

## High School Department

156TH EXAMINATION

## ALGEBRA

Thursday, September 29, 1898—9.15 a. m. to 12.15 p. m., only

Answer the first five questions and five of the others but no more. If more than five of the others are answered only the first five 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. Papers entitled to 75 or more credits will be accepted.

1 Simplify  $\frac{\frac{3a+b}{2a-b} - \frac{3a-b}{2a+b}}{\frac{2a}{4a^2-b^2}}$

2 Simplify  $x - [y - 2(x - y - 2z) + 2x - 3y] - z$

3 Solve  $\begin{cases} \frac{x+y}{4} + \frac{x-y}{3} = 5 \\ 2x - 3(x - 2y) = 9 \end{cases}$

4 Solve  $\frac{2x+a}{b} - \frac{2a-x}{a} = \frac{3x-b}{b}$

5 Solve  $6 - x = 12x^2$ . Prove correctness of the result.

6 Find prime factors of  $3x^3 - 6x - 105$

$$1 + m^3 + m^6$$

$$64 - b^6$$

$$a^{3m} + b^{3n}$$

$$2x - xy + 2y - y^2$$

7 Expand by the binomial theorem  $(2a^2 - \frac{b}{2})^3$  to 4 terms.

Show how the coefficients are formed.

8 Extract the square root of  $9x^6 - 24x^3 + 13x^2 + 4x + \frac{x^2}{4}$

9 Solve  $\sqrt{2x+3} - \sqrt{2x-2} = \sqrt{8x-23}$

10 Simplify  $\sqrt[3]{27}, \sqrt[3]{54}, \sqrt[3]{x^{10}y^{3ab}z^{am}}, \frac{3\sqrt[3]{50} + \sqrt[3]{4} - 2\sqrt[3]{1}}{\sqrt{18}}$

11 Express the interest on  $p$  dollars at  $r$  per cent for  $n$  years.

12-13 The sum of two numbers is 10 and the sum of their squares is 58; find the numbers.

14-15 Solve  $\begin{cases} 2xy - x^2 = 16 \\ 3xy - y^2 = 5 \end{cases}$