IS 1006 – Discrete Mathematics

Tutorial 05 – *Solving Equations*

01. LINEAR EQUATIONS - Solve for *x* in the following equations.

i) $5x - 6 = 3x - 8$

ii) $\frac{3}{4}x + \frac{5}{6} = 5x - \frac{125}{3}$

iii) $\frac{6x-7}{4} + \frac{3x-5}{7} = \frac{5x+78}{28}$

iv) $2(3x - 7) + 4(3x + 2) = 6(5x + 9) + 3$

v) $\sqrt{2}x - \sqrt{3} = \sqrt{5}$

02. QUADRATIC EQUATIONS - Solve for *x* in the following equations.

i) $x^2 - 5x + 3 = 0$

ii) $-x^2 + 6x - 8 = 3x + 7$

iii) $2x^2 - x - 1 = 0$

iv) $\frac{1}{2}x^2 - 16x = 5$

v) $\sqrt{3}x^2 + \sqrt{5}x = 12$

03. EQUATIONS CONTAINING RADICAL(S) - Solve for *x* in the following equations.

i) $\sqrt{x - 8} = 3$

ii) $\sqrt{x - 10} - 4 = 0$

iii) $\sqrt{x + 1} - 3x = 1$

iv) $\sqrt{x} + \sqrt{x - 5} = 1$

v) $\sqrt[3]{x - 8} = 3$

04. EQUATIONS CONTAINING ABSOLUTE VALUE(S) - Solve for *x* in the following equations.

i) $|2x - 1| = 5$

ii) $|5x - 6| + 3 = 10$

iii) $|2x - 1| = |4x + 3|$

05. EQUATIONS INVOLVING FRACTIONS - Solve for *x* in the following equations.

i) $\frac{1}{x-3} + \frac{1}{x+3} = \frac{10}{x^2-9}$

ii) $\frac{1}{x-2} = \frac{3}{x+2} - \frac{6x}{x^2-4}$

iii) $\frac{2x-1}{x+1} = \frac{2x}{x-1} + \frac{5}{x}$

iv) $\frac{x^2-8}{x^2-4} + \frac{2}{x+2} = \frac{5}{x-2}$

06. The product of a number with 8 is the same as its sum with 42. Find the number.

07. When five times a number is decreased by 1, it has the same value as four times the number increased by 10. What is the number?

Solving Simultaneous Equations

08. Solve the following simultaneous equations.

i) $2x + y = 7\,,\ 3x - y = 8$

ii) $3x + 2y = 4\,,\ 2x + y = 3$

iii) $2a - 5b = 11\,,\ 3a + 2b = 7$

iv) $\alpha - 2\beta = 1\,,\ 2\alpha - 3\beta = 5$

v) $2p + 3q = 6\,,\ 4p - 6q = -4$

vi) $y - 2x = 1\,,\ y = x^2 - 2$

09. If sum of two numbers be 45 and their difference being 15, find the numbers.

10. 2 tables and 3 chairs together cost 2000 dollars whereas 3 tables and 2 chairs together cost 2500 dollars. Find the cost of a table and a chair.

11. The sum of four times the first number and three times the second number is 15. The difference of three times the first number and twice the second number is 7. Find the numbers

12. If twice the son's age in years is added to the father's age, the sum is 70. But if the father's age is added to the son's age, the sum is 95. Find the ages of father and son.

13. The difference of two numbers is 3, and the sum of three times the larger one and twice the smaller one is 19. Find the two numbers.

14. 1000 tickets were sold. Adult tickets cost \$8.50, children's cost \$4.50, and a total of \$7300 was collected. How many tickets of each kind were sold?

15. Andre has more money than Bob. If Andre gave Bob \$20, they would have the same amount. While if Bob gave Andre \$22, Andre would then have twice as much as Bob. How much does each one actually have?