

The University of the State of New York

257<sup>TH</sup> HIGH SCHOOL EXAMINATION

**ELEMENTARY ALGEBRA**

Monday, June 19, 1933 — 9.15 a. m. to 12.15 p. m., only

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**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.

# ELEMENTARY ALGEBRA

Monday, June 19, 1933

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  $2\frac{1}{2}$  credits assigned to it; no partial credit should be allowed. Each answer must be reduced to its simplest form.

- Multiply  $a^2 + 3a + 9$  by  $a - 3$  Ans.....
- Factor  $x^2 - 5x - 14$  Ans.....
- Factor  $9ab^2 - a$  Ans.....
- Divide  $x^3 - 2x^2 - 29x + 30$  by  $x + 5$  Ans.....
- In the formula  $L = a + (n - 1)d$ , find the value of  $L$  when  $a = 7$ ,  $n = 13$  and  $d = 3$  Ans.....
- A basketball player in three games scored  $P$ ,  $S$  and  $T$  points; represent the boy's average score. Ans.....
- Write the formula for the number of students ( $n$ ) that may be seated in a room in which there are  $S$  single seats and  $T$  double seats. Ans.....
- A man bought  $d$  dozen apples at  $c$  cents an apple and had 15 cents left; how many cents did he have before making the purchase? Ans.....
- Simplify  $\frac{a}{a-b} + \frac{b}{b-a}$  Ans.....
- The length of a rectangle is twice the width. If the perimeter of the rectangle is  $P$ , find the width in terms of  $P$ . Ans.....
- Find to the nearest tenth the positive root of the equation  $x^2 - 7 = 12$  Ans.....
- Combine into a single term  $3\sqrt{12} - 6\sqrt{\frac{1}{3}}$  Ans.....
- Solve for  $P$  the formula  $R = \frac{V^2 PL}{a}$  Ans.....
- Solve the following set of equations for  $x$ :  
 $3x - y = 13$   
 $2x + 3y = 16$  Ans.....
- Divide  $\frac{7ab^3}{10cd}$  by  $\frac{14b^3}{5c^2d^2}$  Ans.....
- Find to the nearest degree the angle whose cosine is .7821 Ans.....
- If 5 times the square of a certain number is increased by twice the number, the result is equal to 16; write the equation that would be used in solving this problem. Ans.....



18 Some Boy Scouts wish to find the distance from  $B$  to  $C$  across a pond. The distance from  $B$  to  $A$  is 100 feet; angle  $A$  is a right angle and angle  $B$  is equal to  $60^\circ$ . Find the distance from  $B$  to  $C$ .

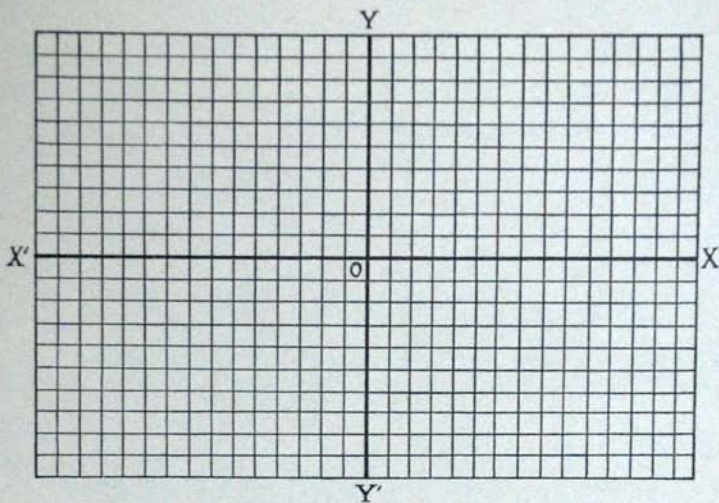


Ans.....

19 On the diagram below plot the points  $x = -10, y = 2$  and  $x = 4, y = -5$

20 If the two points plotted in answer to question 19 are joined, what is the value of  $y$  where the line crosses the  $y$ -axis?

Ans.....



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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. Purely arithmetical solutions for problems will not be accepted.

- 21 Solve and check the following set of equations:

$$\frac{y-3}{x+5} = \frac{1}{2}$$

$$3x = 2y - 5 \quad [7, 3]$$

- 22 A senior class has some candy worth 45 cents a pound and some worth 70 cents a pound. The class wishes to make a mixture of 120 pounds that will be worth 55 cents a pound. How many pounds of each kind should be used? [6, 4]

- 23 The area of a square exceeds the area of a rectangle by 3 square inches. The width of the rectangle is 3 inches shorter and the length of the rectangle 4 inches longer than the side of the square. Find the side of the square. [7, 3]

- 24 A boy visiting New York City views the Empire State Building from a point  $A$ , which is 940.5 feet from the foot  $C$  of the building. The angle of elevation of the top  $B$  of the building as seen by the boy is  $53^\circ$ . Find the height of the building to the nearest foot. [10]

- 25 The numerator and denominator of a certain fraction are in the ratio 3:5. If 2 is subtracted from the numerator and 6 added to the denominator, the resulting fraction has the value  $\frac{1}{3}$ . Find the original fraction. [7, 3]

- 26 Utica and Saratoga Springs are 84 miles apart. A boy riding a bicycle started from Utica toward Saratoga Springs an hour before a second boy started from Saratoga Springs toward Utica. The first boy traveled at the rate of 11 miles an hour but rested two hours on the way. The second boy rode at the rate of 8 miles an hour. How far from Utica were the boys when they met? [8, 2]

- 27 Solve graphically the following set of equations and write the values of  $x$  and  $y$  at the point on the graph that represents the common solution:

$$2x - y = 9$$

$$6x + 3y = 15 \quad [4, 4, 2]$$

- \*28 The units digit of a two-digit number exceeds the tens digit by 5. The number increased by 63 is equal to 10 times the sum of the digits. Find the number. [7, 3]

\* This question is based on one of the optional topics in the syllabus.