University of the State of New York

200TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, January 17, 1910—9.15 a. m. to 12.15 p. m., only

Write at the top of the first page of your answer paper (*a*) the name of the school where you have studied, (*b*) the number of weeks and recitations a week that you have had in algebra.

Two recitations a week for a school year (or four recitations a week for half a school year) in addition to the five recitations a week for a school year required for elementary algebra, in a recognized academic school, is the regular requirement, and any statement showing less or other than this should be accompanied by a satisfactory claim or explanation made by the candidate and certified by the principal; otherwise such paper will be returned.

Answer eight questions, selecting two from each group. No credit will be allowed unless all operations (except mental ones) necessary to find results are given.

Group I 1 Simplify *each* of the following:

$\frac{\sqrt{-75}}{\sqrt{-3}}$, $\sqrt{-a^2}+\sqrt{-b^2}+\sqrt{-c^2}$, $\sqrt{-8}\times(-\sqrt{-18})\times\sqrt{-32}$, $\frac{-\sqrt{25}}{\sqrt{-5}}$

2 Expand $(a^2+2b)^5$ by the binomial formula. Prove the expansion if $a=1$ and $b=1$.

3 Multiply $a^2b^{-2}+2+a^{-2}b^2$ by $a^2b^{-2}-2-a^{-2}b^2$. Prove the correctness of the result by expressing each term with positive exponents and then finding the product.

Group II 4 Solve as a quadratic: $x^4-4x^3-10x^2+28x-15=0$

5 The product of four terms of a geometric series is 4 and the fourth term is 4; find the series.

6 Insert four arithmetic means between a and l and find the sum of these four means.

Group III 7 Find x when $\sqrt{x}+\sqrt{b}:\sqrt{x}-\sqrt{b}=a:b$

8 A launch can go 24 miles down stream and return, making the round trip in 9 hours; if the rate of the stream is 2 miles an hour, find the rate of the launch in still water.

9 Find *two* numbers whose sum, whose product and the difference of whose squares are all equal.

Group IV 10 Plot the graph of $x^2+3x-4=0$ and from the graph determine the roots of the equation.

11 What relation must hold between the coefficients of a quadratic equation if the sum of the reciprocals of the roots is equal to unity?

12 Solve $\begin{cases} x^4+x^2y^2+y^4=21 \\ x^2-xy+y^2=3 \end{cases}$