

ALGEBRA

Monday, January 24, 1898—9:15 a. m. to 12:15 p. m., only

100 credits, necessary to pass, 75

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.

1 Define *coefficient, elimination, polynomial, exponent, radical.*

2 Simplify $a - \{2b + 1 - (c + 2a) + 3 - [b + 4 - (3a - b + c)]\}$

3 Simplify $\frac{a}{a^2 - b^2} \times \frac{a - b - 2b\left(\frac{a - b}{a + b}\right)}{\frac{a - b}{b} \div \frac{a + b}{a}}$

4 Solve $\frac{1}{x} - \frac{1}{y} = a$, $\frac{1}{y} + \frac{1}{z} = b$, $\frac{1}{z} - \frac{1}{x} = c$

5 Solve $3x^2 - 11x = 70$

6 Factor $6a^2 + 10ab - 4b^2$, $x^3 + 125$, $1 - x - x^2 + x^3$, $x^8 + x^4 + 1$, $a^6 - 1$

7 A number is expressed by two digits whose sum is 12; if the digits are interchanged the resulting number is less than the original number by 36. Find the number.

8 Find the greatest common divisor (highest common factor) of $4x^3 - 3x^2 - 24x - 9$ and $8x^3 - 2x^2 - 53x - 39$

9 Find the square root of $4x^8 - 4x^6 - 7x^4 + 4x^2 + 4$

10 Write the first four terms of the expansion of $(2a^2 - b^3)^7$ by the binomial theorem, giving all the work for finding the coefficients.

11 Simplify $\sqrt{50x^3y^2}$, $\sqrt[3]{54a^7b^4}$, $\frac{2a}{3x}\left(\sqrt[3]{\frac{27x^4}{a^2}}\right)$,
 $\sqrt[3]{\frac{128x^6y^2}{81z^4}} \div \sqrt[3]{\frac{16x^3y^2}{3z^7}}$

12 Solve $\sqrt{b^2 + x} - \sqrt{a^2 - x} = a - b$

13-14 Solve $\begin{cases} x^3 + y^3 = 91 \\ x^2 - xy + y^2 = 13 \end{cases}$

15 The length of a floor exceeds its width by 2 feet; if each dimension is increased 2 feet the area of the floor will be increased 48 square feet. Find the dimensions of the floor.