Examination Department

ALGEBRA

Thursday, September 24, 1896—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer the first five questions 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 *polynomial, surd, exponent, pure equation, numeric equation.*

2 Simplify $\sqrt{75}$, $\sqrt[3]{128}$, $\sqrt{8a^3b^5}$, $\sqrt[3]{\dfrac{2a^4}{3b^2}}$, $\sqrt{\dfrac{1}{5}}$

3 Solve $x^2 + xy = 10$, $y^2 + xy = 15$

4 Solve $\dfrac{5}{x} + \dfrac{7}{y} = 8\frac{1}{2}$

$\dfrac{6}{x} + \dfrac{2}{y} = 7$

5 Simplify $\left(\dfrac{a+b}{a-b} - \dfrac{a-b}{a+b}\right) \dfrac{(a+b)\,(a-b)}{ab} \times \dfrac{3}{4}\,(a+2b)\,(2a-b)$

6 Factor $6a^2 + 13ab + 6b^2$, $a^2 - ab - 2b^2$, $6a^2 - 6b^2$, $a^4 + a^2b^2 + b^4$, $x^3 - y^3$

7 Simplify $3x[x - 2\{x - 3(x + 2y - 7) + 4x\} - 5y]$

8 Solve $3ax^2 + \dfrac{2bx}{c} = 3b$

9 Solve $x + 2y = 7$, $y + 3z = 74$, $3x - z = 5$

10 Raise $2x^2 - 3y^3$ to the 5th power. Use the binomial theorem and give all the work for finding the coefficients.

11 Find the square root of $-\dfrac{2b}{3} + 1 + 4a + 4a^2 + \dfrac{b^2}{9} - \dfrac{4ab}{3}$

12–13 A certain number is composed of three digits whose sum is 12; the digit in the unit's place is equal to the sum of the other two; if the order of the digits is inverted the number will be increased by 495; find the number.

14–15 A certain number of men can do a piece of work in *a* days, but if *n* men be taken off, it will take those remaining *b* days to do the same work. How many men were there?