12/05/2021 Assignment

CH-4

QUADRATIC EQUATIONS

Exercise 4.1

1)

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

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

$\Rightarrow x^2 + 7 = 0$

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

Hence, the given equation is a quadratic equation

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

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

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

It is the form $a^2 + bx + c = 0$

Hence, the given equation is a quadratic equation.

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

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

$\Rightarrow 3x - 1 = 0$

It is not in the form $a^2 + bx + c = 0$

Hence, the given equation is not a quadratic equation.

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

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

$\Rightarrow 7x - 3 = 0$

It is not in the form of $ax^2 + bx + c = 0$

Hence, the given equation in not a quadratic equation.

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

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

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

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

Hence, the given equation is a quadratic equation.

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

Sol: $\Rightarrow 2x^2 - 7x + 3 = x^2 + 4x - 5$

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

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

Hence, the given equation is a quadratic equation.

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

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

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

It is not of the form $ax^2+bx+c=0$

Hence, the given equation is not a quadratic equation.

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

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

$\Rightarrow 2x^2 - 13x + 9 = 0$

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

Hence, the given equation is quadratic equation.

Q2) Sol: (i) Let the breadth of the plot be

So, the length of the plot is $(2x+1)$ m

Area of the rectangle $= l \times b$

So, $(2x+1) = 528$

$2x^2 + x - 528 = 0$

$2x^2 - 32x + 33x - 528 = 0$

$2x(x-16) + 33(x-16) = 0$

$(2x+33)(x-16) = 0$

So, $b = 16$

$l = 33$

∴ Length of the plot is 33m and breadth is 16m.

Let the consecutive integers be x and $x+1$

It is given that their product is 306

So, $x(x+1) = 306$

$x^2 + x = 306$

$x^2 + x - 306 = 0$

$x^2 + 18x - 17x - 306 = 0$

$x(x+18) - 17(x+18) = 0$

$(x-17)(x+18) = 0$

$x = 17$

$x = -18$

∴ Two consecutive integers are 17 and 18.

Let Mohan's age be x

Hence his mother's age $= x + 26$

3 years hence,

Mohan's age $= x + 3$

Mother's age $= x + 26 + 3 = x + 29$

So, $(x+3)(x+29) = 360$

$x^2 + 32x - 273 = 0$

∴ This is the required equation.

Let the speed of the train be x km/hr.

Time taken to travel a distance of 480 km $= \frac{480}{x}$ hr

So,

$(x-8)$ km/hr $= \frac{480}{x-8}$ hr

$\frac{480}{x-8} = \frac{480}{x} - 3$

$\frac{480}{x-8} - \frac{480}{x} = 3$

$$\Rightarrow \frac{480(n-n+2)}{n(n-8)} = 3$$

$$\Rightarrow \frac{480 \times 8}{n(n-2)} = 3$$

$$\Rightarrow 3n(n-2) = 480 \times 8$$

$$\Rightarrow n(n-8) = 160 \times 8$$

$$\Rightarrow n^2 - 8n - 1280 = 0$$

∴ This is the required equation.