The University of the State of New York

236TH HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Monday, June 14, 1926 — 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 $2\frac{1}{2}$ credits assigned to it. Each answer must be reduced to its simplest form.

1 When $r = 5$, what is the value of $r^2 - 2r - 15$? Ans..............

2 Simplify $22 - 3(2r - 4) + (9r + 3)$ Ans..............

3 Find the quotient when $6r^3 - 7r^2 + 14r - 8$ is divided by $2r^2 - r + 4$ Ans..............

4 Factor $a^2 - 25b^2$ Ans..............

5 Factor $4m^2 - 28m + 49$ Ans..............

6 Factor $2r^2 + 9r - 35$ Ans..............

7 Reduce to a single fraction $\dfrac{2}{3a - 7} - \dfrac{2}{3a + 2}$ Ans..............

8 Express as a single fraction in its lowest terms

$$\frac{7st^3}{10kk} \div \frac{14t^2}{5h^2k^2}$$ Ans..............

9 Solve for n the following equation: $\dfrac{5n}{2} = 22 + \dfrac{7n}{5}$ Ans..............

10 What must be the value of c if $8r^2 + cr - 15$ has $4r - 5$ and $2r + 3$ for its factors? Ans..............

11 If 16 is 4 more than $3a$, what is the value of $2a - 5$? Ans..............

12 Simplify $\sqrt{\dfrac{18}{5}}$ Ans..............

13 Write as a single term

$$12\sqrt{2} - 2d\sqrt{2} + 18\sqrt{2} - 5d\sqrt{2}$$ Ans..............

14 Find the square root of 53 to the *nearest tenth*. Ans..............

15 Solve the following set of equations for x and y:

$$4x - y = 9$$
$$2x - 3y = -23$$ Ans..............

16 Solve the following equation for x:

$$x^2 - 10x - 39 = 0$$ Ans..............

17 Eliminate y from the following set of equations and form a quadratic equation in x one of whose members is 0:

$$2x - y = 5$$
$$x^2 - 4y^2 = 5$$ Ans..............

18 Using only *one* letter, represent *two* numbers having the ratio $2 : 3$. Ans..............

19 Solve for b the formula $S = \dfrac{a(b + c)}{2}$ and write the answer as a single fraction. Ans..............

20 What is the value of x at the point where the graph of $y = 2x + 4$ crosses the x-axis? Ans..............

[2]

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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 The denominator of a fraction is double its numerator. If its numerator is increased by 3 and its denominator decreased by 4, the value of the fraction becomes 1. Find the denominator of the original fraction. [6, 4]

22 The sum of the three angles of any triangle is 180 degrees. Two of the angles of a certain triangle are in the ratio 6 : 5 and the third angle is the difference between the other two. Find the number of degrees in each angle. [6, 4]

23 Find the roots of the equation $2x^2 - 5x - 4 = 0$ correct to the *nearest tenth*. [10]

24 Two automobiles are 276 miles apart and start at the same time to travel toward each other. They travel at rates differing by 5 miles an hour. If they meet after 6 hours, find the rate of each. [6, 4]

25 In a barnyard are pigs and hens having in all 50 heads and 140 feet; how many animals of each kind are there? [6, 4]

26 A man travels k miles the first day and increases by 10 miles each day the distance traveled the preceding day.

    a How far does he travel the second day? the third day? the fourth day? [3]

    b Write the formula for the distance d he will travel the nth day. [5]

    c Check by letting $k = 50$ and $n = 2$. [2]

27 Select *five* of the following statements and state whether each of the five selected is true or false: [Label each answer with the corresponding letter.] [10]

    a If both terms of a fraction are positive, decreasing the denominator of the fraction decreases the value of the fraction.

    b If the numerator and the denominator of a fraction are equal, the value of the fraction is 0.

    c The difference between two negative numbers may be a positive number.

    d The equation $\frac{5x}{16} - \frac{4x}{5} = 0$ has 2 for a root.

    e The fourth root of a number is the square of the square root of the number.

    f In a radical expression the index of the root to be extracted is always an even number.

    g A coefficient of a term is a factor of that term.

28 The following table shows the rates charged by post offices for money orders of various amounts:

Amount of order	Cost of sending
$ 2.50	5 cents
5.00	7 cents
10.00	10 cents
20.00	12 cents
40.00	15 cents

    a Construct a broken line graph showing the relation between the cost of sending and the amount of the order sent. [8]

    b State which is changing more rapidly, the amount of the order or the cost of sending it. [2]