The University of the State of New York

228TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, January 22, 1923—9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (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.

Answer eight questions, including either question 9 or question 10. 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.

1 Find the prime factors of each of the following:

$3x^2 + 14x - 24$ [2½]

$x^5 + 32$ [2½]

$x^2 + .1x - .06$ [2½]

$x^{2n} - y^6$ [2½]

$x^3 + 5x^2 - 2x - 24$ [2½]

2 Divide $6x^{-3} + 10x^{-2} - 4x^{-1} - 10 - 2x$ by $x^{-2} - 1$ and express the result with positive exponents in descending powers of x. [10, 2½]

3 a Simplify $\left[\frac{\sqrt{72y^{2n}}}{3} \times y^6\right](2y^{n+2})^{-1}$ [3]

b Rationalize the denominator in the following fraction and simplify the result: $\frac{6a}{\sqrt{12}}$ [4½]

4 Solve for x to the nearest hundredth:

$x^2 - 2.2x - 1.16 = 0$ [12½]

5 Solve the following and correctly group your answers:

$x^2 + y^2 = 10$

$x^2 - xy + y^2 = 7$ [11, 1½]

6 Solve the following and check your answer:

$\sqrt{2x+2} + \sqrt{2x-1} - \sqrt{8x+1} = 0$ [10, 2½]

7 By the use of logarithms find the value of $\frac{1.07^6 \times \sqrt[3]{.31}}{.8642}$ [12½]

8 a Without solving the equation, determine the nature of the roots of $6x^2 + 7x - 6 = 0$ [5]

[Leave all work on paper.]

b Determine, without solving or substituting, whether 4 and -3 are roots of the equation $x^2 - x + 10 = 0$ [5½]

[Leave all work on paper.]

9 In January a boy joins a Christmas club and plans to have $25 at the end of the 50 weekly payments; he wishes his weekly payments to decrease by the same amount and his last payment to be 1 cent. What is his first payment and by what amount is each payment decreased? [12½]

10 A can do a piece of work in 4½ days; after he has worked 3 days B joins him and they finish the work in ⅞ of a day. In what time can B do the work alone? [12½]

11 Represent graphically the equation $x^2 - 6x + 6 = y$ from $x = -1$ to $x = 6$ and from the graph determine to the nearest tenth the roots of the equation $x^2 - 6x + 6 = 0$ [8½, 4]