EXAMINATIONS DEPARTMENT
108th examination
ALGEBRA

Wednesday, March 15, 1893—9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

Note—Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it An.s.

1 Define exponent, coefficient, numeric equation, pure quadratic equation, radical quantity.  

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

3 Factor \[ abx^2 + (a^2 + b^2)xy + aby^2; \]
\[ 6x^2 - 13xy + 6y^2; \]
\[ x^4 + x^2y^2 + y^4. \]

4 Solve \[
\begin{align*}
  x^2 + xy + y^2 &= 49 \\
  x + y &= 8 \\
  2x^2 + abx &= c.
\end{align*}
\]

5 Find the value of the following expression when \( x = 4, y = 8, a = 3, b = 5 \):
\[
\left( 4x^2 - a^{-1}(y^3 + \sqrt{x + b}) \right)^3.
\]

6 Sold an article for \( a \) dollars gaining thereby \( b \) per cent on the cost; what was the cost?

7 One half the sum of two numbers is equal to one and one half times their difference; twice the larger number exceeds three times the smaller by 12; find the numbers.

8 Expand by the binomial formula, giving all the operations for finding coefficients: \( \left( \frac{a}{2} + 3b \right)^5. \)

9 Simplify
\[
\begin{align*}
  \left( \sqrt{\frac{18}{x}} \times \sqrt{\frac{12}{y}} \right)^3; \quad & \left( \sqrt{\frac{2}{x}} - \sqrt{\frac{1}{y}} \right)^2.
\end{align*}
\]