}$ *h* $\frac{12}{25}$ *i* $2\frac{1}{12}$ *j* not given..... 24

15 →



25 What per cent of the grass seed is rye?
a 38% *b* 40% *c* 60% *d* 62%
e not given..... 25

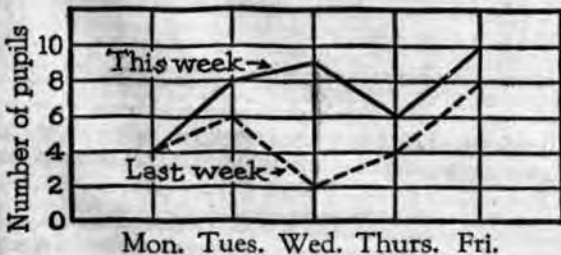
26 How many times as much bluegrass is there as clover?
f 2 *g* 8 *h* 16 *i* 18 *j* not given..... 26

A Grass Seed Mixture

27 Subtract $\begin{array}{r} 11 \text{ ft. } 4 \text{ in.} \\ 8 \text{ ft. } 8 \text{ in.} \\ \hline \end{array}$ *a* 2 ft. 6 in. *b* 2 ft. 8 in. *c* 3 ft. 4 in.
d 20 ft. 0 in. *e* not given..... 27

28 Add $\begin{array}{r} 4 \text{ hr. } 27 \text{ min.} \\ 4 \text{ hr. } 36 \text{ min.} \\ 3 \text{ hr. } 38 \text{ min.} \\ \hline \end{array}$ *f* 11 hr. 41 min. *g* 12 hr. 1 min. *h* 12 hr. 31 min.
i 12 hr. 51 min. *j* not given..... 28

NUMBER OF PUPILS ABSENT DURING A TWO-WEEK PERIOD



29 On which day of these two weeks were the most pupils absent?
a Tues. *b* Wed. *c* Thurs. *d* Fri.
e not given..... 29

30 How many more pupils were absent on Wednesday of this week than on Thursday of last week?
f 2 *g* 5 *h* 6 *i* 9 *j* not given 30

31 Find the average $\begin{array}{r} 16 \text{ ft.} \\ 32 \text{ ft.} \\ \hline 12 \text{ ft.} \end{array}$ *a* 12 ft. *b* $12\frac{1}{2}$ ft. *c* 16 ft. *d* 20 ft. *e* not given 31

TEST 6 *Arithmetic Computation* (Continued)

32 $.4\overline{)3}$ *f* .075 *g* $\frac{3}{4}$ *h* .75 *i* 7.5 *j* not given.....32

33 Add 21 m. 66 cm. *a* 53 m. 38 cm. *b* 54 m. 38 cm. *c* 65 m. 8 cm.
 32 m. 72 cm. *d* 66 m. 8 cm. *e* not given.....33



34 If $A = bh$, what is the area of the parallelogram shown at the left?
 f 32 *g* 36 *h* 160 *i* 1620 *j* not given.....34

35 If 10% of an amount is 25¢, what is the amount?
 a 2.5¢ *b* 25¢ *c* 40¢ *d* \$2.50 *e* not given.....35

36 $\frac{2}{6} = \frac{1}{?}$ *f* 3 *g* 5 *h* 7 *i* 12 *j* not given.....36

37 If $5r + 2 = 37$, $r =$ *a* 5 *b* 7 *c* 30 *d* 35 *e* not given.....37

38 Assessed Valuation = \$2000
 Tax Rate per \$100 = \$4.50
 Amount of Tax = ? *f* \$9 *g* \$15.50 *h* \$90 *i* \$2450 *j* not given...38

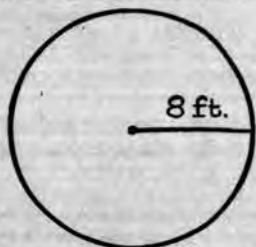
39 $\frac{-24}{-3} =$ *a* -24 *b* -8 *c* 8 *d* 21 *e* not given.....39

40 Multiply $\begin{matrix} -3y \\ -4 \end{matrix}$ *f* 12*y* *g* -12*y* *h* 12 *i* -12 *j* not given....40

41 Principal = \$400
 Annual Interest = \$20
 Rate of Interest = ? *a* .4% *b* 2% *c* 5% *d* 40% *e* not given 41

42 If $\frac{B}{2} = 16$, $B =$ *f* 14 *g* 16 *h* 18 *i* 32 *j* not given.....42

43 Principal = \$400
 Rate = 3%
 Time = 9 mo. *a* \$1.33 *b* \$9 *c* \$12 *d* \$108 *e* not given.....43
 Interest = ?



44 If $A = \pi r^2$, what is the area of the circle shown at the left?
 ($\pi = 3.14$)
 f 24.12 sq. ft. *g* 50.24 sq. ft. *h* 198.24 sq. ft.
 i 200.96 sq. ft. *j* not given.....44

Stop. 16 →

NAME _____ SCHOOL ATTENDED
LAST YEAR _____

SCHOOL ATTENDED LAST
SIX YEARS _____

ADD

$$\begin{array}{r} 648 \\ 3475 \\ 59 \\ 787 \\ \hline 6357 \end{array}$$

SUBTRACT

$$\begin{array}{r} 10530 \\ \hline 2946 \end{array}$$

MULTIPLY

$$\begin{array}{r} 729 \\ \hline 270 \end{array}$$

DIVIDE

$$63 \overline{) 2970}$$

ADD

$$\begin{array}{r} 3 \frac{1}{2} \\ 3 \frac{3}{5} \\ 3 \frac{1}{10} \\ \hline 10 \end{array}$$

SUBTRACT

$$\begin{array}{r} 5 \\ 1 \frac{8}{9} \\ \hline \end{array}$$

MULTIPLY

$$1 \frac{1}{6} \times 1 \frac{1}{4}$$

DIVIDE

$$6 \div \frac{1}{5}$$

ADD

$$\begin{array}{r} .85 \\ 9.74 \\ .12 \\ \hline 4.06 \end{array}$$

SUBTRACT

$$\begin{array}{r} 4.75 \\ \hline .06 \end{array}$$

MULTIPLY

$$\begin{array}{r} .0081 \\ \hline 42 \end{array}$$

DIVIDE

$$2.1 \overline{) 4.221}$$

FILL IN BLANKS

_____ inches in a yard

_____ quarts in a gallon

_____ pounds in a ton

_____ things in a dozen

_____ months in a year

_____ ounces in a pound

Ted bought a car for \$650. He put \$107.71 repair on the car. Later he sold the car for \$971.64. What was the profit?

Find the average of these numbers: 89, 164, 7, 2364, 87, 694.

MATCH THE TERMS BELOW:

1. The bottom number of a fraction _____
2. 12 of these are found in a foot _____
3. 3 feet make one of these _____
4. the distance around a figure _____
5. this contains two pints _____
6. 4 of these make a bushel _____
7. your answer when dividing _____
8. the answer in multiplying _____

- a. yard
- b. product
- c. peck
- d. denominator
- e. numerator
- f. inches
- g. perimeter
- h. difference
- i. quart
- j. quotient
- k. minuend

If 4 bars of soap cost \$1.00, how much will six bars cost?

A farmer has 30 cows. Five of these cows are jersey cows. What part are jersey?

A bus can carry 36 passengers. The bus fare is 7 cents. If the bus driver received \$1.96, how many people rode?