Ch-4 Quadratic Equation

Ex-4.1

1. Check whether the following are quadratic equation

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

$\Rightarrow x^2 + 1^2 + 2 \times x \times 1 = 2(x-3)$

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

$\Rightarrow x^2 + 1 + 2x - 2x + 6 = 0$

$\Rightarrow x^2 + 1 + 6 = 0$

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

It is in form $ax^2 + bx + c = 0$

It is a quadratic equation

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

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

$\Rightarrow x^2 - 2x - 2x + 6 = 0$

$\Rightarrow x^2 - 4x + 6 = 0$

It is a quadratic equation

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

$\Rightarrow x^2 + x - 2x - 2 = x^2 + 3x - x - 3$

$\Rightarrow x^2 + x - 2x - 2 - x^2 - 3x + x + 3 = 0$

$\Rightarrow (x^2 - x^2) + (x - 2x - 3x + x) - 2 + 3 = 0$

$\Rightarrow 0 - 3x + 1 = 0$

$\Rightarrow -3x + 1 = 0$

It is not a quadratic equation

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

$\Rightarrow 2x^2 + 1x - 6x - 3 = x^2 + 5x$

$\Rightarrow 2x^2 - x - 6x - 3 - x^2 - 5x = 0$

$\Rightarrow 2x^2 - x^2 + x - 6x - 5x - 3 = 0$

$\Rightarrow x^2 - 10x - 3 = 0$

It is a quadratic equation

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

$\Rightarrow 2x^2 - 6x - x + 3 = x^2 - x + 5x - 5$

$\Rightarrow 2x^2 - 6x - x + 3 - x^2 + x + 5x + 5 = 0$

$\Rightarrow 2x^2 - x^2 - 6x - x + x + 5x + 3 + 5 = 0$

$\Rightarrow x^2 - 11x + 8 = 0$

It is a quadratic equation

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

$\Rightarrow x^2 + 3x + 1 = x^2 + 2^2 - 2(x)(2)$

$\Rightarrow x^2 + 3x + 1 = x^2 + 4 - 4x$

$\Rightarrow x^2 + 3x + 1 - x^2 - 4 + 4x = 0$

$\Rightarrow x^2 + x^2 + 3x + 4x + 1 - 4 = 0$

$\Rightarrow 0 + 7x - 3 = 0$

$\Rightarrow 7x - 3 = 0$

It is not a quadratic equation

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

$\Rightarrow x^3 + 6x^2 + 12x + 8 - 2x^3 + 2x = 0$

$\Rightarrow -x^3 - 6x^2 + 14x + 8 = 0$

$\rightarrow x^3 - 6x^2 - 14x - 8 = 0$

It is not a quadratic equation

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

$\Rightarrow x^3 - 4x^2 - x + 1 = x^3 - 8 - 6x(x-2)$

$\Rightarrow x^3 - 4x^2 - x + 1 = x^3 - 8 - (x(x-2)$

$\Rightarrow x^3 - 4x^2 - x + 1 = x^3 - 8 - 6x^2 + 12x$

$\Rightarrow x^3 - 4x^2 - x + 1 - x^3 + 8 + 6x^2 - 12x = 0$

$\Rightarrow x^3 - x^3 - 4x^2 + 6x^2 - x - 12x + 1 + 8 = 0$