200TH HIGH SCHOOL EXAMINATION

ELEMENTARY 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.

Five recitations a week for a school year, 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 Solve $\dfrac{a+bx}{3b+2ax} = \dfrac{a-bx}{b-2ax}$

2 Find the prime factors of *each* of the following expressions and from the factors determine the highest common factor: $27m^5 - 8m^2$, $6m^3 + 8m^2 - 8m$, $12m^4 - 8m^3$, $27m^3 - 12m$

3 Find the product of $2x + 3y - z$ and $x - 3y + 2z$. Prove by substitution the correctness of the result if $x = 1$, $y = 2$ and $z = 3$

Group II   4 Reduce *each* of the following to its simplest form: $\sqrt{50} - \sqrt{32}$, $2\sqrt{5} \times \sqrt{15}$, $6\sqrt{20} \div 2\sqrt{10}$, $\sqrt{\tfrac{5}{8}}$, $\sqrt{9\sqrt{a^4}}$

5 Solve $\begin{cases} 2x + y - z = 5 \\ 3x + 2y - 4z = 2 \\ x - 2y + 3z = 3 \end{cases}$

6 Find the square root of the following: $49x^6 - 42x^5 - 47x^4 - 4x^3 + 28x^2 + 16x + 4$

Group III   7 If 122 marbles were divided among three boys so that the first had twice as many as the second and the second had 6 more than the third, how many had each? Prove.

8 Find *three* consecutive numbers such that if the first is divided by 5, the second by 7 and the largest by 11 the sum of the three quotients is $\frac{1}{4}$ of the sum of the three numbers. Prove.

9 Solve $\sqrt{2x+1} = 2\sqrt{x} - \sqrt{x-3}$

Group IV   10 Solve $\begin{cases} 2x + y = 5 \\ 3x^2 - 7y^2 = 5 \end{cases}$

11 Solve $1 - 10ax + 16a^2x^2 = 0$

12 *A* and *B* can together address 100 envelops in an hour; when each works alone *A* can address 100 envelops in 50 minutes less time than *B*. How many can each address in an hour?