

The University of the State of New York

242D HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Monday, June 18, 1928—9.15 a. m. to 12.15 p. m., only

Fill in the following lines:

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

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 write the answer to each question in the space at the right; 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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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 Express in algebraic language the sum of the squares of two numbers, a and b , increased by twice their product. Ans.....

2 The area (A) of any circle may be expressed by the formula $A = \pi R^2$, where $\pi = \frac{22}{7}$ and R is the radius of the circle. By means of this formula find the area of a circle whose radius is 7. Ans.....

3 From the sum of $2m - s + t$ and $s - t$, subtract $m - s$ Ans.....

4 One factor of $2x^2 + 2x - 24$ is $x - 3$; find the other two factors. Ans.....

5 Factor $4 - 9b^2$ Ans.....

6 Of what algebraic expression are $a^2 + a + 1$ and $1 - a$ the factors? Ans.....

7 If y diminished by 6 equals $2y$ divided by 5, what is the value of y ? Ans.....

8 Solve for x : Ans.....
 $ax + b^2 = a^2 - bx$

9 Simplify $(1 - \frac{x}{x+y})(\frac{x+y}{y})$ Ans.....

10 The distance from Buffalo to Albany is 296 miles. If a train travels c miles an hour, how many hours are required for the run, no allowance being made for stops? Ans.....

11 If y and x are positive and $y = \frac{2}{3x+1}$, does y become larger or smaller as x becomes larger? Ans.....

12 Indicate which one of the following, $\frac{1}{b-a}$, $-\frac{1}{b-a}$, $\frac{3}{a-b}$ or $\frac{1}{a-b}$, is the correct answer for $\frac{1}{a-b} - \frac{2}{b-a}$ Ans.....

13 Write the *larger* root of the equation $x^2 - 2x = 15$ Ans.....

14 Find the value of y in the following set of equations: Ans.....
 $3x + 4y = 26$
 $x - 3y = 0$

15 Simplify $8\sqrt{\frac{a^2}{2}}$ Ans.....

16 What number must be added to $x^2 + 12x$ in order to obtain a perfect trinomial square? Ans.....

17 Express the following rule as a formula: The dividend (D) equals the product of the divisor (d) and the quotient (Q), plus the remainder (R). Ans.....

18 In the formula $s = \frac{n}{2}(a + l)$, express n in terms of s , a and l . Ans.....

19 Are -2 and -3 both roots of the equation $x^2 - x - 6 = 0$; that is, do they both satisfy the equation? [Answer yes or no.] Ans.....

20 In the following table for a graph determine the value of x corresponding to the value $y = 18$: Ans.....

x	1	2	3	...	?	...
y	3	6	9	...	18	...

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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 Given $x^2 + 6x = 8$; find the values of x correct to the nearest tenth. [10]
- 22 Two numbers, x and y , are in the ratio 3:7 and the second number exceeds the first by 12; find the two numbers. [6, 4]
- 23 An airmail pilot is able to fly at the rate of 80 miles an hour in a calm. If he can fly 630 miles with the wind in the same time that he can fly 330 miles against the wind, what is the velocity of the wind? [7, 3]
- 24 At a high school baseball game, children paid \$.35 admission and adults \$.50. If 175 people were in attendance, and the receipts were \$72.50, how many children and how many adults attended the game? [6, 4]
- 25 Copy and complete each of the following statements:
- a If the length of a rectangle is l and its width is w , its perimeter is [2]
 - b In a certain number of two digits, let the tens digit be t and the units digit be u ; then the algebraic expression for the number is [2]
 - c To remove the decimals in the equation $x^2 - .7x = -.1$, multiply each member of the equation by [2]
 - d If a^x is divided by a^y , the quotient is [2]
 - e In algebra, a rule expressed in symbols is called a [2]
- 26 Solve, group your answers and check:
- $$a^2 + ab = 6$$
- $$2b - a = 0 \quad [6, 2, 2]$$
- 27 State whether each of the following statements is true or false: [Write the letters a, b, c, d, e in a column and then write the word *true* or *false* after each letter.]
- a The square of either a positive number or a negative number is always positive. [2]
 - b $\sqrt{108} = 6\sqrt{3}$ [2]
 - c One root of the equation $2x^2 - x - 6 = 0$ is -2 . [2]
 - d The square root of 3 to the nearest tenth is 1.8. [2]
 - e $\frac{x^2 - 3x - 10}{x^2 + 4x + 4} = \frac{x - 5}{x + 2}$ [2]
- 28 The formula $A = s^2$ expresses the area (A) of a square in terms of a side (s).
- a Plot the graph of this formula from $s = 0$ to $s = 5$ inclusive. [6]
 - b From the graph estimate the area (A) when $s = 2\frac{1}{2}$ [2]
 - c From the graph estimate the side (s) when $A = 12$ [2]