

The University of the State of New York

245TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, June 20, 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 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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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 By means of the formula $K = \frac{b}{2} \sqrt{\left(a - \frac{b}{2}\right)\left(a + \frac{b}{2}\right)}$
find K when $a = 20$ and $b = 32$. Ans.....
- 2 Find the value of x^{-1} if $2x^1 = 1$. Ans.....
- 3 Simplify $\left(\frac{b}{a-b} + 1\right) \div \frac{a}{b-a}$. Ans.....
- 4 Factor $3x^2 - 5x^2 - 2x$. Ans.....
- 5 Find the roots of $2x^2 + x = 6$. Ans.....
- 6 Find the root common to the equations
 $x^2 = 2x + 3$ and $x^2 = 9$. Ans.....
- 7 Solve the following set of equations for z :
 $3x - 2y - 5z = 11$, $y = 2x$ and $x = 4$. Ans.....
- 8 Write in the form $x^2 + px + q = 0$ the quadratic equation whose roots are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. Ans.....
- 9 Find the product of the roots of the equation
 $x^2 + 3x - 2 = 0$. Ans.....
- 10 If the discriminant of a quadratic equation is 64, are the roots rational or irrational? Ans.....
- 11 Does $\sqrt{\frac{x}{y}}$ equal $\frac{x^{-\frac{1}{2}}}{y^{-\frac{1}{2}}}$? [Answer yes or no.] Ans.....
- 12 Solve for r the formula $S = \frac{r-r_1}{r-1}$. Ans.....
- 13 Write the formula that would be used in finding the sum of the first 50 odd positive integers. Ans.....
- 14 Solve for x the equation $\sqrt{\frac{1}{x}} = 2$. Ans.....
- 15 If $y = \frac{10-x}{x}$, does y increase or decrease as x increases from 1 to 5? Ans.....
- 16 Does $\frac{\log x}{\log y}$ equal $\log x - \log y$? [Answer yes or no.] Ans.....
- 17 Given $\log x^2 = 0.6290$; find $\log 10x$. Ans.....
- 18 What integral multiple of $\log 2$ is $\log 32$? Ans.....
- 19 What must be the value of a if the graph of $3x - 5y = a$ passes through the point where $x = 3$ and $y = 1$? Ans.....
- 20 How many more articles can I buy for d dollars when the price of each article is 20 cents than when the price of each article is 25 cents? 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 (1) elementary algebra, (2) intermediate algebra.

The minimum time requirement is five recitations a week for half a school year, or the equivalent, after the completion of elementary algebra.

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.

In the examination in intermediate algebra the use of the slide rule will be allowed for checking, provided all computations with tables are shown on the answer paper.

21 a Factor $x^3 - 7x - 6$ [5]

b Simplify $(x+1)\sqrt[3]{16x^2} + 4x\sqrt[3]{\frac{1}{2}x}$ [5]

22 Find by the use of logarithms the cube root of 18.43 to three decimal places. [10]

23 The speed of an airplane is 90 miles an hour in calm weather. Flying with the wind, it can cover a certain distance in 4 hours but, when flying against the wind, it can cover only $\frac{3}{4}$ of this distance in the same time. What is the velocity of the wind? [7, 3]

24 Two adjoining lots of different size, each of which is a square, front on the same street. The combined area is 25 square rods. The perimeter of the two lots considered as a single lot is 22 rods. Find the dimensions of each lot. [7, 3]

25 In a geometric progression the second term exceeds the first term by 4 and the sum of the second and third terms is 24; find the sum of the first five terms of one of the two possible progressions. [6, 4]

26 Solve the following set of equations, group the answers and check one set of roots:

$$x^2 + 6xy = 28$$

$$xy + 8y^2 = 4 \quad [7, 2, 1]$$

27 The diagonal of a rectangle is 5 and its perimeter is 14.

a Letting x and y represent the dimensions, write two equations in x and y expressing the above facts. [4]

b Draw the graphs of the two equations written in answer to a. [4]

c From these graphs determine the dimensions of the rectangle. [2]

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