New York State Education Department

209TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, June 16, 1913—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 Find the prime factors of $(x^2+x-2)^2-(x^2-x+3)^2$; $64-n^6$; $12xy+25-4x^2-9y^2$; $12a^2-4ab-3ax^2+bx^2$

2 *a* Simplify $6 \div \sqrt{3}+\sqrt{2}$

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

b Multiply $2\sqrt{a}+5\sqrt{a-b}$ by $\sqrt{a}-\sqrt{a-b}$

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

3 Perform the indicated operations and express the results in their simplest forms: $\sqrt{-25x^2}-\sqrt{-4x^2}-\sqrt{-9x^2}-\sqrt{-1}$;

$\frac{2+3\sqrt{-1}}{2+\sqrt{-1}}$; $(\sqrt{-3}+\sqrt{-5})^2$

4 Find the square root of $\frac{a^2}{x^2}+\frac{6a}{x}+11+\frac{6x}{a}+\frac{x^2}{a^2}$

[No partial credit will be granted on the answer to this question.]

Group II

5 Assuming that a does not equal 0, show that $a^0=1$ and $a^{-x}=\frac{1}{a^x}$.

6 Solve $\begin{cases} x^4+x^2y^2+y^4=91 \\ x^2-xy+y^2=7 \end{cases}$

7 *a* Derive the formula for finding the sum of the terms of an arithmetical progression.

b In an arithmetical progression the first term is $\frac{1}{2}$, the last term is $-\frac{5}{11}$, the number of terms is 22; find the difference between any two successive terms.

Group III

8 Solve $x^{-\frac{1}{2}}-5x^{-\frac{1}{4}}+4=0$

9 Solve graphically $\begin{cases} x^2-4y=18 \\ 3x=8+4y \end{cases}$

10 A number of men subscribed a certain amount to make up a deficit of $100 but 5 men failed to pay and thus increased the share of the others by $1 each; find the amount each paid.