University of the State of New York

201ST HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Thursday, June 9, 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; simply indicating the operations is not sufficient.

Group I

1 Simplify $\dfrac{1 + \dfrac{a}{a+1}}{a + \dfrac{1}{1+a}} \div \dfrac{(a+1)^2 - a^2}{a^3 - 1}$

2 Find the prime factors of *four* of the following: $a^4 - 16$; $20x^2 - 60xy + 45y^2$; $6ax + 10ay - 21bx - 35by$; $y^2 - y + \dfrac{1}{4}$; $1 - \dfrac{x^3}{8}$

3 Solve $\begin{cases} ax + by = m \\ bx + ay = n \end{cases}$

Group II

4 Reduce *each* of the following to its simplest form:
$(\sqrt{3} + 5\sqrt{2})(2\sqrt{3} + 3\sqrt{2})$; $\sqrt{108} \div \sqrt{432}$; $\sqrt{\dfrac{2}{3}}$; $\sqrt{18} + \sqrt{50} - \sqrt{72}$; $\sqrt[3]{2} \times \sqrt[4]{4}$

5 It required as many days for a number of men to dig a trench as there were men; if there had been 6 men more the work would have been done in 8 days. Find the number of men.

6 Solve $x^2 + 5ax = 14a^2$

Group III

7 Solve $\begin{cases} 2x^2 + xy = 24 \\ x^2 - y^2 = 5 \end{cases}$

8 The length of a picture at the inner edge of the frame is twice its width; the frame is 4 inches wide and has an area of 328 square inches. Find the dimensions of the picture.

9 Solve $\sqrt{x+7} + \sqrt{x} = 7$

Group IV

10 The area of a certain square is $\frac{4}{9}$ of the area of a certain other square and its side is $\frac{1}{4}$ of a yard less; find the side of each square.

11 Two quarts of alcohol are mixed with 5 quarts of water; find the number of quarts of alcohol that must be added to make the mixture three fourths alcohol.

12 Define exponent, surd, term, reciprocal, elimination.