University of the State of New York

Examinations Department

105th examination

ALGEBRA

Wednesday, November 23, 1892—9 : 15 a. m. to 12 : 15 p. m., only

40 *credits, necessary to pass,* 30

NOTE.—Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it *Ans.*

1 Write (*a*) a homogeneous polynomial; (*b*) a binomial surd; (*c*) a complete equation. State in each case why the thing written is what is required. 6

2 Indicate the following operations in one connected expression: from c times the sum of a and b subtract c times the difference of a and b; add a^2 to the result and multiply the sum by b; divide this product by the square of the sum of a and b. 5

3 Reduce the following expression to its simplest form and then find the value of the result when $m = 3$ and $n = 2$: $\dfrac{\frac{m^2}{n^3} + \frac{1}{m}}{\frac{m}{n^2} - \frac{m-n}{mn}}$. 5

4 Resolve each of the following polynomials into its prime factors and then indicate by signs which of these factors must be combined to form the greatest common divisor and which to form the least common multiple: $a^3b + a^2b^2 - 6ab^3$, $a^3 + 2a^2b - 3ab^2$, $a^2b + 4ab^2 + 3b^3$. 5

5 Solve the following equations: (*a*) $2ax^2 + 4bx = 6c$. 3

(*b*) $\begin{cases} 3x^2 - 4xy = 16 \\ 3y^2 - 2xy = -4. \end{cases}$ 4

6 Find the square root of the following:

$$a^2 + 4ab - ac + 4b^2 - 2bc + \frac{c^2}{4}.$$ 3

7 The two roots of an equation are -4 and $+3$; form the equation. 3

8 The sum of two numbers is to their difference as 5 to 1, and their product is to the quotient of the greater divided by the less as 16 to 1; find the numbers 4

9 Find the sum of $\sqrt{12a^3}$ and $\sqrt{27a^5b^2}$. 2