

Exercise 4.1.

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

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

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

$$\Rightarrow x^2 + 1 + \cancel{2x} - \cancel{2x} + 6 = 0.$$

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

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

\therefore Hence, It is quadratic equation.

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

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

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

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

\therefore Hence, It is a quadratic equation.

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

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

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

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

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

\therefore Hence, It is not quadratic equation.

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

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

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

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

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

\therefore Hence it is a quadratic equation.

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

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

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

$$\Rightarrow 2x^2 - 7x + 3 - x^2 - 4x + 5 = 0$$

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

\therefore Hence, it is quadratic equation.

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

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

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

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

\therefore Hence it is not a quadratic equation.

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

$$\Rightarrow u^3 + 2^3 + 3u^2(2) + 3u(2)^2 = 2u^3 - 2u$$

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

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

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

\therefore Hence, it is not a quadratic equation

2) (i) let the length of rectangle be x .
let the breadth of rectangle be y .

$$x = 2y + 1$$

$$x \times y = 528$$

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

$$2y^2 + y = 528$$

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

(ii) let the two integers be $x, x+1$.

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

$$x^2 + x = 306$$

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

(iii) let the present age of Rohan be x .
so, the age of his mother = $x+26$.

After 3 years,

$$\text{Rohan's age} = x+3$$

$$\text{Mother's age} = x+29.$$

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

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

$$\Rightarrow x^2 + 32x + 87 - 360 = 0$$

$$\Rightarrow x^2 + 32x - 273 = 0.$$

This is the required equation.

(iv) let the uniform speed be x km/h.

$$\text{Time} = \frac{480}{x} \text{ h}$$

$$\text{speed} = (x-8) \text{ km/h.}$$

$$\text{Time} = \left(\frac{480}{x} + 3 \right) \text{ h}$$

$$\text{Speed} \times \text{Time} = \text{Distance}$$

$$(x-8) \left(\frac{480}{x} + 3 \right) = 480$$

$$\frac{480x}{x} + 3x - \frac{3840}{x} - 24 = 480$$

$$3x - \frac{3840}{x} = 480 - 480 + 24$$

$$\Rightarrow \frac{3u^2 - 3840}{u} = 24.$$

$$\Rightarrow 3u^2 - 3840 = 24u.$$

$$\Rightarrow 3u^2 - 24u - 3840 = 0.$$

$$\Rightarrow 3(u^2 - 8u - 1280) = 0$$

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

This is the required equation.

— x x x —