

## CHAPTER-4

### Quadratic Equations

#### DAY 1

In chapter polynomials, we've already discussed quadratic polynomial (with degree

2) A polynomial  $p(x) = ax^2 + bx + c = 0$ ;  $a \neq 0$  is said to be quadratic polynomial.

If  $p(x) = 0$  means  $ax^2 + bx + c = 0$ ,  $a \neq 0$  then It is standard form or general form of quadratic equation. e. g.  $2x^2 + x - 3 = 0$ ,  $4x^2 - 2x = 0$  or  $3x^2 - 1 = 0$  etc. Now we shall discuss some examples about any equation is quadratic or not:

#### 1. Which of the following are quadratic equations?

i)  $4x^2 - 2x + 3 = 0$

ii)  $4x^2 + 6 = 0$

iii)  $3x^2 - \sqrt{2x} + 1 = 0$

iv)  $2x - \frac{5}{x^2} + 3 = 0$

v)  $x^2 + 4x - 3\sqrt{x} + 4 = 0$

vi)  $x + \frac{1}{x} = 4$

vii)  $x(x + 3) = x^2 - 4x + 3$

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

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

**Sol :-** i) Given equation is  $4x^2 - 2x + 3 = 0$

Since it is of type  $ax^2 + bx + c = 0$

$\therefore$  It is a quadratic equation

ii) Given equation is  $4x^2 + 6 = 0$

Since It is of type  $ax^2 + bx + c = 0$  (having  $b = 0$  in given equation)

$\therefore$  It is a quadratic equation.

iii) Given equation is  $3x^2 - \sqrt{2x} + 1 = 0$

Since it is not of type  $ax^2 + bx + c = 0$  because Given equation contain term involving  $x^{1/2}$  whose power is not a non-negative integer.

So it is not a quadratic equation.

iv) Given equation is  $2x - \frac{5}{x^2} + 3 = 0 \Rightarrow \frac{2x^3 - 5 + 3x^2}{x^2} = 0$   
 $\Rightarrow 2x^3 + 3x^2 - 5 = 0$

Degree of given equation is 3 but in quadratic equation degree is 2.

$\therefore$  It is not a quadratic equation.

v) Given equation is  $x^2 + 4x - 3\sqrt{x} + 4 = 0$

In given equation, one term having  $x^{1/2}$

$\therefore$  It is not a quadratic equation

vi) Given equation is  $x + \frac{1}{x} = 4 \Rightarrow \frac{x^2 + 1}{x} = 4$   
 $\Rightarrow x^2 + 1 = 4x \Rightarrow x^2 - 4x + 1 = 0$

Since it is of type  $ax^2 + bx + c = 0$

∴ It is a quadratic equation

**vii)** Given equation is  $x(x + 3) = x^2 - 4x + 3$

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

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

Since it is not of type  $ax^2 + bx + c = 0$ , as term  $x^2$  is missing

∴ It is not a quadratic equation

**viii)** Given equation is  $(x - 2)^2 + 1 = 2x - 3$

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

$$\Rightarrow x^2 - 6x + 7 = 0$$

Since it is of type  $ax^2 + bx + c = 0$

∴ It is a quadratic equation

**ix)** Given equation is  $(x - 2)(x + 1) = (x - 1)(x + 3)$

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

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

Since it is not of type  $ax^2 + bx + c = 0$ , as term  $x^2$  is missing

∴ It is not a quadratic equation

### EXERCISE

1. Example 2
2. Exercise 4.1, Q1

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