CHAPTER 2: QUADRATIC EQUATIONS

Cloned SPM Question (2005, Paper 1)

Solve the equation $x(3x - 4) = 2x - 1$. Give your answers correct to three decimal places.

Solution

$x(3x - 4) = 2x - 1$

$3x^2 - 4x = 2x - 1$

$3x^2 - 6x + 1 = 0$

$a = 3, b = -6, c = 1$

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

$$= \frac{-(-6) \pm \sqrt{(-6)^2 - 4(3)(1)}}{2(3)}$$

$$= \frac{6 + \sqrt{24}}{6} \text{ or } \frac{6 - \sqrt{24}}{6}$$

$= 1.816$ or 0.184

Pointers

- All quadratic equation must be expressed in the general form $ax^2 + bx + c = 0$.
- If the question requires the answer correct to three decimal places, it means the equation cannot be factorised. Use the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to get the roots of the equation.

Cloned SPM Question (2006, Paper 1)

The quadratic equation $x^2 + px + 16 = 3x$ has two equal roots. Find the possible values of p.

Solution

$$x^2 + px + 16 = 3x$$
$$x^2 + px - 3x + 16 = 0$$
$$x^2 + (p - 3)x + 16 = 0$$
$$a = 1,\ b = p - 3,\ c = 16$$

For two equal roots, $b^2 - 4ac = 0$.

$$(p - 3)^2 - 4(1)(16) = 0$$
$$(p - 3)^2 - 64 = 0$$
$$(p - 3)^2 = 64$$
$$p - 3 = 8 \quad \text{or} \quad p - 3 = -8$$
$$p = 11 \qquad\qquad p = -5$$

Pointers

- It is easier to write $(p - 3)^2 = 64$, and take the square root of both sides then to expand the equation and solve by factorising.
- Remember $\sqrt{64} = \pm 8$.