

Ncert Solution Chapter 4 Quadratic Equations Exercise 4.1

Question 1. Check whether the following are Quadratic Equations.

$$(i) (x+1)^2 = 2(x-3)$$

$$(ii) x^2 - 2x = (-2)(3-x)$$

$$(iii) (x-2)(x+1) = (x-1)(x+3)$$

$$(iv) (x-3)(2x+1) = x(x+5)$$

$$(v) (2x-1)(x-3) = (x+5)(x-1)$$

$$(vi) x^2 + 3x + 1 = (x-2)^2$$

$$(vii) (x+2)^3 = 2x(x^2 - 1)$$

$$(viii) x^3 - 4x^2 - x + 1 = (x-2)^3$$

Solution (i)

We just check degree of equation. If, degree of equation is equal to 2 then only it is a quadratic equation.

$$(x+1)^2 = 2(x-3) \quad \{(a+b)^2 = a^2 + 2ab + b^2\}$$

$$\Rightarrow x^2 + 1 + 2x = 2x - 6$$

$$\Rightarrow x^2 + 7 = 0$$

Degree of equation is 2. Therefore, it is a Quadratic Equation.

Solution (ii)

$$\begin{aligned}x^2 - 2x &= (-2)(3 - x) \\ \Rightarrow x^2 - 2x &= -6 + 2x \\ \Rightarrow x^2 - 2x - 2x + 6 &= 0 \\ \Rightarrow x^2 - 4x + 6 &= 0\end{aligned}$$

Degree of equation is 2. Therefore, it is a Quadratic Equation.

Solution (iii)

$$\begin{aligned}(x - 2)(x + 1) &= (x - 1)(x + 3) \\ \Rightarrow x^2 + x - 2x - 2 &= x^2 + 3x - x - 3 = 0 \\ \Rightarrow x^2 + x - 2x - 2 - x^2 - 3x + x + 3 &= 0 \\ \Rightarrow x - 2x - 2 - 3x + x + 3 &= 0 \\ \Rightarrow -3x + 1 &= 0\end{aligned}$$

Degree of equation is 1. Therefore, it is not a Quadratic Equation.

Solution (iv)

$$\begin{aligned}(x - 3)(2x + 1) &= x(x + 5) \\ \Rightarrow 2x^2 + x - 6x - 3 &= x^2 + 5x \\ \Rightarrow 2x^2 + x - 6x - 3 - x^2 - 5x &= 0 \\ \Rightarrow x^2 - 10x - 3 &= 0\end{aligned}$$

Degree of equation is 2. Therefore, it is a quadratic equation.

Solution (v)

$$\begin{aligned}
(2x-1)(x-3) &= (x+5)(x-1) \\
\Rightarrow 2x^2 - 6x - x + 3 &= x^2 - x + 5x - 5 \\
\Rightarrow 2x^2 - 7x + 3 - x^2 + x - 5x + 5 &= 0 \\
\Rightarrow x^2 - 11x + 8 &= 0
\end{aligned}$$

Degree of Equation is 2. Therefore, it is a Quadratic Equation.

Solution (vi)

$$\begin{aligned}
x^2 + 3x + 1 &= (x-2)^2 & \{(a-b)^2 &= a^2 - 2ab + b^2\} \\
\Rightarrow x^2 + 3x + 1 &= x^2 + 4 - 4x \\
\Rightarrow x^2 + 3x + 1 - x^2 + 4x - 4 &= 0 \\
\Rightarrow 7x - 3 &= 0
\end{aligned}$$

Degree of equation is 1. Therefore, it is not a Quadratic Equation.

Solution (vii)

$$\begin{aligned}
(x+2)^3 &= 2x(x^2-1) & \{(a+b)^3 &= a^3 + b^3 + 3ab(a+b)\} \\
\Rightarrow x^3 + 2^3 + 3(x)(2)(x+2) &= 2x(x^2-1) \\
\Rightarrow x^3 + 8 + 6x(x+2) &= 2x^3 - 2x \\
\Rightarrow 2x^3 - 2x - x^3 - 8 - 6x^2 - 12x &= 0 \\
\Rightarrow x^3 - 6x^2 - 14x - 8 &= 0
\end{aligned}$$

Degree of Equation is 3. Therefore, it is not a quadratic Equation.

Solution (viii)

$$\begin{aligned}x^3 - 4x^2 - x + 1 &= (x-2)^3 & \{(a-b)^3 = a^3 - b^3 - 3ab(a-b)\} \\ \Rightarrow x^3 - 4x^2 - x + 1 &= x^3 - 2^3 - 3(x)(2)(x-2) \\ \Rightarrow -4x^2 - x + 1 &= -8 - 6x^2 + 12x \\ \Rightarrow 2x^2 - 13x + 9 &= 0\end{aligned}$$

Degree of Equation is 2. Therefore, it is a Quadratic Equation.

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