

The University of the State of New York

253D HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, January 28, 1932—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 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 28, 1932

Fill in the following lines:

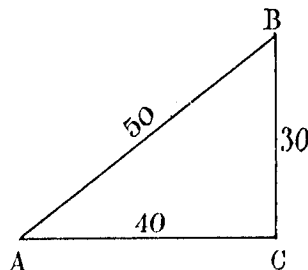
Name of school.....Name of pupil.....

**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 Write the equation with *integral* coefficients the sum of whose roots is  $\frac{2}{3}$  and the product of whose roots is  $\frac{4}{3}$ . Ans.....
- 2 Solve for  $r$  the formula  $\frac{E}{e} = \frac{R+r}{r}$  Ans.....
- 3 In the expression  $y = \frac{1-x}{x}$ , if  $x$  is positive and increases, does  $y$  increase or decrease? Ans.....
- 4 Factor  $a^{2x} - b^{6y}$  Ans.....
- 5 Combine into a single fraction  $\frac{1}{x-1} + 2 - \frac{2x}{1-x}$  Ans.....
- 6 If the discriminant of a quadratic equation in one unknown is 49, are the roots rational or irrational? Ans.....
- 7 Find the *seventh* term of the series  $\frac{2}{3}, \frac{1}{3}, \frac{1}{6}, \dots$  Ans.....
- 8 Find the sum of all the odd numbers between 4 and 100. Ans.....
- 9 Write the first three terms of the expansion of  $(a+b)^6$  Ans.....
- 10 Find the value of  $\frac{3+2^{-1}}{7} + 4(3)^0$  Ans.....
- 11 Simplify  $4 + \sqrt{-25} - 2\sqrt{-4}$  Ans.....
- 12 Solve the equation  $\sqrt{x - \frac{1}{2}} = \frac{1}{2} \sqrt{\frac{1}{2}}$  Ans.....
- 13 What is the name of the graph of the equation  $y = 3x^2$ ? Ans.....
- 14 Write the logarithm of .06386 Ans.....
- 15 If  $\log x = 3.6315$ , find  $\log \sqrt[3]{x}$  Ans.....
- 16 The length of a shadow cast by a pole is 80 feet. The angle of elevation of the sun is  $48^\circ$ . Find to the *nearest foot* the height of the pole. Ans.....
- 17 Find  $\log \sin A$  where  $A$  is an angle of the right triangle  $ABC$ .



Ans.....

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18 Find angle  $x$  to the *nearest degree* if  $\tan x = .6158$

Ans.....

19 What is the slope of the graph of  $y = 2x - 4$ ?

Ans.....

20 Express a simple relation between the two variables shown in the table below.

Ans.....

$x$	1	2	3	4	5
$y$	4	7	10	13	16

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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 Two years ago Mary was 7 times as old as John. Two years from now she will be 3 times as old as John. Find the present age of each. [7, 3]

22 An automobile traveled 90 miles at a uniform rate. If the rate had been three miles an hour less, the trip would have taken 20 minutes longer. Find the rate at which the automobile traveled. [7, 3]

23 The formula for the  $n$ th term of a geometric progression is  $l = ar^{n-1}$ . By the use of logarithms find the 14th term of the progression when  $a = 2714$  and  $r = \frac{1}{2}$ . [10]

24 Find to the nearest tenth the roots of the equation  $4x^2 - 11x - 6 = 0$ . [10]

25 The sum of the areas of two squares is  $36\frac{1}{2}$ . The difference between their sides is 3. Find the side of each square. [6, 4]

26 The balcony in the assembly hall of a school contains 450 seats. The front row has 36 seats and each succeeding row has 2 more seats than the row in front of it. How many rows of seats are there? [10]

27 a Make a table of values for the equation  $x^2 - x - 2 = y$ , from  $x = -2$  to  $x = 3$  inclusive. [2]

b Draw the graph of the equation. [6]

c From the graph estimate to the nearest tenth the roots of the equation  $x^2 - x - 2 = 3$ . [2]

\*28 A train leaves a town and averages 30 miles an hour. After it has traveled 3 hours, an accident occurs and causes a delay of an hour. The train then continues at the rate of 15 miles an hour. A second train leaves the same town 3 hours later than the first train, and averages 40 miles an hour. How many hours must the second train travel in order to overtake the first train and how far are the trains from the town? [10] [Solve by graphic method.]

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