University of the State of New York

Examination Department

133D EXAMINATION

ALGEBRA

Thursday, September 26, 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 *algebra, simple equation, numeric equation, positive quantity, transposition.*

2 Simplify $\left(\dfrac{2(a-x)}{a+x} - \dfrac{a+x}{a-x}\right)\left(\dfrac{1}{a} + \dfrac{1}{x}\right)$

3 Factor the following: $4a^2 - 9$, $4a^2 + 9a - 9$, $6x^2 - 13xy + 6y^2$, $x^6 - y^6$, $8x^2 - 8xy - 6y^2$

4 Multiply $x^2 + 2xy + y^2$ by $x^{-2} + 2x^{-1}y^{-1} + y^{-2}$ and simplify the result.

5 Solve $\dfrac{ax}{b} + \dfrac{2by}{a} = \dfrac{1}{b} + \dfrac{2}{a}$, $2ax - 3by = -1$

6 Raise $\dfrac{a}{2} + \dfrac{3x}{4}$ to the fifth power, indicating all the operations for finding the coefficients.

7 Solve $ax^2 - bx = \dfrac{a^3}{b^2} - a$

8–9 Solve $x^2 + 2xy = 21$, $2x^2 - 3y^2 = 6$

10 The sum of two numbers is 15, and the sum of their squares is 137; what are the numbers?

11 Simplify each of the following: $\sqrt{24}$, $\sqrt{\dfrac{1}{a}}$, $\sqrt{-3} \times \sqrt{-4}$, $\sqrt{a} + 2\sqrt{ab^2}$, $3\sqrt{2} \div 2\sqrt[3]{3}$

12–13 Six men and four boys working together for two days earn $24, the same amount that would be earned by four men and eight boys working four days; find the daily wages of each.

14–15 In settling a bill for a company of *m* persons it was found that each person was obliged to pay *p* dollars more than he would have had to pay had there been *n* persons to pay the same bill; what was the amount of the bill?