University of the State of New York

High School Department

179TH EXAMINATION

ALGEBRA

Tuesday, September 29, 1903—9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others but **no more.** *If more than four of the others are answered only the first four answers will be considered. Give all operations (except mental ones) necessary to find results. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 12½ credits. Papers entitled to 75 or more credits will be accepted.*

1 Simplify $\dfrac{\left(x-1+\dfrac{2}{x+1}\right)\left(\dfrac{4}{x-1}+x+3\right)}{x^2+1} \div \left(\dfrac{1}{x-1}+\dfrac{2}{(x-1)^2}\right)$

2 Factor *five* of the following: $12a^2+4a-1$, a^4+ab^3, b^7+c^7, $ab-3b-2a+6$, $(a-b)^3-1$, a^2-b^2+2b-1, $x^4+x^2y^2+y^4$

3 Solve $\begin{cases} \dfrac{a}{x}+\dfrac{b}{y}=1 \\ \dfrac{b}{x}+\dfrac{a}{y}=1 \end{cases}$

4 Solve $3x-5=\dfrac{6}{x}+\dfrac{11}{2}$

5 In an orchard containing 580 trees the number of rows of trees is 9 greater than the number of trees in a row; find the number of trees in a row.

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

7 Find the highest common factor (greatest common divisor) of $2x^3-2x^2-3x-2$ and $3x^3-x^2-2x-16$

8 Expand by the binomial theorem the first *four* terms of $\left(a-\dfrac{b}{2}\right)^5$, giving all the work for finding the coefficients.

9 The product of two numbers is 96; the sum of 2 times the first number and 3 times the second equals 52. Find the numbers.

10 Solve $\begin{cases} x^3-y^3=296 \\ x-y=2 \end{cases}$

11 Simplify $\sqrt{3x(x+7y)^2}+(x-y)\sqrt{27x}-\sqrt{48xy^2}$; $\dfrac{a+2\sqrt{b}}{a-2\sqrt{b}}$; $(a^{\frac{1}{3}}+b^{\frac{1}{3}})(a^{\frac{1}{2}}-b^{\frac{1}{2}})$

12 The area of a rectangle is 480 square inches and its diagonal is 34 inches; find the base and altitude of the rectangle.