22

University of the State of New York

Examination Department

131st examination

ALGEBRA

Wednesday, June 12, 1895—9:15 a. m. to 12:15 p. m., only

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. Division of groups is not allowed. 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 *literal quantity, numeric equation, sign, surd, homogeneous quantity.*

2 Simplify $\left(1 + \dfrac{n-1}{n+1}\right) \div \left(1 - \dfrac{n-1}{n+1}\right) + \left(1 + \dfrac{n+1}{n-1}\right) \div \left(1 - \dfrac{n+1}{n-1}\right)$

3 Factor $a^3 - 8$, $x^2 + x - 12$, $2x^2 + 3x - 2$, $8a^3 - 32ab^2$, $2x^5 + 2x^3y^2 + 2xy^4$

4-5 Solve $ax - 2by = a^2 - 2ab - 2b^2$
$bx + ay = 2a^2 + 2ab + 2b^2$

6 The sum of two numbers is 20 and one half the larger is equal to three fourths the smaller; find the numbers.

7-8 Solve $x^2 - bx = \dfrac{4a^2 - 6ab}{9}$

9-10 Solve $3x^2 + 4y^2 = 43$
$x^2 + 2y = 13$

11 Expand $(x+1)^5$.

12-13 Solve $\sqrt{x} + \sqrt{4a+x} = 2\sqrt{b+x}$

14-15 If a certain number is increased by the sum of its digits the sum is 21; if the number is diminished by twice the sum of its digits the result is 3. Find the number.