University of the State of New York

Examination Department

138TH EXAMINATION

ALGEBRA

Monday, June 15, 1896 — 9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer questions 1–5 and five of the others but **no more.** *If more than five of these other questions are answered only the first five 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, monomial, degree of a term, elimination, radical.*

2 Solve $x + 2y + z = 10$, $2x + 3y - 2z = 1$, $x - 3y + 3z = 7$

3 Solve $x^6 - 7x^3 = 8$ (Find two roots.)

4 Find the square root of $\dfrac{x^4}{4} - x^3 + x + x^2 - 2 + \dfrac{1}{x^2}$

5 Solve $\sqrt{x - a} = b - \sqrt{x}$

6 Simplify $3\left[2a - b - \{a(2b + c) - ac\} - 2(a - 2b)\right]$

7 Factor $6a^2 - 11ab + 3b^2$, $x^2 + x + \frac{1}{4}$, $12a^2 + 12ab + 3b^2$, $2x^6 - 16y^3$, $28a^2 - 7b^2$

8 Simplify $\dfrac{x - y}{y} + \dfrac{2x}{x - y} - \dfrac{x^3 + x^2 y}{x^2 y - y^3}$

9 Find the greatest common divisor (highest common factor) of $3a^3 - 3a^2 b + ab^2 - b^3$ and $4a^2 b - 5ab^2 + b^3$

10 Solve $x^2 + xy = 8x + 3$, $y^2 + xy = 8y + 6$

11 State the rule for transposing a term in an equation and give the axioms on which this rule is based.

12–13 Six years ago A's age was one half B's age, four years hence A's age will be two thirds B's age. What is the age of each?

14–15 If the sum of two numbers is multiplied by the greater number the product is a; if the same sum is multiplied by the lesser number the product is b; find the numbers.