

The University of the State of New York

244TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, January 24, 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.

INTERMEDIATE ALGEBRA

Thursday, January 24, 1929

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 Simplify $\sqrt{1 - (\frac{1}{2})^2}$ [Leave answer in radical form.] Ans.....
- 2 If $v = \frac{1}{c} - 1$, find the value of $(v + 1)^2$ in terms of c . Ans.....
- 3 Given $\log x = 0.3156$; find $\log \frac{10}{x}$ Ans.....
- 4 Simplify $(.125)^{\frac{1}{3}} + (16)^{-\frac{1}{4}}$ Ans.....
- 5 In the arithmetic progression $\frac{1}{4}; \frac{1}{2}, \dots$ find the 12th term. Ans.....
- 6 Solve for n the formula $I = \frac{nE}{R + nr}$ Ans.....
- 7 What is the binomial factor of $x^3 - 2x^2 - x - 6$? Ans.....
- 8 The area of a rectangle is 240 and its dimensions have the ratio 5:3; find the longer dimension. Ans.....
- 9 In the equation $3x^2 - 16x = 8$, what is the product of the roots? Ans.....
- 10 The sum of the roots of a quadratic equation is 8 and their difference is 4; write the equation. Ans.....
- 11 Solve for x :

$$\sqrt{x^2 + 27} = 9 - x$$
Ans.....
- 12 Considering the first five powers of 2 as a progression, write the formula that would be used in finding their sum. Ans.....
- 13 Simplify $3x^0 - (3x)^0 - 1^{3x}$, if $x = 2$. Ans.....
- 14 Factor $x^{2a} - 3x^a - 10$ Ans.....
- 15 Given $x + y : x - y = 5 : 2$; find $x : y$ Ans.....
- 16 What is the value of $x^2 - 2x - 3$ when $x = \sqrt{2} - 1$? Ans.....
- 17 If $y = \frac{-12}{x}$ and x is positive, does y increase or decrease as x increases? Ans.....
- 18 Will the graphs of $3x - y = 1$ and $6x - 3 = 2y$ have a point in common? [Answer *yes* or *no*.] Ans.....
- 19 What is the value of y for the intersection of $4x - 3y = 12$ with the y -axis? Ans.....
- 20 If $2x - 3$ is a factor of $kx^2 - 7x - 3$, what is the value of k ? Ans.....

INTERMEDIATE ALGEBRA

Thursday, January 24, 1929

- 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 The perimeter of a rectangle is 20 inches. If the length is increased by 2 inches and the width is decreased by 1 inch, then the area is 24 square inches. What are the dimensions of the original rectangle? [7, 3]

22 Brown and Smith own two tracts of land, Brown's tract being $\frac{3}{4}$ as large as Smith's. After selling Smith 60 acres, Brown owns $\frac{1}{2}$ as much as Smith. How many acres did Smith own at first? [7, 3]

23 Find three numbers in geometric progression whose sum is 26 and whose product is 216. [6, 4]

24 In the formula $K:K' = a^2:a'^2$, $K = 1600$, $K' = 7290$ and $a' = 310.6$. By the use of logarithms find the value of a . [10]

25 a One root of the equation $2x^2 - 15x + k = 0$ is twice the other; what is the value of k ? [5]

b Form the equation whose roots are $1 + \sqrt{3}$ and $1 - \sqrt{3}$ [5]

26 Solve the following set of equations, correctly group your answers and check one answer:

$$\frac{8}{x} - \frac{9}{y} = -1$$

$$x - 3y = -5 \quad [7, 2, 1]$$

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 logarithm of 2^0 is zero. [2]

b An arithmetic progression becomes a geometric progression when each of its terms is multiplied by 2. [2]

c $2^a \times 2^a = 4^{2a}$ [2]

d If the length of a rectangle is decreased by d feet and its width is increased by d feet, its area is not changed. [2]

e The roots of the equation $2x^2 - x = 1$ are rational. [2]

28 a Form a table of values for $y = x - x^2$ by giving x all integral values from -2 to $+3$ inclusive. [2]

b Draw the graph of the equation. [6]

c By means of the graph drawn in answer to b, determine the nature of the roots of $x - x^2 = 3$ and $x - x^2 = -4$ [1, 1]