

**SUBJECT: MATHEMATICS**

**CLASS: SS3**

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**TOPIC: SIMULTANEOUS LINEAR AND QUADRATIC EQUATION**

**Example 1** solve the equations

$$2x - y = 10 \quad (i)$$

$$3x + y^2 = 22 \quad (ii)$$

**Solution**

From equation (i), make  
y the subject of the formula

$$2x - y = 10$$

$$y = 2x - 10$$

Substitute for y in equation (ii)

$$3x + y^2 = 22$$

$$3x + (2x - 10)^2 = 22$$

$$3x + 4x^2 - 40x + 100 = 22$$

$$4x^2 - 37x + 78 = 0$$

Using quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{37 \pm \sqrt{37^2 - 4(4)(78)}}{2(4)}$$

$$x = \frac{37 \pm \sqrt{1369 - 1248}}{8}$$

$$x = \frac{37 \pm \sqrt{121}}{8}$$

$$x = \frac{37 \pm 11}{8}$$

$$x = \frac{37 + 11}{8} \text{ or } x = \frac{37 - 11}{8}$$

$$x = \frac{48}{8} \text{ or } x = \frac{26}{8}$$

$$x = 6 \text{ or } 13/4$$

Substitute for x in equation(i)

$$2x - y = 10$$

When x=6

$$2(6) - y = 10$$

$$12 - y = 10$$

$$-y = 10 - 12$$

$$-y = -2$$

$$y = 2$$

When

$$x = \frac{13}{4}$$

$$2\frac{13}{4} - y = 10$$

$$\frac{13}{2} - y = 10$$

$$-y = 10 - \frac{13}{2}$$

$$\frac{20 - 13}{2}$$

$$y = -\frac{7}{2}$$

Answers:  $x = 6, y = 2$  or  $x = \frac{13}{4}, y = -\frac{7}{2}$

Assignment:

Solve the following simultaneous equations

**(a)**

$$3x + 2y = 10$$

$$x + 2y = 2$$

**(b)**

$$x + 2y = 7$$

$$2x - 3y = -3\frac{1}{2}$$