4. QUADRATIC EQUATION:

EXERCISE : 4.1

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

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

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

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

$x^2 + 1 + 6 = 0$

$x^2 + 7 = 0$

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

Since it is of the form $ax^2 + bx + c = 0$ where $a = 1, b = 0, c = 7$

Hence it is quadratic equation.

11) $x^2 - 2x = (-2)(3-5)$

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

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

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

It is in form $ax^2 + bx + c = 0$ where $a = 1, b = -4, c = 6$

Hence it is quadratic equation.

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

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

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

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

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

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

$\Rightarrow -3x + 1 = 0$

Since highest power is 1 and 2

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

$\Rightarrow (x-3)\cdot(2x+1) = x(x+5)$

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

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

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

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

Since equation in form of ax^2+bx+c
So it is a
quadratic eq.

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

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

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

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

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

So it is a quadratic eq.

2(i) Area $= 528 m^2$

and,

Length $= 2x + 1$

So

Area

$528 = (2x + 1)x$

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

$= 2x^2 + x = 528$

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

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

where $a = 2, b = 1, c = -528$

Hence it is a quadratic equation.

(ii) Let the first integer $= x$

second integer $= x + 1$

So,

area

$x(x + 1) = 306$

$\Rightarrow x^2 + 1 = 306$

$\Rightarrow x^2 + x = 306$

$\Rightarrow x^2 + x - 306 = 0$

So it is a quadratic eq.

(iii) Let Rohan's age = x

Rohan's mother age = x + 26

After 3 yrs.

Rohan's age = x + 3

So product of ages after 3yr = 360

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

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

$= x^2 + 29x + 3x + 87 = 360$

$= x^2 + 29x + 3x + 87 - 360 = 0$

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

So it is a quadratic eq.

(iv)

Dis = 480 km	Dis = 480 km
speed = x km/hr	speed = (x − 8) km/hr
$\text{speed} = \frac{d}{t}$	$\text{Time} = \frac{480}{x} + 8$
$= \frac{480}{x}$	$\text{speed} = \frac{d}{t} =$
	$x - 8 = \frac{480}{\left(\frac{480}{x} + 8\right)}$
	$(x - 8) \cdot \left(\frac{480}{x} + 8\right) = 480$

$\Rightarrow (x - 8)\left(\frac{480}{x} + 8\right) = 480$

$\Rightarrow (x - 8)\left(\frac{480 + 8x}{x}\right) = 480$

$\Rightarrow 8x^2 - 64x - 3840 = 0$

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