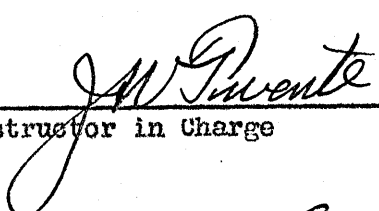A Comparative Study of Certain Dual Scholarship

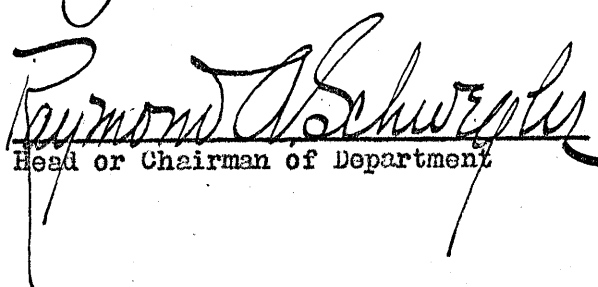Contest Scores and Their Relation to Intelligence Scores.

by

H. O. LeGrande, A.B., Ottawa University, 1921.

Submitted to the Department of Education and the
Faculty of the Graduate School of the University
of Kansas in partial fulfillment for the degree
of Master of Arts.

Approved by:

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June 1928

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CHAPTER I

INTRODUCTION

The movement to measure, more scientifically, educational products began about two decades ago. It was, of necessity, to a great extent theoretical. The elementary school was the field around which the educational yardstick was first placed. It is only since the World War that the newer methods of objective measurements have been generally used in the secondary schools and the institutions of higher learning.

In 1924 the Holton (Kansas) Senior High School challenged the Sabetha (Kansas) Senior High School to a dual scholarship contest in American history. This was the first dual scholarship contest.

In 1926 the Kansas State Teachers' College of Emporia brought this group contest idea, worked out on a larger scale, before the high schools of Kansas. The tests are constructed under the supervision of the Bureau of Educational Measurements and Standards at the State Teachers' College. In 1926 tests in 18 subjects were prepared for these contests. More than

65,000 pupils in 687 schools participated in these contests. More than 55 per cent of the schools sent reports to the Bureau of Measurements from which a summary report was made and sent to the participating schools for comparison purposes. The interest in the 1927 contests increased the number that took part to more than double that in 1926. There were more than 143,000 students who took part in the two contests of January 11th and March 15th.

A small charge is made for the tests to take care of the expense of conducting the contests. The tests cost 2 cents per copy, the report sheet 1 cent per copy and the general directions 1 cent per copy. Schools are asked to order early so that the approximate number of tests to be printed will be known. All postage is borne by the participating schools.

In these contests every member of the class takes part. The class accomplishment is determined by the mid-score. In this way a school is competing with all the schools that report on the test. It is not necessary to 'enter' the contest. A school participates in the contest when it sends in a report of its students on the test. A school may report on only one subject, even though all the tests have been given. A school may challenge another school or group of schools and contest with them independently of the regular contest group.

The tests are given as a regular examination in the classroom. They are given in all schools on the same day and scored under the direction of the superintendent or principal. General directions and keys for scoring accompany the tests. The tests are administered in 30 minutes and are so constructed that the scoring is objective and is quickly done.

There is only one form of the tests, hence it is not possible to determine the reliability. So far as the writer knows, there has been no attempt to determine the validity of these tests. They are not standardized except in the administration and scoring of them.

My purpose in making this study is to find if these contest examination results correlated with the Otis Intelligence Tests scores to about the same extent as did Standardized Educational Tests results. There has been such an added interest among educators, especially in Kansas, and so much school time is given to the preparation for and administration of these tests, that it seemed to me worth while to find the relation between pupils' scores on these tests and standard intelligence tests scores.

In Kansas the high schools are divided into four classes; viz, A, B, C, and D. The classification is based among other things, on (1) quality of work, (2) equipment, and (3) teacher preparation. It seems only fair to assume

that better work should be expected from the better class
schools. I shall make a comparison of the median scores of
the four classes of high schools on six of the subjects of
the contest examinations.

CHAPTER II

RELATED STUDIES AND LITERATURE

A great many studies have been made comparing the accomplishments on certain mental tests with those on selected educational tests. In most studies of this nature, however, standardized tests results have been used.

The amount of the correlation as found by the different investigators has varied considerably. It is agreed among previous investigators that variability in correlations between intelligence and accomplishment is caused, among other things, by the following: (1) the type of mental test used, (2) the type of educational test used, (3) the year or grade in school in which the tests are administered, and (4) the subject that is being tested.

It is generally agreed that there is a slight decrease in the correlations between intelligence and accomplishment from the grade schools through the high school and to the higher institutions of learning.

I shall review here a few of the typical studies that have been made in correlating mental achievement with educational achievement scores.

W. H. McCall reports[10] one of the early studies of this type. The purpose was to "discover the intercorrelations

Note: The number for each reference corresponds to the number in the alphabetically arranged bibliography.

of some of the recently developed educational and vocational tests and certain traditional psycho-physical tests when given to sixth grade public school pupils." Conclusions, in part, are as follows:

"(1) The corrected correlations among the Educational and Psychological tests and the functions which they measure continuously vary in size from -.63 to .98. ----------------------

(4) Ranked in the order of their correlation with mental ability the complex educational and vocational tests come first, the relatively complex practise tests second, and the simple practise tests last.

(5) The power tests, or those which measured the upper threshold of ability, showed a higher correlation with mental ability than the speed tests, or those which measured how rapidly a relatively easy task could be accurately performed. The power tests were superior not only as to correlations but also as to time required and the distribution of that time.

(6) The indications are that for a test to show a close correlation with mental ability it should emphasize power rather than speed and test a relatively complex function rather than a narrow mental trait."

Arthur I. Gates[7] summarizes in a study he reported as follows:

"Other things being equal the more verbal the material the higher the correlation with school attainment.

When the   individual group tests were arranged for the degree of verbalness, time being eliminated by the technique of partial correlation, the independent correlation (partial r first order) with achievement was .69.

Verbalness being equal, the greater the length of the test the higher the correlation with achievement.

The Stanford test and the verbal group tests yield very nearly the same correlations with particular school subjects, the former correlating relatively high with arithmetic, the latter with reading and spelling."

William H. Smith[13] correlates the high school grades of a group of freshmen with their coefficients of brightness, as found by the Otis Group Intelligence Test, Form A. The coefficient of correlation by the Spearman footrule method was .59 $\pm$.06 and by the Pearson method it was .53 $\pm$ .068. Smith concludes "that the Otis Group Tests are going to prove of value to us in predicting high school success."

A. H. McPhail[11] reports an experiment which was carried on in the grades. The National Intelligence Test, Form A, and the Lippincott-Chapman Test, in arithmetic and reading for grades V to VIII were used. For the lower grades Otis Primary Group Intelligence Scale and the Haggerty reading examinations, Sigma 1, were used.

McPhail gives the following findings: "A high coefficient of correlation was found between the National Intelligence Tests and scores on the Lippincott-Chapman Tests in reading

and arithmetic. The number of pupils in each of the four grades ranged from 12 to 124 with an average of 45. Eighteen coefficients of correlations were computed by the rank difference method between these two tests, ranging from .45 to .88, with a median of .68. Two coefficients of .65 and .66 were found by the product moment formula and were based upon 106 and 124 cases respectively."

In a study of 250 freshmen women at the University of Oklahoma, M. O. Wilson[17] correlated the Index of Brightness, as measured by the Otis Group Intelligence Test, Form A, with a grade point average, and found a correlation of .39 $\pm$.036.

Gustave A. Feingold[6] reports the correlations between intelligence and achievement in ten first year high school subjects. The intelligence test employed was a modified form of the Army-Alpha Test. The correlations obtained were by the Pearson formula. The correlations ranged from .25 to .53.

Feingold suggests: "The chief objection to the use of the intelligence tests in the high school is that they do not prognosticate with 100 per cent accuracy. As proof of their failure to do so, it is pointed out that the correlation between intelligence and scholarship is not very high. Generally speaking, in the three upper grades of the grammar

school it varies from .4 to .7; in the high school from .35 to .65; and in the colleges from .3 to .5. Results depend on the type of mental test used and the effort put forth by the pupils in their studies. The reason for this diminution is that as the individual grows older his interests become more fixed and his abilities more specialized."

John F. Taylor[16] found a high correlation (.78) between the Multi-mental and the Stanford Achievement Tests. He found also a correlation of .63 between the Binet Tests and the Stanford Achievement tests.

A. M. Jordan[9] reports the correlating of four intelligence tests: Otis, Terman, Army-Alpha and Milder, with the combined grade points of all subjects of 67 pupils in high school. He concludes, "Some tests are better for certain purposes than others but in no case has a really high correlation been found. The highest correlation obtained was .68."

It would not be possible to list here all the studies that show relationship existing between mental capacity and educational achievement. Enough are reported to show, as Feingold suggests, that the correlation spreads over a range from about .25 to .75, usually from about .4 to .65.

So far as the writer has been able to discover, there has been no attempt at a similar study with reference to

the comparisons of the accomplishments of the different class

high schools.

CHAPTER III

SPECIFIC FIELD OF THIS STUDY

The specific scope of this study is to find the
relationship existing between scores on the Otis Group
Intelligence Scale, Advanced Examination; Form A, and
achievement scores on the Kansas State Teachers' College
Dual Scholarship Contest Examinations of January 11th
and March 15th, 1927. Correlations are computed as fol-
lows:

<u>January Test Scores</u>

Between-
Otis	Scores	and	English	I-II
"	"	"	English	III-IV
"	"	"	English	V-VI
"	"	"	Algebra	I-II
"	"	"	Geometry	I-II
"	"	"	American History	

<u>March Test Scores</u>

Between-
Otis	Scores	And	English	I-II
"	"	"	English	III-IV
"	"	"	English	V-VI
"	"	"	Algebra	I-II
"	"	"	Geometry	I-II
"	"	"	American History	

Between-
E

<u>January Test Scores</u>			<u>March Test Scores</u>	
English	I-II	& English	I-II
English	III-IV	" English	III-IV
English	V-VI	" English	V-VI
Algebra	I-II	" Algebra	I-II
Geometry	I-II	" Geometry	I-II
American History		" American History	

Comparisons are made of the accomplishments on the same six subjects for the different class schools in Kansas. The high schools are classified A, B, C and D by the State Department of Education. Medians, Q_1, Q_3, Q and Standard Deviations are computed.

CHAPTER IV

METHOD OF SECURING DATA AND METHOD OF PROCEDURE

The data for this study were secured (1) from the mental tests given to pupils in the Eureka (Kansas) High School and (2) from the Dual Scholarship Contest Examinations of the Kansas State Teachers' College participated in by the high schools of Kansas on January 11th and March 15th, 1927.

The Otis Group Intelligence Scale, Advanced Examination, Form A, was administered to the students of the Eureka High School in the fall of 1926. The Otis scores were used in this study to correlate with subject scores of the Dual Scholarship Contest Tests.

The Dual Scholarship Tests were administered on January 11th and again on March 15th. Great care was taken in the administration of and scoring of these tests. The package of test material was not opened until the day of the examination, and then the instructors were not given access to the tests until the hour appointed for the administration. Two instructors were in each room during the testing period of all these tests. These papers were then graded by the regular

instructor and then were checked by another. A duplicate copy of the reports was made and kept in the high school files.

To make comparisons between the different classes of schools it was necessary to secure the scores of all pupils, of Kansas schools, who took part in the Dual Scholarship Contest of January 11th, in the six subjects the writer proposed to study. The scores were obtained through the cooperation of Dr. H. E. Schrammel of the Kansas State Teachers' College, who supervised the copying of the scores from the report sheets of the participating schools.

With these data at hand the writer proceeded (1) to correlate intelligence as measured by Otis scores, with scores on the six subjects of the January 11th and March 15th tests, (2) to correlate the scores of the six subjects of the two tests, and (3) to make comparisons between the different classes of schools of Kansas, viz, A, B, C and D.

The statistical method has been employed throughout this study. Use is made of tables and correlations, including medians, ranges and standard deviations. The Pearson Product Moment Formula has been used in computing all correlations.

The Pearson Product Moment Formula follows:

$$\text{Correlation or } r = \frac{\frac{\sum x\,y}{n} - c_x\,c_y}{\sigma x\ \sigma y}$$

CHAPTER   V

PRESENTATION OF DATA

Tables I to VI show the correlations found between
the Otis scores and the subject material scores for the
January 11th tests.

Table I shows a substantial relationship (.58) exist-
ing between the Otis scores and scores on the freshmen
English test. As will be seen, tables II for sophomores
and IV for juniors, show even higher correlations. (soph-
omores .676 and for juniors .764). The same test was used
for all English classes. The above correlations show a
constant increase from the freshmen to the junior year.
This seems to indicate verbalness in the Otis test. The
correlation of the Otis scores with the English V-VI
scores might be said to be high. It is somewhat in con-
trast with the relationship shown in tables IV, V and VI.
The small relationship shown in table VI is accounted
for by the lack of effort on the part of some of the
seniors. While some were doing all that could be expected
from them, yet others worked far below their capacity as
indicated by the Otis scores.

TABLE I
CORRELATION BETWEEN OTIS SCORES AND ENGLISH I-II SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

ENGLISH I-II SCORES, JANUARY 11	50–59	60–69	70–79	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
58–61															1	1
54–57												1				1
50–53									1	2						3
46–49							1	2	2	2	1					8
42–45							2		1	2						5
38–41							1	1	2	3	1					8
34–37					2		1	3	1		1	1				9
30–33							2	1			1					4
26–29		1		1	2	1	2		1	1						9
22–25					1		1	2	1							5
18–21	1						1	1								3
F_x	1	1		1	5	2	10	10	9	10	4	2			1	56

$$r = .581$$
$$P.E. = \pm .059$$

TABLE II
CORRELATION BETWEEN OTIS SCORES AND ENGLISH III-IV SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

ENGLISH III-IV SCORES, JANUARY 11	70–79	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
72–76												1		1
67–71											1			1
62–66									1		2	1		4
57–61							1	1	2					4
52–56				1				1	1	1				4
47–51	1				1	1		1	1	2				7
42–46						2	1		1					4
37–41				2			3	3	1					9
32–36			1	3			3	1						8
27–31				1	1		1	1						4
22–26	1													1
F_y	2		1	7	2	6	7	7	7	3	3	1	1	47

$$r = .676$$

$$P.E. = \pm .054$$

TABLE III

CORRELATION BETWEEN OTIS SCORES AND ENGLISH V-VI SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

ENGLISH SCORES V-VI, JANUARY 11	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	200–209	210–219	F_y
77–81										1				1	2
72–76											2		1		3
67–71								1		1	1				3
62–66							1		1	1	1				4
57–61				1	1	1	1	1							5
52–56					1		1	1							3
47–51			1	1			2	3							7
42–46				1	1										2
37–41			2			2	1			1					6
32–36	1					2									3
27–31				1											1
F_x	1		3	4	3	5	6	6	2	3	4		1	1	39

$$r = .764$$

$$P.E. = \pm .046$$

TABLE IV

CORRELATION BETWEEN OTIS SCORES AND ALGEBRA I-II SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
33–34						1				1		1	3
31–32						2	2						4
29–30					2	1				1			4
27–28		1		1	1	1	1	2					7
25–26			1	2	3		2	1					9
23–24		1	1	2		2	1	1					8
21–22				1	4	2	2	2					11
19–20				2	1	1	1						5
17–18	1			1									2
15–16		2		1			1						4
13–14					1								1
11–12		1											1
F_x	1	5	2	10	12	10	10	6	2			1	59

(Row label: ALGEBRA I-II SCORES, JANUARY 11)

$$r = .475$$

$$P.E. = \pm .068$$

TABLE V

CORRELATION BETWEEN OTIS SCORES AND GEOMETRY I-II SCORES

OTIS SCORES
ADVANCED EXAMINATION FORM A

	100 109	110 119	120 129	130 139	140 149	150 159	160 169	170 179	180 189	190 199	F_y
29-30								1			1
27-28									1		1
25-26								1			1
23-24	1				1					1	3
21-22				1	2	1	1	1			6
19-20			1		1						2
17-18						2					2
15-16			1	1	1	1	2				6
13-14		1		1		1					3
11-12	1			1							2
F_x	2	1	2	4	5	5	3	3	1	1	27

GEOMETRY SCORES, JANUARY 11

$$r = .519 \pm .096$$

TALBE VI
CORRELATION BETWEEN OTIS SCORES AND AMERICAN HISTORY SCORES
OTIS SCORES
ADVANCED EXAMINATION FORM A

AMERICAN HISTORY SCORES, JANUARY 11.	90 99	100 109	110 119	120 129	130 139	140 149	150 159	160 169	170 179	180 189	190 199	F_Y
50-51							2					2
48-49					1		1					2
46-47			1				1			1		3
44-45				1	2		1			2		6
42-43					2		1				1	4
40-41	1				1	1		1	1			5
38-39				1	1			2	2			6
36-37	1				2	1						4
34-35	1			1	1			1				4
32-33												0
30-32												0
28-29		1										1
F_X	3	1	1	3	10	2	6	4	3	3	1	37

$$r = .334 \pm .098$$

Tables VII to XII show the correlations between Otis Group Intelligence scores and the subject matter tests for March 15th, 1927.

The Otis correlations with English scores in tables VII, VIII and IX are somewhat different from the January correlations. The correlation with freshmen English is several points higher than for the January results, while the sophomore relation has changed but little and the junior correlation has fallen .22.

Table X shows the correlation between the Otis scores and algebra I-II for the March 15th test. This correlation is marked and is somewhat higher than that of the January 11th.

Table XI shows the correlation between the Otis scores and geometry I-II for the March 15th test. There is .07 increase over the Otis-geometry correlation for January.

Table XII shows the correlation between the Otis scores and American History scores for March 15th. The correlation is low. Another point that detracts from its significance is the size of the probable error. The correlation: $r = .193 \pm .108$, does not indicate much relationship.

TABLE VII
CORRELATION BETWEEN OTIS SCORES AND ENGLISH I-II SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

ENGLISH I-II SCORES, MARCH 15	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
65.5–68.4									1			1	2
62.5–65.4						1	2						3
59.5–62.4					1		2	1					4
56.5–59.4					2	2	2						6
53.5–56.4				2	1	1							4
50.5–53.4				1	1	2	3	1					8
47.5–50.4				2	2	2	1	1					8
44.5–47.4				1	1	1			1				4
41.5–44.4		1	1	1									3
38.5–41.4	1			1									2
35.5–38.4				1									1
32.5–35.4		1											1
F_x	1	2	1	9	8	9	10	3	2			1	46

$$r = .644$$

$$P.E. = \pm .058$$

TABLE VIII
CORRELATION BETWEEN OTIS SCORES AND ENGLISH III-IV SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

	70–79	80–89	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
75–77											1		1	2
72–74														0
69–71											1			1
66–68									2		2	1		5
63–65				1				1		1				3
60–62							2	1	3	2				8
57–59			1				1	1						3
54–56	1			2		3	1	2	1					10
51–53	1			1			2		1					5
48–50							1							1
45–47					1									1
F_x	2		1	4	1	4	6	5	7	3	4	1	1	39

ENGLISH III-IV SCORES, MARCH 15

$r = .648$

$P.E. = \pm .063$

TABLE IX
CORRELATION BETWEEN OTIS SCORES AND ENGLISH V-VI SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

ENGLISH V-VI SCORES, MARCH 15	80 89	90 99	100 109	110 119	120 129	130 139	140 149	150 159	160 169	170 179	180 189	190 199	200 209	210 219	F_y
78-81.9											1				1
74-77.9											1		1	1	3
70-73.9							1	1		2	1				5
66-69.9	1				1		2	1							5
62-65.9				2	1		1	2		1					7
58-61.9			2	1			2	1	2	1					9
54-57.9			1			2									3
50-53.9				1				1							2
46-49.9						3									3
42-45.9				1											1
F_x	1		3	4	3	5	6	6	2	4	3		1	1	39

$$r = .540$$

$$P.E. = \pm .076$$

TABLE X
CORRELATION BETWEEN OTIS SCORES AND ALGEBRA I-II SCORES

OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

	80 89	90 99	100 109	110 119	120 129	130 139	140 149	150 159	160 169	170 179	180 189	190 199	F_y
40-42									1			1	2
37-39													0
34-36													0
31-33				1			1						2
28-30					2	1		2					5
25-27				4	2	2	1			1			10
22-24		1	1		2	4	3	2					13
19-21				1	3	2	1						7
16-18				2			2						4
13-15		2	2	1	1			1					7
10-12	1	1		1									3
F_x	1	4	3	10	10	9	8	5	2			1	53

ALGEBRA I-II SCORES, MARCH 15

$r = .546$

$P.E. = \pm .065$

TABLE XI
CORRELATION BETWEEN OTIS SCORES AND ALGEBRA I-II SCORES
OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

GEOMETRY SCORES (RAW) MARCH 15	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_Y
32								1			1
29						1				1	2
28							2	1	1		4
27					1						1
26								2			2
25			1								1
24				1		1					2
23	1		1	1	1	1	1				6
22	1				1	1					3
21	1										1
19					1						1
17						1					1
F_X	3		2	2	4	5	3	4	1	1	25

r = .589
P.E.= ±.087

TABLE XII
CORRELATION BETWEEN OTIS SCORES AND AMERICAN HISTORY SCORES
OTIS SCORES
ADVANCED EXAMINATION
(FORM A)

	90–99	100–109	110–119	120–129	130–139	140–149	150–159	160–169	170–179	180–189	190–199	F_y
65–66			1		1		2					4
63–64						1	1				1	3
61–62					2		1					3
59–60				1			1		1			3
57–58										1		1
55–56				1				2		1		4
53–54	1											1
51–52					4		1		1			6
49–50	1			1	1	1		1	1			6
47–48	1	1			1							3
45–46								1				1
43–44												0
41–42							1					1
F_x	3	1	1	3	9	2	7	4	3	2	1	36

$$r = .193$$
$$P.E. = \pm .108$$

If the Dual Scholarship Contest Examinations are consistently difficult and the students are consistent in their study, then there should be a rather high correlation between the scores of the January and March tests.

Tables XIII, XIV and XV show correlations between the scores on the English tests of January and March. While these are^{not}high, they are apparently quite significant. The highest, .814 for English V-VI shows that these students were somewhat consistent and that the tests were quite reliable.

Table XVIII correlates the American History scores of the two tests. These scores correlate .68. While neither showed any appreciable correlation with the Otis scores, yet there is enough relation shown between the scores to indicate that the students were to some degree consistent.

In table XVI the correlation between the algebra scores (.53) and table XVII the correlation between the geometry scores (.51) are not high enough to be of any great significance.

TABLE XIII
CORRELATION BETWEEN ENGLISH I-II SCORES ON THE JANUARY 11th AND MARCH 15th TESTS

ENGLISH I-II SCORES

MARCH 15

ENGLISH I-II SCORES, JANUARY 11	32.5–35.4	35.5–38.4	38.5–41.4	41.5–44.4	44.5–47.4	47.5–50.4	50.5–53.4	53.5–56.4	56.5–59.4	59.5–62.4	62.5–65.4	65.5–68.4	Fy
58.61												1	1
54.57											1	1	2
50-53									1		2		3
46-49						2	1	1	1	2	1		8
42-45							2	2	1				5
38-41						2	1	1	3				7
34-37				1	1	3	2			1			8
30-33				1	1	1							3
26-29	1	1	2				2						6
22-25					2			1					3
18-21			1	1									2
Fx	1	1	3	3	4	8	8	5	6	3	4	2	48

r = .771

P.E. = ± .039

TABLE XIV

CORRELATION BETWEEN ENGLISH III-IV SCORES
ON THE JANUARY 11th AND MARCH 15th TESTS

ENGLISH III-IV SCORES

MARCH 15

	45 47	48 50	51 53	54 56	57 59	60 62	63 65	66 68	69 71	72 74	75 77	F_y
72-76											1	1
67-71											1	1
62-66								3	1			4
57-61						3	1					4
52-56						2	2					4
47-51	1			3		2		1				7
42-46		1		2		1	1					5
37-41			3	2	2							7
32-36				3	1							4
27-31			1		1							2
22-26			1									1
F_x	1	1	5	10	4	8	4	4	1		2	40

ENGLISH III-IV SCORES, JANUARY 11

$$r = .724$$

$$P.E. = \pm .051$$

TABLE XV

CORRELATION BETWEEN ENGLISH V-VI SCORES
ON THE JANUARY 11th AND MARCH 15th TESTS

ENGLISH V-VI SCORES

MARCH 15

ENGLISH V-VI SCORES, JANUARY 11	42 45.9	46 49.9	50 53.9	54 57.9	58 61.9	62 65.9	66 69.9	70 73.9	74 77.9	78 81.9	F_y
77-81.9								1	1		2
72-76.9									2	1	3
67-71.9								2			2
62-66.9					1	1	1	1			4
57-61.9				1	1	1	2	1			6
52-56.9						2	1				3
47-51.9			1	1	2	3					7
42-46.9			1		1						2
37-41.9		1		1	3						5
32-36.9		2					1				3
27-31.9	1										1
F_x	1	3	2	3	8	7	5	5	3	1	38

$$r = .814$$

$$P.E. = \pm.037$$

TABLE XVI

CORRELATION BETWEEN ALGEBRA SCORES
ON JANUARY 11th AND MARCH 15th TESTS

ALGEBRA I-II SCORES

MARCH 15

ALGEBRA SCORES, JANUARY 11	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 42	F_y
33-34				1							2	3
31-32				2	2	1		1				6
29-30					1	2	1					4
27-28	1		1		1	2	2					7
25-26				2	2	4						8
23-24		1	1	1	3	1	1					8
21-22		1	1	1	4		1	1				9
19-20		1		2								3
17-18	1											1
15-16		1	1									2
13-14		1										1
11-12		1										1
F_x	2	6	4	9	13	10	5	2			2	53

$$r = .53$$
$$P.E. = \pm .026$$

TABLE XVII

CORRELATION BETWEEN GEOMETRY SCORES
ON THE JANUARY 11th AND MARCH 15th TESTS

GEOMETRY SCORES

MARCH 15

	16 17.4	17.5 18.9	19 20.4	20.5 21.9	22 23.4	23.5 24.9	25 26.4	26.5 27.9	28 29.4	29.5 30.9	31 32.4	F_y
29-30										1		1
27-28									1			1
25-26							1					1
23-24				1	1				1			3
21-22					1	1	1	1	1			5
19-20					2							2
17-18					1	1	1		1			4
15-16	1			1	1		1		1			5
13-14					2							2
11-12					1							1
F_x	1		1	1	9	2	4	1	5		1	25

Geometry Scores, January 11

$r = .511$

$P.E. = \pm .099$

TABLE XVIII

CORRELATION BETWEEN AMERICAN HISTORY
SCORES ON THE JANUARY 11th AND MARCH 15th TESTS

AMERICAN HISTORY SCORES

MARCH 15

AMERICAN HISTORY SCORES, JANUARY 11	41 42	43 44	45 46	47 48	49 50	51 52	53 54	55 56	57 58	59 60	61 62	63 64	65 66	F_y
49-50													2	2
47-48											1		2	3
45-46						1				1				2
43-44								1	1	1	1	1		5
41-42	1				2	1		1			1	1		7
39-40						2	1	1		1				5
37-38			1	1				1				1		4
35-36				1	4	1								6
33-34														0
31-32														0
29-30				1										1
F_x	1		1	3	6	5	1	4	1	3	3	3	4	35

$$r = .681$$
$$P.E. = \pm .061$$

TABLE XIX

SUMMARY OF CORRELATIONS MADE IN THIS STUDY

	Subjects		Otis Scores	Dual Scholarship test Results March 15th
Dual Scholarship test results, January 11th	English	I-II	.58 ±.059	.77 ±.039
	English	III-IV	.676 ±.054	.724±.039
	English	V-VI	.764 ±.046	.814±.037
	Algebra	I-II	.475 ±.068	.53 ±.026
	Geometry	I-II	.519 ±.096	.511±.099
	American History		.334 ±.098	.681±.061
Dual Scholarship test results, March 15th	English	I-II	.644 ±.058	
	English	III-IV	.648 ±.063	
	English	V-VI	.54 ±.076	
	Algebra	I-II	.546 ±.065	
	Geometry	I-II	.589 ±.087	
	American History		.193 ±.108	

TABLE XX

MEDIANS FOR THE FOUR CLASSES OF SCHOOLS IN KANSAS
IN THE SIX SUBJECTS STUDIED (JANUARY TESTS)

Class	English I-II	English III-IV	English V-VI	Algebra I-II	Geometry I-II	American History
A	35.29	41.97	45.92	22.93	17.78	41.34
B	34.34	40.88	43.26	22.87	17.09	41.25
C	33.50	39.77	45.11	22.01	17.93	40.42
D	31.08	40.28	44.00	23.73	18.18	40.15

The above table shows the difference in the median
accomplishment of the classes A, B, C and D high schools of
the State. So far as the dual scholarship contest measures,
there is no appreciable difference in the work done by the
A and D schools. It is interesting to note that the average
difference in the median for the six subjects is only 1.3
points in favor of the class A schools over the class D
schools.

So far as the comparisons of the medians in algebra,
geometry and American history are indicative of accomplish-
ment there is little difference. There is a slight difference
in algebra and geometry in favor of the class D schools,

while the difference in American history favors the A and B schools.

Tables XXI, XXII and XXIII indicate measures of central tendency and of variation on the three English tests. There is a decided increase in the median scores from one year to the other. These results indicate that if the dual scholarship tests measure accomplishment in English , then the students in the participating high schools of Kansas are making some progress, at least. Whether or not this progress is enough to be accepted as satisfactory is not for the writer to suggest.

Tables XXIV and XXV show measures of central tendency and variation on the algebra and geometry tests, respectively. There is no appreciable difference in the scores of the different class schools. The small amount of difference does not favor the better class schools as did the English scores.

Table XXVI shows a closer grouping around the median in American History than in any of the other subjects.

TABLE XXI

MEDIAN, Q_1, Q_3, Q AND S.D. IN ENGLISH I-II AS OF JANUARY 11, FOR
CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2617	35.29	28.59	43.55	7.48	11.85
B	585	34.34	27.93	43.65	7.86	11.80
C	289	33.50	27.66	40.03	6.18	10.90
D	137	31.08	26.31	37.59	5.64	10.85

TABLE XXII

MEDIAN, Q_1, Q_3, Q AND S.D. IN ENGLISH III-IV AS OF JANUARY 11, FOR
CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2083	41.97	33.96	51.77	8.90	13.55
B	459	40.88	32.49	50.44	8.97	12.85
C	341	39.77	31.87	50.11	9.12	12.50
D	132	40.28	31.58	49.12	8.77	12.10

TABLE XXIII

MEDIAN, Q_1, Q_3, Q AND S.D. IN ENGLISH V-VI AS OF JANUARY 11, FOR CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2313	45.92	37.31	57.40	10.04	13.85
B	600	45.26	34.69	55.34	9.32	12.90
C	364	45.11	35.37	55.54	10.08	13.65
D	176	44.00	35.00	54.82	9.91	12.75

TABLE XXIV

MEDIAN, Q_1, Q_3, Q AND S.D. IN ALGEBRA I-II AS OF JANUARY 11, FOR CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2252	22.93	18.71	27.39	4.34	5.97
B	930	22.87	18.70	27.67	4.48	6.03
C	500	22.01	18.63	26.17	3.77	5.70
D	205	23.73	18.99	27.63	4.32	6.27

TABLE XXV

MEDIAN, Q_1, Q_3, Q AND S.D. IN GEOMETRY I-II AS OF JANUARY 11, FOR
CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2399	17.78	14.75	21.32	3.28	4.71
B	667	17.09	14.39	20.25	2.93	4.42
C	385	17.93	15.07	20.67	2.80	4.08
D	184	18.18	14.82	21.26	3.22	4.56

TABLE XXVI

MEDIAN, Q_1, Q_3, Q AND S.D. IN AMERICAN HISTORY AS OF JANUARY 11, FOR
CLASSES A, B, C AND D SCHOOLS

CLASS	NUMBER OF CASES	MEDIANS	Q_1	Q_3	Q	STANDARD DEVIATION
A	2204	41.34	36.61	45.58	4.48	5.64
B	580	41.35	36.11	45.46	4.67	6.72
C	351	40.42	36.14	45.01	4.43	6.96
D	161	40.15	35.59	45.12	4.76	6.36

CHAPTER VI

SUMMARY AND CONCLUSIONS

SUMMARY

An examination of the tables in this study will reveal the following findings:

(1) All correlations between the Dual Scholarship tests scores and Otis scores are positive, and all except the American History show marked relationship. The correlation between American History scores and Otis scores on the January and March tests were .33 and .19 respectively.

(2) Correlations between English scores and Otis scores were the highest found. Tables I, II, III, VII, VIII and IX show these results. The range is from .54 to .76.

(3) Correlations between the scores of the six subjects on the two tests are highest in English.

(4) The correlations between the Dual Scholarship Contest scores and Otis scores in this study compare favorably with a majority of similar studies where standardized test results were employed to correlate with intelligence tests scores.

(5) Table XX shows the medians for the six subjects studied, of all Kansas schools, by classes.

(6) There is a greater difference between the English medians from one year to another of the lower class schools than between those of the higher class schools.

CONCLUSIONS

(1) Results obtained in this study indicate that the Dual Scholarship Contest Examinations measure about the same thing that the Standardized Educational Tests measure.

(2) The correlations would have more meaning had there been larger numbers in the classes.

(3) It is questionable whether or not the medians are accurate for the lower class schools. (Table XX). The number of pupils in the class A schools probably is sufficient to secure a rather accurate measure. The grouping of the scores into five-step intervals makes the medians, for class D schools especially, questionable.

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APPENDIX

INSERTS

1.   The Otis Group Intelligence Scale,
   Advanced Examination, Form A.

2.   Kansas State Teachers' College Dual
   Scholarship Contest Examinations(Samples).

3.   General directions for administering the
   examinations.

OTIS GROUP INTELLIGENCE SCALE

Devised by ARTHUR S. OTIS

ADVANCED EXAMINATION: FORM A

Examination Number.......... Name...
(First name, initial, and last name)

Age last birthday.............years.   Birthday.................................
(Tell in figures)   (Month,   day)

School...   Grade.............

City....................................   Date....................19....
(Month,   day,   year)

(Do not write below this line.)

Remarks or Further Data

TEST	SCORE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total Score	
Norm	
IB	
PR	

1 ....
2 ....
3 ....
4 ....
5 ....
6 ....
7 ....
8 ....
9 ....
10 ....
11 ....
12 ....
13 ....
14 ....
15 ....

Following Directions

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Sample problem: Write the fifth letter of the alphabet.........................(E)

Begin here:

1. Do you understand that each letter is to be a capital made like printing and put in the parenthesis after the problem? If so, write C in the parenthesis.........( ) 1

2. Will you remember not to ask any questions during the examination? If so, write Q...( ) 2

3. Will you remember not to look toward the paper of any other pupil during the examination? If so, write L...( ) 3

4. Will you remember not to turn over your booklet or any page of it at any time unless you are told to? If so, write B; if not, write N......................( ) 4

5. Write the letter O...( ) 5

6. Write the eighth letter of the alphabet.......................................( ) 6

7. Write the same letter that you were told to write in the fifth problem.........( ) 7

8. Write the letter which follows the third letter of the alphabet...............( ) 8

9. Write the letter which the letter L follows in the alphabet...................( ) 9

10. If K comes after R in the alphabet, write K; if not, write R..................( ) 10

11. Suppose all the even numbered letters in the alphabet (that is, the 2d, 4th, 6th, etc.) were crossed out. The fifth letter left, not crossed out, would be what letter?( ) 11

12. Write the letter which follows the letter which comes next after B in the alphabet.( ) 12

13. If E and F appear together in the alphabet, write E, unless T and Z also appear together in the alphabet, in which case write T instead....................( ) 13

14. Write the letter which is the third letter to the right of the letter which is midway between K and O...( ) 14

15. Suppose that the first and second letters of the alphabet were interchanged, also the third and fourth, the fifth and sixth, etc. Write the letter which would then be the 14th letter in the alphabet...( ) 15

16. A certain letter is the second letter to the left of another letter. This other letter is the fifth letter to the right of Q. What is the "certain letter" first mentioned?..( ) 16

17. A certain letter is the fourth letter to the right of another letter. This other letter is midway between two other letters. One of these last two letters is next after E in the alphabet and the other is just before K in the alphabet. What is the "certain letter" first mentioned? ....( ) 17

18. If the letters in the word IF appear in the same order that they do in the alphabet and if the same is true of the letters in the word AN, write the letter Z. But if this is true of only one of these words, write the last letter of that word.........( ) 18

19. Find the letter which, in this sentence, appears a second time nearest the beginning. Write it, using a capital.....................................( ) 19

20. Find the two letters in the word AFTER which have just as many letters between them in the alphabet as in the word. Write the one of these two letters that comes first in the alphabet...( ) 20

Score...............

Opposites

Samples:
$$\begin{cases} \text{up} \ldots\ldots\ldots\ldots\text{(short,} \quad \underline{\text{down,}} \quad \text{small,} \quad \text{low,} \quad \text{young)} \\ \text{hot} \ldots\ldots\ldots\ldots\text{(warm,} \quad \text{ice,} \quad \text{dark,} \quad \underline{\text{cold,}} \quad \text{fire)} \end{cases}$$

DIRECTIONS. Look at the first word on each line, think what word means exactly the opposite of it, find that word among the five words in parenthesis on that line and draw a line under it.

Begin here:

1. east.......... (north,   west,   south,   pole,   equator)............. 1

2. yes.......... (may-be,   wrong,   no,   sure,   nothing)............. 2

3. top.......... (bottom,   side,   cover,   inside,   feet)............. 3

4. before........ (late,   now,   soon,   when,   after)............... 4

5. difficult....... (hard,   quick,   soft,   easy,   common)............. 5

6. friend........ (brother,   acquaintance,   enemy,   wife,   stranger).... 6

7. succeed....... (win,   decline,   fail,   accede,   try)............... 7

8. command...... (officer,   shout,   order,   obey,   soldier)............ 8

9. beautiful...... (crooked,   handsome,   old,   ugly,   dirty)............ 9

10. brave........ (painful,   fear,   weak,   stingy,   cowardly)........... 10

11. pride........ (sorrow,   humility,   miserable,   conceit,   proud)...... 11

12. expand....... (burst,   smaller,   contract,   vanish,   stay)........... 12

13. genuine....... (coarse,   counterfeit,   adulterated,   worthless,   impure) 13

14. help......... (person,   work,   push,   give,   hinder)............. 14

15. love.......... (like,   anger,   hate,   strange,   lover)............. 15

16. graceful....... (rough,   homely,   miserable,   awkward,   stout)....... 16

17. extravagant.... (miser,   humble,   economical,   poor,   wasteful)....... 17

18. cause........ (reason,   because,   origin,   effect,   why)............ 18

19. abolish........ (alter,   create,   continue,   destroy,   change) 19

20. loyal......... (treacherous,   enemy,   thief,   coward,   jealous)....... 20

21. always........ (sometimes,   often,   occasionally,   seldom,   never).... 21

22. fickle......... (silly,   constant,   stationary,   solid,   sober).......... 22

23. therefore...... (since,   why,   may-be,   there,   cause).............. 23

24. however....... (nevertheless,   moreover,   whether,   even,   never).... 24

25. unless........ (and,   therefore,   however,   also,   if).............. 25

Score..............

Disarranged Sentences

Samples:
$\left\{\begin{array}{l}\text{men\quad money\quad for\quad work} \dots\dots\dots\dots\dots\dots\text{(\underline{true}\qquad false)}\\\text{uphill\quad rivers\quad flow\quad all} \dots\dots\dots\dots\dots\dots\text{(true\qquad \underline{false})}\\\text{ocean\quad waves\quad the\quad has} \dots\dots\dots\dots\dots\dots\text{(true\qquad false)}\end{array}\right.$

DIRECTIONS.   The words on each line below make one sentence if put in order.   If the sentence the words would make is *true*, underline the word *true* at the side of the page.   If the sentence they would make is *false*, underline the word *false*.

Begin here:

1. eat grass cows..(true   false)   1
2. sail ocean ships the on............................(true   false)   2
3. sun morning the the in sets......................(true   false)   3
4. trees birds nests the in build..................(true   false)   4
5. mountains live the in whales.....................(true   false)   5
6. comes Christmas a but year once.................(true   false)   6
7. float iron water on will.........................(true   false)   7
8. days there in are week seven a.................(true   false)   8
9. usually are of made tables wood.................(true   false)   9
10. has short very a a neck giraffe................(true   false)   10
11. cream ice children like most.....................(true   false)   11
12. milk bees flowers gather the from...............(true   false)   12
13. obtained sea sugar from is water................(true   false)   13
14. fuel wood are coal and for burned..............(true   false)   14
15. substances light lead gold and are very........(true   false)   15
16. rivers lakes and many desert has a.............(true   false)   16
17. moon earth the from feet twenty the is........(true   false)   17
18. hump camel has a his a back on................(true   false)   18
19. grow and apples ground oranges the in..........(true   false)   19
20. music fond people many are of..................(true   false)   20
21. and eat good gold silver to are ....(true   false)   21
22. clouds rain sky from comes the the in.........(true   false)   22
23. mile a a a travel snail in can minute........(true   false)   23
24. automobile pocket man his keeps a his in......(true   false)   24
25. vote persons twenty-one cannot under ....(true   false)   25

Right..........*Wrong*...........   *Score*.............

TEST 4

Proverbs

DIRECTIONS. Read each proverb, find the statement that explains it, and put the number of that statement in the parenthesis before the proverb.

Proverbs (Group 1)

( ) Make hay while the sun shines.
( ) A drowning man will grasp at straws.
( ) A stitch in time saves nine.
( ) Rats desert a sinking ship.
( ) In a calm sea every man is a pilot.
( ) Destroy the lion while it is young.
( ) He who would eat the kernel must crack the nut.
( ) One swallow does not make a summer.
( ) People who live in glass houses must not throw stones.
( ) A mouse must not think to cast a shadow like an elephant.

Statements to Explain Proverbs in Group 1

1. It pays to attend to troubles before they get worse.
2. Leadership is easy when all goes well.
3. Make the best of your opportunities.
4. Those who would reap rewards must work for them.
5. It pays to do only one thing at a time.
6. Desperate people cling to absurd hopes.
7. False friends flee from us in disaster.
8. Weed out bad habits before they are too firmly established.
9. It is best to be silent when there is nothing to say.
10. Those who have faults should not criticize others.
11. Do not attempt the impossible.
12. A single sign is not convincing.

Proverbs (Group 2)

( ) Every rose has its thorn.
( ) A tree is known by its fruits.
( ) All is not gold that glitters.
( ) Where there is much smoke there must be some fire.
( ) No wind can do him good who steers for no port.
( ) Plant the crab tree where you will, it will not bear sweet apples.
( ) A bird in the hand is worth two in the bush.
( ) Too many cooks spoil the broth.
( ) Meddle not with dirt — some of it will stick to you.
( ) It is a long road that has no turn.

Statements to Explain Proverbs in Group 2

1. Environment will not change one's nature.
2. There is no happiness without its pain or sorrow.
3. Appearances are often deceptive.
4. It is better to be content with little than to gamble for more.
5. One cannot have the same luck forever.
6. No object can be attained without some sacrifice.
7. Deeds show the man.
8. We cannot help those who have no object in life.
9. Suspicions usually have some basis.
10. Association with evil is sure to leave its effect.
11. Who undertakes too much accomplishes little.
12. Division of responsibility brings poor results.

Score. . . . .

Arithmetic

DIRECTIONS. Place the answer to each problem in the parenthesis after the problem. Do any figuring you wish on the margin of the page.

1. If a boy had 10 cents and earned 5 cents, how much money did he have then?...(   ) cents   1

2. At 4 cents each, how much will 12 pencils cost? ....(   ) cents   2

3. If a man had $25 and spent $10, how much money did he have left?...(   ) dollars   3

4. At 6 cents each, how many pencils can be bought for 48 cents? ....(   ) pencils   4

5. A boy spent 20 cents and then earned 30 cents. How much more money did he have than at first?...............................(   ) cents   5

6. How far can a train go in 5 hours at the rate of 40 miles per hour? ....(   ) miles   6

7. How long will it take a glacier to move 1000 feet at the rate of 100 feet a year?...(   ) years   7

8. If $2\frac{1}{2}$ yards of cloth cost 20 cents, what will 10 yards cost? ....(   ) cents   8

9. If 2 pencils cost 5 cents, how many pencils can be bought for 50 cents?(   ) pencils   9

10. If a man walks east from his home 7 blocks and then walks west 4 blocks, how far is he from his home? ....(   ) blocks   10

11. If a boy can run at the rate of 5 feet in $\frac{1}{5}$ of a second, how far can he run in 10 seconds?.......................................(   ) feet   11

12. A ship has provisions enough to last a crew of 20 men 50 days. How long would they last a crew of 40 men?.........................(   ) days   12

13. One schoolroom has 7 rows of seats with 8 seats in each row, and another schoolroom has 6 rows of seats with 9 seats in each row. How many more seats does one room have than the other?................(   ) seats   13

14. If 10 boxes full of oranges weigh 500 pounds, and each box when empty weighs 5 pounds, what do all the oranges weigh?..............(   ) pounds   14

15. Town X is 30 miles north of Town Y. Town Y is 15 miles north of Town Z. How far is Town Z from Town X? ....(   ) miles   15

16. If $3\frac{1}{2}$ yards of cloth cost 70 cents, what will $2\frac{1}{2}$ yards cost? ....(   ) cents   16

17. If a strip of cloth 36 inches long will shrink to 33 inches when washed, how long will a 48-inch strip be after shrinking?....................(   ) inches   17

18. If Frank can ride a bicycle 300 feet while George runs 200 feet, how far can Frank ride while George runs 300 feet? ....(   ) feet   18

19. A hotel serves a mixture of 3 parts cream and 2 parts milk. How many pints of cream will it take to make 25 pints of the mixture? .....(   ) pints   19

20. If a wire 20 inches long is to be cut so that one piece is $\frac{2}{3}$ as long as the other piece, how long must the longest piece be? ....(   ) inches   20
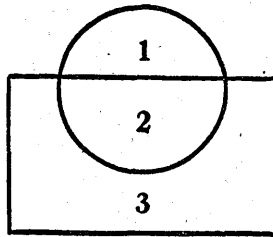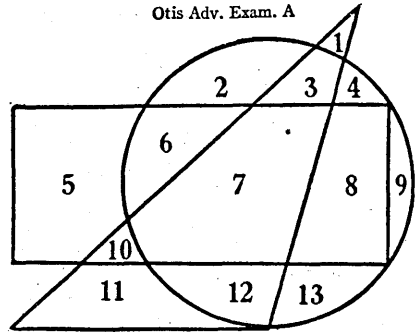
Score.............

Geometric Figures

DIRECTIONS. Each problem asks a question that is answered by a number. Write the answer to each problem in the parenthesis after the statement of the problem.

Fig. I

Fig. II

Sample problem:

- Look at Fig. I. What number is in the circle but not in the rectangle?........... (1)

1. What number in Fig. I is in the rectangle but not in the circle?............... ( ) 1

2. What number in Fig. I is in both the rectangle and the circle?............... ( ) 2

3. Look at Fig. II (at the right). What number is in the rectangle but not in the circle nor in the triangle?.. ( ) 3

4. What number in Fig. II is in the rectangle and in the triangle but not in the circle? ( ) 4
(The remaining questions all refer to Fig. II.)

5. What number is in the circle and in the rectangle and in the triangle?............ ( ) 5

6. What is the smallest number that is in the triangle but not in the circle nor in the rectangle?.. ( ) 6

7. What is the largest number that is in the circle but not in the triangle nor in the rectangle?.. ( ) 7

8. Write the number that is in the lowest space that is in the triangle and in the circle but not in the rectangle..................................... ( ) 8

9. Find the geometrical figure (circle, triangle, or rectangle) that has the least number of spaces in it. Write that number of spaces........................... ( ) 9

10. How many spaces are there each of which is in all three geometric figures?........ ( ) 10

11. How many spaces are there each of which is in one and only one geometric figure?..( ) 11

12. How many spaces are there each of which is in two and only two geometric figures?( ) 12

13. We may say that space 12 is *like* space 3 because they are *both* in the circle and triangle but not in the rectangle. Any space is *like* another which is in exactly the same geometrical figures. Write the number of the space which is like space 6......( ) 13

14. Write the number of the space which is like space 1............................ ( ) 14

15. How many other spaces are there like space 9?................................ ( ) 15

16. There is no other space like space 5, so we may call space 5 *unique* (yūneek). Any space is unique which has no other space like it. Examine spaces 8, 9, 10, 11, 12, and 13 in order until you find another unique space. Write its number.............( ) 16

17. How many unique spaces are there in Fig. II?................................( ) 17

18. What is the greatest number of unique spaces which it is possible to make by overlapping a circle, triangle, and rectangle? (You may draw any figures you wish on the margin of this page)... ( ) 18

19. Also what is the least number of unique spaces possible? .... ( ) 19

20. What is the greatest number of spaces which it is possible to make by overlapping a circle, triangle, and rectangle?... ( ) 20

Score.............

TEST 7

Analogies

Samples:
$$\begin{cases} \text{finger : hand — toe : (?)} \dots \underline{\text{foot}}, \text{ knee, arm, shoe, nail} \\ \text{clothes : man — fur : (?)} \dots \text{coat, } \underline{\text{animal}}, \text{ hair, skin, cloth} \\ \text{tall : short — fat : (?)} \dots \text{man, wide, thin, boy, heavy} \end{cases}$$

DIRECTIONS. The first sample means: Finger is to hand as toe is to what? Underline the word on each line that should go in the parenthesis in place of the question mark.

Begin here:

1. hand : arm — foot : (?) . . . . leg, toe, finger, wrist, elbow   1

2. peeling : banana — shell : (?) . . . . skin, orange, egg, juice, ripe   2

3. wool : sheep — feathers : (?) . . . . pillow, rabbit, bird, goat, bed   3

4. coal : locomotive — (?) : automobile . . . . motorcycle, smoke, wheels, gasoline, horn   4

5. man : woman — brother : (?) . . . . daughter, sister, boy, mother, son   5

6. automobile : wagon — motorcycle : (?) . . walking, horse, buggy, train, bicycle   6

7. hospital : the sick — (?) : criminals . . . . . doctor, asylum, judge, prison, sentence . .   7

8. hat : head — thimble : (?) . . . . finger, needle, thread, hand, sewing   8

9. captain : ship — mayor : (?) . . . . state, council, city, ship, boss   9

10. better : good — worse : (?) . . . . very good, medium, bad, much worse, best   10

11. grass : cattle — bread : (?) . . . . butter, flour, milk, man, horses   11

12. large : object — loud : (?) . . . . soft, small, heavy, weight, sound   12

13. king : kingdom — president : (?) . . . . vice president, senate, republic, queen, democrat   13

14. revolver : man — (?) : bee . . . . wings, honey, flying, wax, sting   14

15. egg : bird — (?) : plant . . . . seed, shell, leaf, root, feathers   15

16. education : ignorance — (?) : poverty . . . laziness, school, wealth, charity, teacher .   16

17. circle : square — sphere : (?) . . . . circumference, cube, round, corners, ball   17

18. point : line — line : (?) . . . . surface, pencil, dot, curve, solid   18

19. sanitation : disease — (?) : accident . . . . . doctor, hospital, bandage, cleanliness, care   19

20. ordinary : exceptional — many : (?) . . . . all, none, few, common, more   20

21. sunlight : darkness — (?) : stillness . . . . . quiet, sound, dark, loud, moonlight   21

22. peninsula : land — (?) : ocean . . . . river, lake, cape, gulf, water   22

23. ellipse : circle — (?) : square . . . . cube, curve, oval, circle, diamond   23

24. violence : anger — (?) : love . . . . caressing, hate, temper, hope, happiness   24

25. evolution : revolution — crawl : (?) . . . . . baby, floor, stand, run, hands and knees   25

Score . . . .

Similarities Test

Samples:
{ hat, collar, glove.......... hand,   cane,   head,   <u>shoe</u>,   house
{ rose, daisy, violet......... bush,   red,   plant,   bed,   <u>pansy</u>
{ desk, bed, chair.......... book,   table,   floor,   pencil,   coat

DIRECTIONS. Find the way in which the first three things on a line are alike. Then look at the five other things on the same line and draw a line under the one that is *most* like the first three.

1. red, white, green................. rose,   paper,   grass,   soft,   blue........   1
2. apple, peach, pear................ seed,   tree,   plum,   juice,   peel........   2
3. pan, bowl, basket............... pail,   handle,   knife,   fork,   spoon......   3
4. snake, cow, sparrow.............. tree,   doll,   pig,   feather,   skin........   4
5. ship, bicycle, carriage........... sail,   automobile,   wheel,   ocean,   harness   5
6. cannon ball, wire, penny.......... dollar bill,   bone,   string,   pencil,   key...   6
7. president, captain, general....... ship,   army,   king,   republic,   soldier....   7
8. book, teacher, newspaper........ pencil,   magazine,   ink,   card,   box.....   8
9. ax, knife, shears............... hammer,   razor,   hoe,   rake,   fork......   9
10. ivory, snow, milk............... butter,   rain,   cold,   cotton,   water.....   10
11. day, say, gay................... night,   said,   joy,   happy,   lay........   11
12. nut, turnip, potato............. shell,   tree,   bush,   milk,   apple........   12
13. strong, bad, fast............... and,   man,   soon,   round,   come........   13
14. generous, kind, honest.......... strong,   selfish,   wise,   loyal,   rich......   14
15. joy, anger, fear............... habit,   memory,   hate,   life,   hearing....   15

Continue below in the same way.

Sample:

16. 16

17. 17

18. 18

19. 19

20. 20
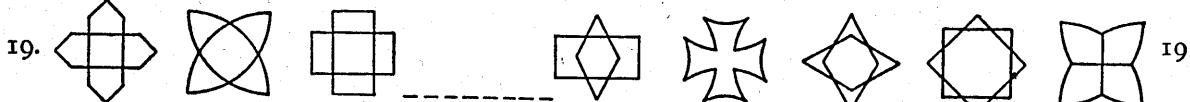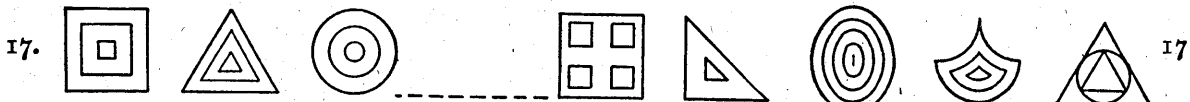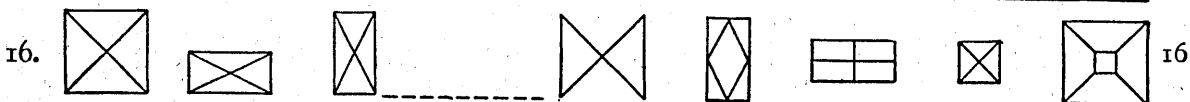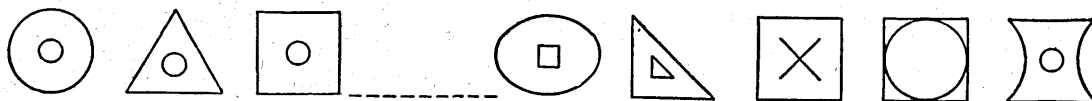
Score..............

Narrative Completion

DIRECTIONS. For each numbered blank in the story, choose the best word of the three in the list having the same number as the blank. Underline the word you choose. You may write these words in the blank spaces if you wish, but only the underlining counts. Do nothing about the blanks that are not numbered.

The Reward of Kindness

Once upon a .... there was a .... that lived in a .... One (1) ... (2) ... (3) .... as he was roaming about, he stepped on a .... and it stuck in his .... (4) ... (5) In great pain he .... out of the .... (6) in search of some one who would .... out the ....

At last he saw a .... and went up to him (7) as if to say, "............. pull this .... out of my ...." The .... saw what was the .... and was so .... (8) to see the lion suffer that he forgot to be frightened. Very .... he pulled the thorn out of the (9) lion's foot. The .... was so .... (10) that he .... the shepherd's .... (11) and went away without .... him. (12)

Not long after, the .... was blamed for a cruel deed which he had not .... The .... said: "He .... die. (13) ... (14) Throw .... into the lion's den." So the king's men .... shepherd and put him into the .... with a great .... It was the very .... the (15) shepherd had .... near the forest. And lo! Instead of .... the ...., the (16) lion only licked his hand.

The................ was amazed. He .... the shepherd to .... (17) his power over the .... Then the .... how he had (18) .... the .... of .... Upon .... (19) ... (20) this, the .... said, "This man .... no .... (21) ... (22) deed. Let him go." So the................ .... freed and after that no .... (23) .... him of................ .... (24) ... (25) Have you heard this story before?..............

Score................

Underline words here

1. time	place	man	1
2. man	lion	dog	2
3. street	garden	forest	3
4. tack	thorn	rock	4
5. back	hand	foot	5
6. came	limped	ran	6
7. shepherd	hunter	woodsman	7
8. glad	sorry	anxious	8
9. gently	nicely	suddenly	9
10. angry	hungry	grateful	10
11. hand	sheep	dog	11
12. eating	thanking	harming	12
13. hunter	king	people	13
14. must	may	will	14
15. man	shout	lion	15
16. fighting	killing	helping	16
17. lion	shepherd	king	17
18. explain	give	keep	18
19. softened	relieved	satisfied	19
20. hunger	anger	suffering	20
21. king	people	men	21
22. cruel	kind	good	22
23. dog	lion	shepherd	23
24. knew	accused	hurt	24
25. many	other	cruel	25

Memory

DIRECTIONS. Read each question and if the right answer, according to the story, is *yes*, draw a line under the word *yes*. If the right answer is *no*, draw a line under the word *no*. But if you do not know the right answer, because the story didn't say, draw a line under the words *didn't say*.

Samples :
$\begin{cases}\end{cases}$
Was the story about a king?............................(<u>yes</u> no didn't say)
Was the king's daughter sixteen years old?..............(yes no <u>didn't say</u>)
Was she ugly?....................................(yes <u>no</u> didn't say)

Begin here:

1. Was the king fond of hearing stories?........................(yes no didn't say) 1
2. Did the king offer his daughter to any one who could tell him a story that would last forever?....................................(yes no didn't say) 2
3. Did he offer all his kingdom also?............................(yes no didn't say) 3
4. Did he say, "but if he fails he shall be cast into prison"?.........(yes no didn't say) 4
5. Was the king's daughter pretty?..............................(yes no didn't say) 5
6. Did she like stories, too?....................................(yes no didn't say) 6
7. Did the story say that after a long time a young man came and offered to tell the king a story?..............................(yes no didn't say) 7
8. Did the first man's story last a week?.........................(yes no didn't say) 8
9. Was the first man's head cut off?.............................(yes no didn't say) 9
10. Did the king then order another man to tell him a story?.........(yes no didn't say) 10
11. Did each man's story last longer than that of the one before? .....(yes no didn't say) 11
12. Were all the young men who came to tell stories handsome?.......(yes no didn't say) 12
13. Did a handsome young man say to the king, "I can tell you a story that will last forever"?....................................(yes no didn't say) 13
14. Did the king beg the young man not to try?...................(yes no didn't say) 14
15. Was the king's daughter afraid he would fail?..................(yes no didn't say) 15
16. Did she love him and so not want to see him killed?............(yes no didn't say) 16
17. Did the young man tell the princess to have no fear?............(yes no didn't say) 17
18. According to the young man's story, did a rich man order a huge granary built?..(yes no didn't say) 18
19. Did he have it filled with oats to the very tip-top?.............(yes no didn't say) 19
20. Was a very small hole left between the bricks near the ground?....(yes no didn't say) 20
21. Was the hole just big enough to let one little ant through?.......(yes no didn't say) 21
22. Did the young man say that one day a little ant went in and carried off a grain of wheat?......................................(yes no didn't say) 22
23. Did he say that the next day another little ant went in and carried off another grain of wheat?..................................(yes no didn't say) 23
24. Did the king plead with the young man to tell him what happened after that?..(yes no didn't say) 24
25. Did the young man say, "Why, after that the ants just kept on carrying off the wheat"?......................................(yes no didn't say) 25
26. Did the king finally say, "Man, man, your story will last forever"?(yes no didn't say) 26
27. Did he say, "Take my daughter and half my kingdom and don't speak to me again"?....................................(yes no didn't say) 27
28. Did the young man marry the princess?.......................(yes no didn't say) 28
29. Did the king ever want to hear another story? ....(yes no didn't say) 29
30. Was the name of this story, "The story that had no end"?.......(yes no didn't say) 30
Have you heard this story before?..............(yes   no)

Score...............

Directions: Answer the easiest parts first. Go back and work on the others. You will have exactly 30 minutes.

ENGLISH TEST

Arranged by E. R. Barrett and Teresa M. Ryan
with valuable assistance from the high
school teachers of English.

TOTAL POINTS

Pupil .... Age .... Grade ....

School .... Town .... State .... Date ......

I

PUNCTUATION

DIRECTIONS: Some of the punctuation marks in the sentences below are correct. Some are not. Look carefully at each punctuation mark. If you think that it is the correct mark for the place, draw a line under the number below that mark. If you think that the mark should not be used, do not make any line under the number beneath it.

Some of the words beginning with capitals are preceded by small letters in parentheses. If you think the word should begin with a capital, draw a line under the number below that capital. If you think the small letter should be used, draw a line under the number below the small letter.

Example:

" (j) John, bought, ; a pen, ; a pencil, : and a (b) Book. ? "
1   2   3   4   5   6   7   8   9   10   11   12   13   14   15

In this sentence commas should be used after "pen" and "pencil"; therefore a line is placed under 7 and 9, the numbers below these commas. A period should be placed at the end of the sentence; therefore a line is placed placed under the number 13, below the period. None of the other punctuation marks should be used, and so no mark is made under the numbers below them. The word "John" should begin with a capital letter; therefore a line is placed under the number 3, below the capital J. The word "book" should begin with a small letter; therefore a line is placed under the number 11, below the small b.

I. In Washington, D. C. , (m) March, 4, 1925, (p) President
               1   2   3   4   5   6   7   8   9   10   11

Coolidge took the oath of office.
            12

II. "Have you your books, John, ? " "asked the (t) Teacher. ? "
      1   2   3   4   5   6   7   8   9   10   11

III. When the game was over; , the official announced; , "The score,
                     1   2   3   4   5   6

is twenty-six, to ten; , " "Westgate wins the championship. "
  7   8   9   10   11   12   13   14

IV. The boy, that lives next door to (m) Me, says, "that he came from
          1   2   3   4   5   6

Kansas (c) City, Missouri, with a friend of our ' s. "
       7   8   9   10   11   12   13

V. We hear that (s) Senator Curtis, who is now in Washington, spends
              1   2   3   4

much of his vacation in Kansas; , which is his (n) Native (s) State.
                      5   6   7   8   9   10   11

II

DICTION AND SENTENCE STRUCTURE

A

DIRECTIONS: A number, in parenthesis, is placed before each of several words in the following sentences. One of these words in each sentence is **wrongly** used. Write the number of this word in the parenthesis at the beginning of the sentence. If you think that two words in a sentence are incorrect, write the number of the one that you think makes the greater error.

Example: (3) I (1)tell (2)you he has (3) sang that song (4) twice this (5) evening.

"Sang" is incorrectly used here for "sung"; therefore, "3," the number of the word "sang," is placed in the parenthesis at the beginning of the sentence.

( ) I. The (1)coach (2)will not give me my football (3)suit (4)until tomorrow, (5)though (6)most all (7)of the boys on the team (8)got (9)theirs yesterday.

( ) II. The boy (1)rose from the ground (2)where' he (3)lay and (4)shook the dust off (5)of his (6)clothes.

( ) III. An (1)old (2)woman will be (3)hanged on July 1 for (4)murdering her husband if the Governor (6)don't (7)commute the (8)sentence.

( ) IV. When mother (1)knew that the apples were (2)frozen, she (3)gave some of them to (4)us children, and the (5)balance she (6)threw (7)away.

( ) V. When I (1)asked Lois if 'she (2)were (3)willing to have (5)us girls help her, she said she (6)wanted us to (7)leave her do the work (8)herself, as it would not take her long.

( ) VI. Jane (1)told me (2)that (3)when the bread (4)had (5)raised to the top of the pan, I (6)should (7)knead it down again.

( ) VII. Kansas (1)may (2)well boast (4)of having one of the (5)most (6)healthy climates to (7)be (8)found in this country.

( ) VIII. The (1)party (2)reached the (3)station (4)plenty soon enough to (5)catch the train for Chicago, in (6)which city they (7)wished to be the (8)next (9)day.

( ) IX. When the class (1)told the teacher (2)that they had (3)already (4)memorized the poem; she said, (5)"Alright, I (6)shall give you a (7)chance to write it (8)from (9)memory."

( ) X. When (1)no one (2)could find Carl. . . .(3)anywhere, . . .(4)everybody (5)thought he (6)must (7)of gone (8)home. . . . .

B

DIRECTIONS: In the following letter some of the numbered groups of words make complete sentences. Other groups do not. If you think the first group of words makes a complete sentence, put a cross in the square numbered "1." In like manner, for each group of words that makes a complete sentence, put a cross in the square having the **same number** as that group.

Dear Sir:

1. ☐   (1) Your letter of March 12 at
2. ☐   hand. (2) I appreciate very much
3. ☐   your prompt reply. (3) Am asking you to send the books to my new ad-
4. ☐   dress. (4) Upon receipt of bill, I
5. ☐   will send my check. (5) The price
6. ☐   not being stated. (6) For this reason 1 am not enclosing check in this
7. ☐   letter. (7) If you cannot fill the
8. ☐   order at once. (8) Because you
9. ☐   have not the books in stock. (9) If you must delay the order a week,
10. ☐   write me. (10) Several customers
11. ☐   are awaiting the books. (11) Not wishing them to wait longer if we
12. ☐   can avoid the delay. (12) Hoping to have the order filled at once,

Very truly yours,

J. C. Dorm.

III

VERB USAGE

DIRECTIONS: In the following sentences, several words are enclosed in parentheses. Each of these words is numbered. Only one of these words is the correct word for the

place. Write the number of the correct word in the parenthesis at the beginning of the sentence.

Example: (2) The child (1 speaked, 2 spoke, 3 spoken) to the teacher.

The sentence should be, "The child **spoke to** the teacher"; therefore the figure "2," the number of the word "spoke," is placed in the parenthesis at the beginning of the sentence.

( ) I. Last summer I (1 taked, 2 took, 3 taken) a trip to Yellowstone Park.

( ) II. I had never (1 seed, 2 seen, 3 saw) Old Faithful geyser.

( ) III. We were (1 drove, 2 drived, 3 driven) to see many other sights.

( ) IV. The water suddenly (1 burst, 2 bursted, 3 busted) from the ground.

( ) V. We had (1 stole, 2 stold, 3 stolen) up as close as we dared.

( ) VI. Around the geyser it looked as though the water had (1 freezed, 2 froze, 3 frozen) into curious shapes.

( ) VII. The water had (1 overflowed, 2 overflown, 3 overflew) the basin.

( ) VIII. I never (1 saw, 2 seen) such wonderful scenery anywhere else.

( ) IX. I have (1 rid, 2 ridden, 3 rode) much in the mountains.

( ) X. Others who have (1 spoke, 2 spoken, 3 spoked) to me about the subject think as I do.

( ) XI. All of us had to be very careful or we might have (1 fell, 2 fallen) over a precipice.

( ) XII. Many have (1 choosed, 2 chose, 3 chosen) to visit the place a second time.

( ) XIII. Many have (1 drinked, 2 drank, 3 drunk) in the beauty of the place.

( ) XIV. The ground was (1 shaked, 2 shaken, 3 shook) by the explosion.

( ) XV. The glee club has often (1 sung, 2 singed, 3 sang) that song.

( ) XVI. The child has (1 sit, 2 set, 3 sat) quietly in that chair for an hour.

( ) 17. One boy in the school has never (1 broke, 2 broken) a rule.

( ) XVIII. Somebody had (1 ringed, 2 rung, 3 rang) the bell before I came in.

IV

GRAMMAR

DIRECTIONS: Under each "A," in the following, is a sentence containing a parenthesis. In the parenthesis are two or more words each of which is numbered. Choose which of these words would be the correct one to use in that place, and write the number of the word on the dotted line above the sentence.

Under "B," four reasons are given for the choice of word in "A." Make a cross in the square before the reason that you think is correct.

EXAMPLE

0—A

... 2 ....

I saw (1 he, 2 him, 3 himself) at the circus.

0—B

☐ Nominative case, subject of "saw."
☐ Plural number, to agree with "at."
☒ Objective case, object of "saw."
☐ First person, to agree with "I."

1—A

. . . .

The secretary of the class has sent special invitations to John and (1 I, 2 me, 3 myself) to attend the class party.

1—B

☐ Nominative case, subject of "attend."
☐ Nominative case, to agree with "John."
☐ Objective case, object of "to."
☐ Possessive case, after "and."

2—A

. . . .

Our basket ball team always plays (1 good, 2 well) on the home court.

2—B

☐ Adverb, modifies "plays."
☐ Predicate adjective, used with "plays."
☐ Objective case, object of "plays."
☐ Nominative case, subject of "on the home court."

3—A

. . . .

When the teacher put any work on the board, she made it look (1 neat, 2 neatly).

3—B

☐ Adverb, modifies "look."
☐ Predicate adjective, used with "look."
☐ Objective case, object of "look."
☐ Nominative case, apposition with "it."

4—A

. . . .

Ethel has a brother who studies harder than (1 she, 2 her).

4—B

☐ Nominative case, subject of verb understood.
☐ Objective case, object of "than."
☐ Possessive case, used with "harder."
☐ Predicate adjective, used with "studies."

5—A

. . . .

We have no idea as to (1 who, 2 whom) of the three will come.

5—B

☐ Objective case, object of "to."
☐ Nominative case, to agree with "we."
☐ Nominative case, subject of "will come."
☐ Objective case, object of "as."

6—A

. . . .

Not one of the poems which (1 is, 2 are) in the book was known to any of the class.

6—B

☐ Singular number, to agree with "one."
☐ Singular number, to agree with "which."
☐ Plural number, to agree with "which."
☐ Subjunctive mode.

7—A

. . . .

All of (1 we, 2 us) boys were at the game.

7—B

☐ Nominative case, subject of "were."
☐ Nominative case, to agree with "all."
☐ Objective case, object of "of."
☐ Possessive case, modifies "boys."

8—A

. . . .

Neither the boy nor the girl (1 write, 2 writes) so well as the father.

8—B

☐ Plural number, to agree with 'boy" and "girl."
☐ Plural number, with "neither-nor."
☐ Singular number, to agree with "girl."
☐ First person, to agree with "father."

9—A

. . . .

They asked us (1 who, 2 whom) we thought was going.

9—B

☐ Nominative case, subject of "was going."
☐ Nominative case, to agree with "we."
☐ Objective case, object of "asked."
☐ Objective case, object of "thought."

10—A

. . . .

The captain as well as the sailors (1 fear, 2 fears) the storms at sea.

10—B

☐ Singular number, to agree with "captain."
☐ Plural number, to agree with "captain" and "sailors."
☐ Plural number, to agree with "storms."
☐ Second person, to agree with "sailors."

Directions: Answer the easiest parts first. Go back and work on the others. You will have exactly 30 minutes.

ALGEBRA I

Arranged by Ethel A. Rumney, with valuable assistance from the Kansas high school teachers of Algebra.

TOTAL NUMBER POINTS

Pupil ....Age .... Grade ....

School .... Town .... State .... Date ....

DIRECTIONS:. Perform whatever computation is necessary on another sheet of paper. Put only the results on this paper. Write the result in the blank left for that purpose. Wherever there is a group of stars an important word or answer has been omitted. You are to write the important word or answer on the line in front of the statement. Remember that you are to write the word or answer on the blank line in front of the statement.

1. (———————) The sign of the quotient obtained by dividing a negative quantity by a positive quantity is ****

2. (———————) The sign of the product of two negative and two positive quantities is ****

3. (———————) In y yards there are **** feet.

4. (———————) In k ounces of wheat there are **** pounds.

5. (———————) The product of a^3 and a^2 is ****

6. (———————) If 5^6 is divided by 5^2 the quotient is ****

7. (———————) $7(-xy^2)^2(-x^3y^2) = $ ****

8. (———————) In the equation $3x-1=5$, the value of x is ****

9. (———————) The square of the fraction $\dfrac{b}{3}$ is ****

10. (———————) The cube of the fraction $\dfrac{a}{4}$ is ****

11. (———————) $(a+7)(a-1) = $ ****

12. (———————) $(x+2y)(2x-y) = $ ****

13. (———————) $(a+b)(c+b) = $ ****

14. (———————) $5(x-4) = $ ****

15. (———————) $(10a^2)^2(-0.1a)^2 = $ ****

16. (———————) The lowest common multiple of (c^2-x^2) and $(c^2+2cx+x^2)$ is ****

17. (———————) The highest common factor of (a^2-m^2), $(a^2-2am+m^2)$, (a^2b-bm^2) and (a^2-am) is ****

18. (———————) A trinomial is a polynomial containing only **** terms.

19. If the width of a rectangle is represented by w inches, and the length is four times the width, then the length is represented

(a) ——— by (a) **** inches, the perimeter

(b) ——— is represented by (b) **** inches, and the area is represented by

(c) ——— (c) **** square inches.

20. (———————) In the equation $\dfrac{a-7}{5} + 2 = \dfrac{a+8}{10}$, the value of a is ****

21. (———————) The prime factors of (ac^2-ad^2) are ****

22. (———————) The prime factors of $(5x^2+20x+60)$ are ****

23. (———————) $(3a^2)^2(\dfrac{1}{3a^2})^2(2a)(0)\tfrac{1}{2} = $ ****

24. (——————) In the equation $7(b-2)-2(3+b)$
$= 0$ the root is: $b =$ ****

25. (——————)
The sum of $(11bc+10a+4cd)$,
$(9a-2bc-cd)$, and
$(6cd-11a-7bc)$ is ****

26. (——————)
The sum of $(6d+8f+11k)$,
$(7d-2k-7a)$, and $(2a-9d-4f)$
is ****

27. (——————) The product
$$\frac{x^2-2x-24}{x^2-x-30} \cdot \frac{x^2+10+25}{x^2-16} = ****$$

28. (——————) The product $\dfrac{9-y^2}{r^3-r} \cdot \dfrac{r-1}{y+3} = ****$

29. (——————) The quotient of
$(x^3-x^2y-xy^2+y^3) \div (x-y) = **$

30. (——————) $\dfrac{x}{x-3} - \dfrac{x}{3-x} = ****$

31. (——————) Express as a common fraction in
its lowest terms the value of the
fraction $\dfrac{n}{d}$ if n equals 1⅞ and d
equals 2¼. $\dfrac{n}{d}$ equals ****

32. (——————) The fraction $\dfrac{-21a^9b^3c^2}{-3a^8b^4c^3}$ reduced
to lowest terms equals ****

33. (——————) If $5x+3x+7x=0$, then $x =$ ****

34. (——————) If $I = prt$ then $r =$ ****

35. (——————) If $A = \dfrac{bh}{2}$, then $b =$ ****

36. (——————) If $\dfrac{1}{2x} = 3$, then $x =$ ****

37. (——————) $(2bc-4b^2c^2) \div 2bc = ****$

38. (——————) If $mx = nx+7f$, then $x =$ ****

DIRECTIONS: Put in the parentheses at the left of
each one of these problems the letter which indicates the
correct result. For example:

(c) The product of $(2x)(4x) =$: (a) 8x.
(b) 6x². (c) 8x². (d) 6x.

The letter **c** is put in the parenthesis because the cor-
rect answer 8x² appears after **(c)**.

1. (   ) The fraction $\dfrac{c}{d}$ means: (a) cd. (b) c • d.
(c) c—d. (d) c÷d.

2. (   ) If $A = bw$, then b equals: (a) $\dfrac{A}{w}$.
(b) A—w. (c) Aw. (d) $\dfrac{w}{A}$.

3. (   ) $\dfrac{-c}{-d}$ equals: (a) $\dfrac{c}{d}$. (b) cd. (c) $\dfrac{-c}{d}$.
(d) $\dfrac{c}{-d}$.

4. (   ) If $x-m=n$, then x equals: (a) n—m. (b) $\dfrac{n}{m}$.
(c) m—n. (d) $\dfrac{m}{n}$. (e) m+n.

5. (   ) A linear equation is one which: (a) contains
no more than two terms (b) contains no
higher power of the unknown than the first
power (c) requires no transposition in solv-
ing (d) contains no fractional terms.
(e) contains no negative terms

6. (   ) To find the exponent of the product of two or
more powers of the same number: (a) add
their coefficients (b) multiply their expon-
ents (c) add their exponents

7. (   ) To find the exponent of the quotient of two
powers of the same number: (a) subtract the
exponent of the divisor from the exponent of
the dividend (b) subtract the exponent of
the dividend from the exponent of the divisor
(c) divide the exponent of the dividend by the
exponent of hte divisor

8. (   ) The lowest common multiple of a group of ex-
pressions is: (a) the sum of all the prime
factors of the group (b) the product of all
the prime factors taking each the highest num-
ber of times that it occurs in any expression
(c) the product of all the factors not common
to all the expressions

9 (   ) $r^2 • r^3$ equals: (a) r⁶. (b) r⁵. (c) 5r.
(d) 6r.

Bureau of Educational Measurements and Standards
Kansas State Teachers College,
Emporia, Kansas.

PLANE GEOMETRY

Arranged by A. W. Philips with valuable assistance from
the Kansas high school teachers of Geometry

TOTAL NUMBER POINTS

Pupil .... Age .... Grade ....

School .... Town .... State .... Date ....

DIRECTIONS: Read the following sentences carefully. If a statement is true, place a plus (+) in the parenthesis in front of the statement, as in example A below. If the statement is false, make a minus (—) in the parenthesis in front of it as in example B. Make the + and the — small and clear.

Examples: (+) A. Apples are good to eat.
(—) B. Potatoes grow on trees.

1. ( ) A polygon is the only figure which may be moved from one place to another without changing its size and shape.

2. ( ) The equal angles of an isosceles right triangle are each 60°.

3. ( ) The following propositions are converses:
(a) "In an isosceles triangle the angles opposite the equal sides are equal."
(b) "If two angles of a triangle are equal, the sides opposite the equal angles are equal, and the triangle is isosceles."

4. ( ) A right triangle may have a hypotenuse of 18 inches, a side of 9 inches, and an acute angle of 60°.

5. ( ) The sum of the exterior angles of a polygon is 180°.

6. ( ) The locus of points on the New Santa Fe Trail (passing through Emporia from east to west), and five miles from that town, is a point on the Trail five miles east of Emporia.

7. ( ) Two circles having the same center are concentric.

8. ( ) As a central angle of a circle increases, its intercepted arc decreases.

9. ( ) A diameter perpendicular to a chord bisects the chord.

10. ( ) Parallel tangents to a circle divide it into semicircles.

11. ( ) The opposite angles of any inscribed quadrilateral are equal.

12. ( ) The hypotenuse of an inscribed right triangle is a diameter.

13. ( ) An inscribed equilateral polygon is also equiangular.

14. ( ) An inscribed angle of 56° intercepts an arc of 56°.

15. ( ) All equilateral triangles are similar.

16. ( ) If two triangles have two sides of one proportional to two sides of the other and an acute angle of the first equal to an acute angle of the second, the triangles are similar.

17. ( ) The mean proportional between 3 and 27 is 9.

18. ( ) Each side of a triangle is increased to 3 times its original length. The new triangle has an area three times that of the original triangle.

19. ( ) If 2 chords intersect within a circle, the sum of the segments of one is equal to the sum of the segments of the other.

20. ( ) Similar triangles are congruent.

PART II

DIRECTIONS: Place the letter of the correct answer in the parenthesis before the statement. Look carefully at this sample:

(c) Biology is a: **(a) habit. (b) education. (c) science. (d) nerve.**

In this sample, "science" is the correct answer. The letter in front of the work "science" is (c). The letter (c) has been placed in the parenthesis.

1. (   ) A triangle can be constructed with sides of the following lengths: **(a) 2 in., 3 in., and 4 in. (b) 3 in., 4 in., and 7 in. (c) 7 in., 10 in., and 20 in. (d) 8 in., 9½ in., and 18 in.**

2. (   ) A straight line joining the extremities of an arc of a circle is a: **(a) diameter. (b) chord. (c) tangent.**

3. (   ) The figure bounded by a chord and its arc is a: **(a) central angle. (b) quadrant. (c) sector. (d) segment.**

4. (   ) If the vertices of a regular hexagon lie on a circle, each side subtends an arc of: **(a) 120°. (b) 90°. (c) 60°. (d) 100°.**

5. (   ) An inscribed angle is measured by: **(a) one-half its intercepted arc. (b) its intercepted arc. (c) one-half the sum of the intercepted arcs.**

6. (   ) Any angle inscribed in a semicircle is: **(a) obtuse. (b) acute. (c) straight. (d) right.**

7. (   ) If a chord of a circle is met at one extremity by a tangent, forming an angle of 61°, the smaller arc of the circle is: **(a) 122°. (b) 238°. (c) 61°. (d) 30½°.**

8. (   ) The center of a circle inscribed in a triangle is the point of meeting of: **(a) the bisectors of the angles of the triangle. (b) the medians. (c) the altitudes. (d) the perpendicular bisectors of the sides.**

9. (   ) If two triangles are mutually equiangular they are: **(a) congruent. (b) similar. (c) equal in area. (d) equilateral.**

10. (   ) If in any right triangle a perpendicular be drawn from the vertex of the right angle to the hypotenuse, the two right triangles thus formed are: **(a) equal in area. (b) in the ratio 2 to 1 as to area. (c) similar. (d) congruent.**

11. (   ) If a line divides two sides of a triangle proportionately, it is: **(a) equal to one-half the third side. (b) parallel to the third side. (c) equal to the third side.**

12. (   ) Two polygons are similar when: **(a) their corresponding sides are proportional. (b) they are mutually equiangular. (c) they are equal in area. (d) they are mutually equiangular and their corresponding sides are proportional.**

13. (   ) The ratio of the circumference to the diameter of a circle is approximately: **(a) 4. (b) 2. (c) 3. (d) 6.**

Directions: Answer the easiest parts first. Go back and work on the others. You will have exactly 30 minutes.	Bureau of Educational Measurements and Standards Kansas State Teachers College Emporia, Kansas	

AMERICAN HISTORY

Arranged by W. D. Ross, with valuable assistance from the Kansas high school teachers of History.

TOTAL NUMBER POINTS

Pupil .... Age .... Grade ....

School .... Town .... State .... Date ....

DIRECTIONS: Read the following sentences carefully. If a statement is true, place a plus (+) in the parenthesis in front of the statement, as in example A below. If the statement is false, make a minus (—) in the parenthesis in front of it as in example B. Make the + and the — small and clear.

Examples: (+) A. Apples are good to eat.
(—) B. Potatoes grow on trees.

1. (　) The convention that drew up the Constitution met for the purpose of revising the Articles of Confederation.
2. (　) Washington in choosing his first cabinet felt that in order best to promote the interests of his country, he should choose members of his own political party to fill important offices. Thus was party government established.
3. (　) The Treaty of Ghent did not settle the chief cause of the War of 1812, namely, the impressment of American seamen.
4. (　) The first two years of the administration of John Quincy Adams were so prosperous they were termed the "Era of Good Feeling."
5. (　) Congress under the Articles had power to lay and collect taxes and to regulate commerce.
6. (　) The term of residence required for naturalization has always been five years.
7. (　) The Louisiana Purchase was a loose construction measure.
8. (　) Washington had lost much of his popularity before he was out of office.
9. (　) The Dutch were the first settlers to enter the Connecticut Valley.
10. (　) Joliet sailed the length of the Mississippi and claimed the land in the name of France.
11. (　) The party of Jefferson was always opposed to a United States bank.
12. (　) The patroon system was employed by the English to promote agriculture in New York.
13. (　) All men over twenty-one could vote in the colonies.
14. (　) Prior to the American Revolution the colonists made no effort to form a union among themselves.
15. (　) Virginia was the first colony to establish a public school system.
16. (　) The Proclamation of 1763 opened the land west of the mountains for colonization.
17. (　) The Intolerable Acts were England's reply to the Stamp Act Congress.
18. (　) The idea that the earth is round originated with Columbus.
19. (　) The Puritans in colonial Massachusetts practiced religious toleration.
20. (　) Vermont was one of the thirteen original states.
21. (　) The Mayflower Compact was an agreement that the Puritans made with the Indians concerning the purchase of land.
22. (　) When Henry Hudson sailed up the Hudson River he was looking for a favorable place to plant a colony.
23. (　) The Whisky Insurrection in 1794 proved to the American people that the new Federal government had power to enforce its laws.
24. (　) Bonhomme Richard and Serapis were two Frenchmen who helped train Washington's troops.

25. (　) X, Y, Z, were the names by which our representatives to France were known.
26. (　) The war of 1812 gave us commercial freedom.
27. (　) Under the confederation a small state had as many votes in congress as a large one.
28. (　) North Carolina refused to ratify the Constitution until it had a Bill of Rights.
29. (　) The War of 1812 stimulated manufacturing in the U. S.
30. (　) Thomas Jefferson originated the expression, "To the victor belongs the spoils."
31. (　) Jackson opposed Calhoun in his doctrine of Nullification.
32. (　) The Constitutional Convention met in Philadelphia May 25, 1787.
33. (　) The Twelfth Amendment was passed as a result of the election of 1800.
34. (　) America claimed the Oregon territory by right of discovery, purchase as part of the Louisiana territory and the Lewis and Clark expedition.
35. (　) J. Q. Adams was elected president by the House of Representatives.
36. (　) Henry Clay opposed a protective tariff.
37. (　) Through the efforts of Andrew Jackson, the second bank of the U. S. was re-chartered in 1832.
38. (　) The main factors that helped to build up the West, 1840-50, were: improved agricultural implements, immigration, and cheap land.

DIRECTIONS: Place the number of the correct word in the parenthesis before the statement. Look carefully at this sample.

(3) Biology is a: **1 habit. 2 education. 3 science. 4 nerve.**

In this sample, "science" is the correct answer. The number in front of the word "science" is 3. the figure 3 has been placed in the parenthesis.

1. (　) The English Puritan wished to: **1 reform the English church from within. 2 set up an independent church. 3 return to the Catholic faith.**
2. (　) The "Work of the Fathers" was: **1 the winning of our independence. 2 the work of the 2nd Continental Congress. 3 the framing of the Constitution. 4 the drafting of the Articles of Confederation. 5 getting the first ten amendments to the Constitution ratified.**
3. (　) Washington was inaugurated in: **1 New York. 2 Philadelphia. 3 Washington.**
4. (　) John C. Calhoun was connected with: **1 Spoils System. 2 Supreme Court. 3 the second United States bank. 4 the Missouri Compromise. 5 the Nullification Act of South Carolina.**
5. (　) The most influential American in the eyes of Europe in 1776 was: **1 Alexander Hamilton. 2 Benjamin Franklin. 3 George Washington.**
6. (　) At the opening of the Revolution Washington sympathized with: **1 the Tories. 2 the Patriots. 3 the Moderates.**
7. (　) The Revolutionary soldier who sought to betray America into the hands of her enemies was: **1 Benedict Arnold. 2 Major Andre. 3 Horatio Gates. 4**

8. (   ) The Articles of Confederation were in effect from: (1) 1781-1788. (2) 1775-1783. (3) 1780-1790.

9. (   ) The first president to be inaugurated in the city of Washington was: 1 Washington. 2 Jefferson. 3 Adams.

10. (   ) South Carolina threatened secession on the grounds that: 1 U. S. ought to annex Florida. 2 States had right to "interpose" and render any obnoxious law null and void.

11. (   ) The tariff of 1833 was known as: 1 the Compromise Tariff. 2 Clay's American System. 3 the Tariff of Abominations.

12. (   ) The last state to ratify the Constitution was: 1 Rhode Island. 2 Vermont. 3 New York.

13. (   ) The Wilmot Proviso was: 1 the leading issue in the election of 1848. 2 avoided as far as possible by both the great political parties in the election of 1848. 3 the issue that decided the Whig victory in 1848.

14. (   ) A president without a party was: 1 Jackson. 2 Polk. 3 Tyler.

15. (   ) The purpose of the organization of the Liberty Party was: 1 to strengthen the abolitionist movement. 2 to give Cuba its freedom. 3 to strengthen a prison reform movement.

16. (   ) The first state to have state-wide prohibition was: 1 Kansas. 2 Ohio. 3 Maine. 4 Missouri.

17. (   ) Before the treaty with Spain following the Spanish-American War our foreign policy had been that of: 1 co-operation. 2 discriminating alliances. 3 isolation.

18. (   ) The first transcontinental railroad was the: 1 Northern Pacific. 2 Union Pacific. 3 Rock Island.

19. (   ) The Alabama Claims were: 1 claims against England for damages done to our merchant vessels by the Alabama and other similar vessels built in England and sold to the South during the Civil War. 2 claims presented to Congress by the State of Alabama for damages done to property in the Civil War. 3 land claims of the southern confederacy whose temporary capital was at Montgomery, Ala.

20. (   ) The name "Carpet-bagger" was given to: 1 northern politicians who went south, and taking advantage of the ignorance of the negroes, succeeded in getting themselves elected to office. 2 dishonest southern politicians who persuaded the negroes to elect them to office. 3 the more ambitious negroes of the south who, though they could put all their property in a carpetbag, promised to make their fellow countrymen rich if they would elect them to office.

21. (   ) The "salary grab" was in the administration of: 1 Grant. 2 Cleveland. 3 Hayes.

22. (   ) The Whiskey Ring was formed to: 1 sell more liquor. 2 manufacture more liquor. 3 avoid paying tax.

23. (   ) Bessemer invented: 1 air-brakes. 2 telephone. 3 talking-machine. 4 arc-light. 5 process of making steel.

24. (   ) Foreign immigration in the forties came from: 1 Southern Europe, and Asia. 2 Northern Europe, and Great Britain. China and Japan. 4 Philippines and Australia.

PART III.

DIRECTIONS: In the parenthesis in front of the first column place the number found in the second column that matches it.

Section A.

Column I	Column II
1. ( ) A religious group believing in complete division of church and state.	1. Discovery
2. ( ) A Dutch landlord.	2. Separatist
3. ( ) A line dividing settled from unsettled territory.	3. Cavalier
4. ( ) A form of government in which power is vested in one person.	4. Patroon
5. ( ) The doctrine that colonies existed for the benefit of the mother country.	5. Proprietor
6. ( ) Discovered the Mississippi River.	6. Suffrage
7. ( ) First attempt to establish a French colony on the St. Lawrence River.	7. Frontier
8. ( ) Organized the Committees of Correspondence.	8. Monarchy
9. ( ) Founded the Colony of Rhode Island.	9. Mercantile theory
10. ( ) Philanthropist who settled Georgia.	10. Democracy
11. ( ) Established in America a refuge for English Quakers.	11. DeSoto
12. ( ) Opposed Writs of Assistance in the Courts of Massachusetts.	12. Wm. Bradford
13. ( ) First English explorer of North America.	13. Grenville
14. ( ) Author of the Stamp Act.	14. Daniel Boone
15. ( ) Started the movement to settle Kentucky.	15. John Cabot
	16. Roger Williams
	17. Vespucius
	18. Wm. Penn
	19. James Otis
	20. Patrick Henry
	21. Samuel Adams
	22. Champlain
	24. James Oglethorpe
	23. John Winthrop
	25. Cartier

EVENTS DURING ADMINISTRATIONS:
Section B.

Column I	Column II
1. ( ) Martin Van Buren.	1. Panic of 1837.
2. ( ) James Polk.	2. Settlement of Oregon question.
3. ( ) Franklin Pierce.	3. Compromise of 1850.
	4. Purchase of Florida.
	5. Kansas Nebraska Bill.

General Directions

Dual Scholarship Contest Conducted by

Kansas State Teachers College,

Emporia, Kansas.

A copy of these directions should be placed in the hands of each person who has anything to do with the tests. These directions should be carefully studied until each person is thoroughly familiar with each part.

These same directions will be used for every Dual Contest. Save your copy.

Important. In order that your school and every other school may be able to get the maximum value from these tests, may we depend upon your cooperation. Even though you are not contesting with any other school, will you not cooperate by sending in a complete report of each dual test you use. The Dual Scholarship Contest Report Sheet is provided for this purpose.

A summary report of the results from all the schools will be worked out and sent to each school cooperating. This report should be valuable to each teacher, superintendent, and principal. You will be able to compare the work done by your pupils with the work done in other schools.

ATTENTION

Follow the "General Directions." See that each person who gives a test absolutely understands each step of procedure. You should go over every detail with the teachers. Insist upon directions being followed.

DIRECTIONS FOR GIVING THE TESTS

1. All sections of the same subject (two or more sections of First Year Algebra or any other subject) should take the test at the same hour.

2. The conductor should have one other teacher or assistant in the room. This person should remain in the back of the room and assist the conductor.

3. Have an extra sheet or two of paper ready for each pupil who takes the Algebra or Geometry test.

4. See that each pupil has two sharpened pencils. The conductor and assistant should have several extra ones. (In the Geometry test each pupil should bring a compass and a ruler.)

5. Have all papers distributed face down. The first pupil in each row can do this. See that no pupil turns over his paper until the signal is given.

6. Read without comment the following directions aloud to the pupils. **No other statement of any kind is to be given at any time by any one. No exception is to be made.**

   (Directions to be read by teacher to pupils.)

   (a) Follow the Directions.

   (b) There is to be no talking during this test.

   (c) If you need a pencil raise your hand.

   (d) You are not to receive nor give help during this test. It is up to each one of you to do your very best so that your class may stand high.

   (e) As soon as I tell you to turn over your test blank, carefully fill in all of the blanks at the top. As soon as you have finished look up and hold up your pencil so I can see when everyone has finished. "Turn over your paper and carefully fill in all the blanks."

   (To the conductor: You must see that all pupils continue to look up and hold up their pencils until all pupils have finished. Go on just as soon as all pupils have finished.)

   (f) As soon as I read the directions I shall give the signal Go!

   (g) At the signal Go! you are to begin and continue until you finish or until you hear the signal Stop! As soon as the signal Stop! is given, look up and hold up your pencil.

   (h) Look at the directions at the top of the page while I read them. (Teacher should read the directions at the top of the test paper.)

7. In certain tests all pupils will finish before the thirty minutes of time is up. In this case collect the papers as soon as the last pupil has finished.

8. Have the papers collected immediately.

9. See that the papers are tied up and put in a safe place until you are ready to score them.

10. Follow all directions to the letter.

SCORING THE TEST PAPERS

1. The tests will be easily and quickly scored.

2. A key is provided for scoring each test.

3. Know that you are right before you begin.

4. The papers must be scored according to the key.

5. All papers must be scored under the immediate direction of the one who is required to certify on the final report.

6. Use red pencils in scoring the first time. Make a red cross through the **wrong** and the **omitted** ones.

7. Place the total number of **points right** in the rectangle in the upper right hand corner of test paper.

8. All papers should be rescored by another person.

9. Use a blue pencil in rescoring. Mark only in blue those items that were not properly scored the first time.

10. Check the total number of points right.

RECORDING SCORES AND DETERMINING THE MEDIAN

Classes will be ranked according to the median scores. Use the following method to determine the median score.

1. After all papers have been scored, rescored, checked, and rechecked, arrange the papers in a consecutive order according to the score—highest, next highest, etc.

2. If you have more than one section of a class throw all the papers together.

3. Record these scores in column form on the Dual Scholarship Contest Report Sheet. Illustrations I and II give specific details. If you have less than thirty papers, distribute them in column A according to sample I. If you have thirty or more papers, distribute them in column B according to sample II.

4. Count the total number of papers and record this as **total number of papers.**

5. Find the score on the middle paper when there is an odd number of papers; and the score halfway between the scores on the two middle papers when there is an even number of papers. This score will be the median score. Illustrations (x), (y), and (z) will make the above statement clear.

6. Check and recheck your work. Know that you are right.

7. If you are in doubt about the median, leave the median alone and we will take care of it.

8. **The Dual Scholarship Contest Report Sheet must be sent to the Bureau within four days after the test is given.**

9. All Report Sheets must be certified by the teacher of the subject and by either the Superintendent or the Principal.

10. The report Sheets will be of three colors—white, blue and red.

11. The following number of certified copies of the Dual Scholarship Contest Report Sheet must be sent to the Bureau: A blue copy for the Bureau, a white copy for you, and a red copy for each school you are contesting with. Suppose you are contesting with Athens High School in Algebra. You will send three certified copies (a white, a blue, and a red) to the Bureau. If you are contesting with two high schools in Algebra, then you will send four certified copies (a white, a blue, and two red) to the Bureau. The Bureau will check the records, stamp them, return the white copy to you, send the red copies to the contesting schools, and keep the blue copy.

SAMPLES

I

Score on each paper
54
53
50
50
49
48
45
43
42
41
40
40
40
39
35
34
25

Total No. of papers 17
Median Score 42

II

Score	No of papers having each specific score
54	1
43	2
51	2
50	3
45	4
43	5
42	6
40	5
39	5
38	4
30	3
27	2
26	5
25	2
24	1
22	2
21	1

Total No. of papers 53
Median Score 40

(x)	(y)	(z)
61	61	54
54	55	53
53	50	50
50	48	50
9{ 50	9{ 47	8{ 49
49	45	45
48	45	43
45	44	42
43	43	* * * *
***42	* * * * *	40
41	43	38
40	42	37
40	41	36
40	40	8{ 35
9{ 39	9{ 39	32
35	38	30
34	30	29
25	30	
10	20	

Total 19   Total 18   Total 16
Median 42   Median 43   Median 41