The University of the State of New York

245th High School Examination

ELEMENTARY ALGEBRA

Monday, June 17, 1929 — 9.15 a. m. to 12.15 p. m., only

Instructions

Do not open this sheet until the signal is given.

Answer all questions in part I and five questions from part II.

Part I is to be done first and the maximum time to be allowed for this part is one and one half hours. Merely place the answer to each question in the space provided; no work need be shown.

If you finish part I before the signal to stop is given you may begin part II. However, it is advisable to look your work over carefully before proceeding to part II, since *no credit will be given any answer in part I which is not correct and reduced to its simplest form.*

When the signal to stop is given at the close of the one and one half hour period, work on part I must cease and this sheet of the question paper must be detached. The sheets will then be collected and you should continue with the remainder of the examination.

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Write at top of first page of answer paper to part II (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in elementary algebra.
The minimum time requirement is five recitations a week for a school year.

Part II

Answer five questions from this part. Full credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form.

21 Solve the following set of equations for x and y and check:
$$2x + 3y = 6$$
$$3x + 5y = 15 \qquad [7, 3]$$

22 In a foul-shooting contest the points made by Howard and Kenneth were in the ratio 8 : 11. Kenneth made 12 more points than Howard. Find the number of points made by each. [8, 2]

23 If 3 is subtracted from the numerator of a certain fraction, the value becomes $\frac{2}{3}$. If 10 is added to the denominator of the original fraction, the value becomes $\frac{1}{2}$. Find the original fraction. [5, 5]

24 If one side of a square is increased by 2 and an adjacent side is decreased by 2, the area of the resulting rectangle is 32. Find one side of the square. [6, 4]

25 Indicate whether *each* of the following is true or false: [Write the letters *a* to *j* in a column and then write the word *true* or *false* after each letter.]

a $3a^2 \times 2a^3 = 6a^6$ [1]

b If $\frac{2}{x} = 6$, then $x = 3$ [1]

c If $A = 45°$, then $\sin A = \cos A$ [1]

d If $ax = b$, then $x = b - a$ [1]

e The common factor of $a^2 - b^2$ and $a^2 - ab$ is $a - b$. [1]

f If an even integer is represented by $2n$, then the next larger even integer is represented by $2n + 2$. [1]

g $\frac{ab + c}{a} = b + c$ [1]

h $\sqrt{a^2 + b^2} = a + b$ [1]

i $\sqrt{\frac{1}{2}} = \frac{1}{2}\sqrt{2}$ [1]

j $\frac{-a}{a-1} = \frac{a}{a+1}$ [1]

26 $K = \frac{1}{2} h (b_1 + b_2)$ is the formula for the area of a trapezoid, h representing the altitude and b_1 and b_2 the bases. If $K = 252$, $b_1 = 18$ and $b_2 = 24$, find h. [10]

27 A boy selling newspapers earns on 5 consecutive days the following amounts: 10¢, 3¢, 17¢, 25¢, 20¢.

a Represent this information by a bar graph. [5]

b Represent by a sixth bar his average daily earnings. [5]

The following question is based on one of the optional topics in the syllabus and may be substituted for any other question in part II.

28 Solve for x to the *nearest tenth:*
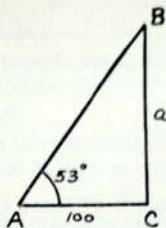$$x^2 - 2x = 23 \qquad [10]$$

[2]

16 In a certain freshman class there are *a* boys and *b* girls. Express the ratio of the number of girls to the total number of pupils.

Ans. . . . .

17 The cosine of a certain acute angle is .8712; find the angle to the *nearest degree*.

Ans. . . . .

18 Using the tables, find to the *nearest tenth* the value of *a* in the right triangle *ABC*.

B

a

53°

A   100   C

Ans. . . . .

19–20 *a* On the diagram below represent by a graph the equation $y = 2x$

    b On the graph plotted in answer to *a*, mark with the letter *P* the point for which $x = 4$

Y

X'

O

X

Y'
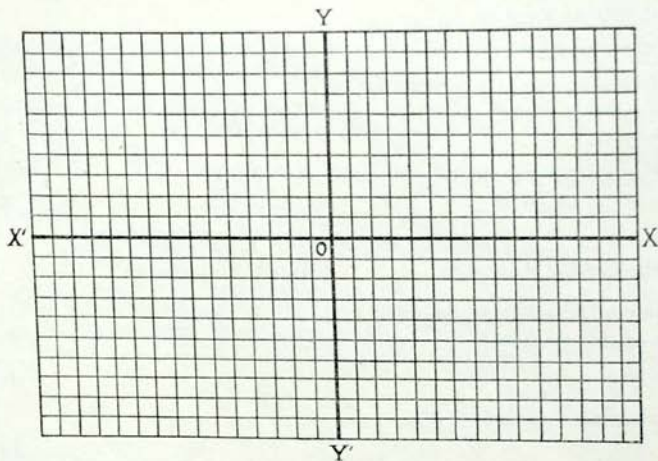
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Fill in the following lines:

Name of school...Name of pupil...

Detach this sheet and hand it in at the close of the one and one half hour period.

Part I

Answer all questions in this part. Each question has 2½ credits assigned to it; no partial credit should be allowed. Each answer must be reduced to its simplest form.

1 A customer purchases n pounds of sugar at c cents a pound and gives in payment a one-dollar bill; express in cents the change he should receive.　Ans..............

2 From the sum of $2a - 10b$ and $3a + 14b$ subtract $3a - 2b$　Ans..............

3 In the formula $2\pi r = C$, if $C = 88$ and $\pi = \frac{22}{7}$, find r.　Ans..............

4 Solve the following equation for y:
$$5y - 2(y - 5) = 17$$
Ans..............

5 Solve the following set of equations for x:
$$x - 3y = 8$$
$$2x + 3y = 7$$
Ans..............

6 Solve the following equation for x in terms of a and b:
$$ax - a^2 = bx - b^2$$
Ans..............

7 The formula $B = 2A$ is obtained by inspection from the table at the right.

A	1	2	3	...
B	2	4	6	...

What formula is obtained from the table given at the right of this question?

A	1	2	3	...
B	3	6	9	...

Ans..............

8 Factor $P + Prt$　Ans..............

9 Solve the following equation for d:
$$\frac{d}{2} - \frac{d}{5} = 6$$
Ans..............

10 Express as a single fraction in its lowest terms
$$\frac{a+b}{2} - \frac{2a-b}{6}$$
Ans..............

11 Express as a single term
$$2\sqrt{32} - 3\sqrt{2}$$
Ans..............

12 The parcel-post rate for a certain zone is expressed by the formula $c = 2w + 6$; solve this formula for w.　Ans..............

13 If x and y are positive and $y = \frac{3}{x}$, does y increase or decrease as x increases?　Ans..............

14 Find $\sqrt{68}$ to the *nearest tenth*.　Ans..............

15 Simplify $(-\frac{2}{3}ab^3)^2$　Ans..............

[3]　[OVER]