University of the State of New York
Examinations Department
81st examination

ALGEBRA

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

60 credits; necessary to pass, 45

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

1. Define and illustrate each of the following: (a) coefficient; (b) term; (c) homogeneous polynomial; (d) literal equation.

2. Indicate the following in algebraic language forming one connected expression: 4 times \(a\) increased by 2\(b\) times the sum of \(a\) and \(c\); this result diminished by 4\(a\) times the product of \(a + b\) by \(a - b\), and this remainder multiplied by 3\(c\).

3. Find the value of \(x^n + x^{n-2} + x^{n-3} + x^2\) when \(x = 2, y = 4, n = 2\).

4. Find the prime factors of \(a^2 + a - 12, b^2 + 3b + 2, 3x^2 - 15x + 18\).

5. Simplify \(\frac{4a - 2b}{a + b} - \frac{3a - 2b}{a - b} + \frac{a}{a^2 - b^2}\).

6. Solve (a) \(\frac{x - b}{2a} - \frac{x - a}{2b} = 1\).

(b) \(2x + 3y - 4z = -4\)
\(x + 2y + z = 8\)
\(2y + z - x = 6\).

7. Expand \((a - \frac{b}{2})^5\) by the binomial formula. (Write in full the work of finding coefficients.)

8. Solve \(3x - \frac{x - 1}{x + 1} = \frac{17}{2}\), obtaining both values of \(x\).

9. The sum of two numbers is 5, and the sum of their squares is 13; find the numbers.

10. Simplify \((\sqrt{27} - \sqrt{12}) (\sqrt{8} + \sqrt{18})\).

11. If \(a\) times the larger of two numbers plus \(b\) times the smaller is \(c\), and \(b\) times the larger plus \(a\) times the smaller is \(d\), what are the numbers?

12. Form the equation whose roots are \(-2a\) and \(+b\).