22
University of the State of New York

Examination Department

119th examination

ALGEBRA

Wednesday, March 14, 1894—9 : 15 a. m. to 12 : 15 p. m , only

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more.** *If more than 10 questions are answered only the first 10 of these answers will be considered. Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 10 credits.*

1 Define *coefficient, simultaneous equations, surd, imaginary quantity, exponent.*

2 Simplify $\left(\dfrac{a+b}{b+c} - \dfrac{a+b}{a+c}\right)\left(\dfrac{a}{a+b} + \dfrac{c}{a-b} - \dfrac{a^2-2ab-c^2}{a^2-b^2}\right).$

3 Remove parentheses and simplify :

$\{4a-[-2b-(3a+2bc)-2a+b]+b-3a\}+3c.$

4 Factor the following : a^3-b^3, $16x^2-9$, $a^2+ab+ac+bc$, $1-\dfrac{1}{x^2}$, $2a^2+ab-6b^2$.

5 Solve, using elimination by substitution : $ax-2by=a^2-ab+4b^2$, $2x+y=3a.$

6 Solve, using elimination by comparison : $4x+3y=20$, $2x-y=\tfrac{5}{3}.$

7 Solve $\dfrac{5a^2}{8} - \dfrac{ax}{4} = 2x^2.$

8 Solve $x^3-y^3+x=1\tfrac{3}{8}+y$, $x-y=\tfrac{1}{2}.$

9 Expand by the binomial formula $\left(3a+\dfrac{b}{2}\right)^5.$

10 Solve $\sqrt{x+2}+\sqrt{x-3}=5.$

11 The length of a rectangular field is three times its width, and the number of square rods in its area is $7\tfrac{1}{2}$ times the number of rods around the field. Find its length and width.

12 Divide $x+\dfrac{1}{y}$ by $\dfrac{1}{x}+y$, finding the quotient to four terms.

13 Simplify $\sqrt{\dfrac{1}{a}}$, $\sqrt{45}+\sqrt{20}$, $\sqrt[3]{ab^2}\times\sqrt{ab^3}$, $\sqrt{-9}\times\sqrt{-16}$, $\sqrt{ab}\times\left(\tfrac{2}{3}+\tfrac{3}{4}\right).$

14 Find the square root of $\dfrac{1}{x^2}+\dfrac{6}{x}-\dfrac{2y}{x}+9-6y+y^2.$

15 John is a times as old as James ; b years ago he was c times as old as James. What is the present age of each?