University of the State of New York

210TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, January 19, 1914—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.

Answer seven questions, selecting three from group I and two from each of the other two groups. 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.

Assign 12 credits to each question in group I and 16 credits to each question in groups II and III.

Group I

1 Factor, find the highest common factor and the lowest common multiple of $a^4+a^2b^2+b^4$, $4a^3+4b^3$, $2a^2c-2abc+2b^2c$

2 Simplify *each* of the following expressions:

$$(a)\ \sqrt{3}\times\sqrt[6]{2}\times\sqrt[3]{5};\quad (b)\ \frac{3+\sqrt{-2}}{2-\sqrt{-2}};\quad (c)\ \frac{\sqrt{-6}}{-3\sqrt{-2}}$$

[No partial credit will be granted on the answer to either (*a*) or (*b*) or (*c*).]

3 Reduce to lowest terms $\dfrac{2x^3+x^2-25x+12}{3x^3+5x^2-34x-24}$

4 *a* Solve by the graphic method the equation $x^2=2x+3$

b Solve by the formula the equation $x^2+x+1=0$

Group II

5 If the series $\frac{2}{5}, \frac{9}{10}\ldots$ is arithmetical, find the sum of the first 15 terms; if geometrical, find the 5th term.

6 Determine, without solving, the nature of the roots of the equation $3x^2-5x+3=0$

7 *a* If $x^{-\frac{2}{3}}:2=1:x^{\frac{1}{6}}$, what is the value of x?

b Simplify and express with positive exponents

$$\frac{a^{-1}b\sqrt{c}}{a^{\frac{2}{3}}}\div\sqrt{\frac{a^2b^{-1}}{c^{-3}}}$$

[No partial credit will be granted on the answer to *b*.]

Group III

8 *a* Form the quadratic equation whose roots are 5 and $-\frac{2}{3}$.

b State the relation between the roots and the coefficients in a quadratic equation.

9 A merchant bought a number of barrels of apples for $120; he kept two barrels and sold the remainder at an advance of $2 per barrel, thereby gaining $34. How many barrels did he buy?

10 A train traveled 273 miles at a uniform rate; if the rate had been 3 miles an hour less, the journey would have taken $\frac{1}{2}$ hour longer. Find the rate of the train.