

Exercise 4.2

$$Q1) (i) x^2 - 3x - 10 = 0.$$

$$\Rightarrow x^2 + (2-5)x - 10 = 0$$

$$\Rightarrow x^2 + 2x - 5x - 10 = 0$$

$$\Rightarrow x(x+2) - 5(x+2) = 0.$$

$$\Rightarrow (x-5)(x+2) = 0$$

$$\Rightarrow x-5=0, \quad x+2=0$$

$$\Rightarrow x=5, \quad x=-2.$$

$$(ii) 2x^2 + x - 6 = 0.$$

$$\Rightarrow 2x^2 + (4-3)x - 6 = 0.$$

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

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

$$\Rightarrow 2x-3=0, \quad x+2=0$$

$$x = \frac{3}{2}, \quad x = -2.$$

$$(iii) \sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$

$$\Rightarrow \sqrt{2}x^2 + (2+5)x + 5\sqrt{2} = 0.$$

$$\Rightarrow \sqrt{2}x^2 + 2x + 5x + 5\sqrt{2} = 0.$$

$$\Rightarrow \sqrt{2}x(x+\sqrt{2}) + 5(x+\sqrt{2}) = 0.$$

$$\Rightarrow (\sqrt{2}x+5)(x+\sqrt{2}) = 0.$$

$$\Rightarrow \sqrt{2}x+5=0, \quad x+\sqrt{2}=0.$$

$$\Rightarrow x = \frac{-5}{\sqrt{2}}, \quad x = -\sqrt{2}$$

$$(iv) 2x^2 - x + \frac{1}{8} = 0.$$

$$\Rightarrow 8\left(2x^2 - x - \frac{1}{8}\right) = 0 \times 8$$

$$\Rightarrow 16x^2 - 8x + 1 = 0$$

$$\Rightarrow 16x^2 + (-4 - 4)x + 1 = 0.$$

$$\Rightarrow 16x^2 - 4x - 4x + 1 = 0.$$

$$\Rightarrow 4x(4x - 1) - 1(4x - 1) = 0.$$

$$\Rightarrow (4x - 1)(4x - 1) = 0.$$

$$\Rightarrow (4x - 1) = 0, 4x - 1 = 0$$

$$\Rightarrow x = \frac{1}{4}, \quad x = \frac{1}{4}.$$

$$(v) 100x^2 - 20x + 1 = 0.$$

$$\Rightarrow 100x^2 + (-10 - 10)x + 1 = 0.$$

$$\Rightarrow 100x^2 - 10x - 10x + 1 = 0$$

$$\Rightarrow 10x(10x - 1) - 1(10x - 1) = 0.$$

$$\Rightarrow (10x - 1)(10x - 1) = 0.$$

$$\Rightarrow 10x - 1 = 0, \quad 10x - 1 = 0.$$

$$\Rightarrow x = \frac{1}{10}, \quad x = \frac{1}{10}.$$

2) (i) let the number of marbles John had be x
Then the no. of marbles Jivanti had = $45 - x$
The no. of marbles left with John, when he
lost 5 marbles = $x - 5$.
The no. of marbles left with Jivanti, when
she lost 5 marbles = $45 - x - 5$.
= $40 - x$.

$$\cancel{x-x} \Rightarrow (x-5)(40-x)$$

$$\Rightarrow 40x - x^2 - 200 + 5x$$

$$\Rightarrow -x^2 + 45x - 200$$

$$\Rightarrow -x^2 + 45x - 200 = 124$$

$$\Rightarrow -x^2 + 45x - 324 = 0$$

$$\Rightarrow x^2 - 45x + 324 = 0$$

This ~~the~~ is the required equation.

(ii) let the number of toys produced on that
day be x .

Therefore, the cost of production (in rupees)
of each toy that day = $55 - x$.

So, the total cost of production (in rupees)
that day = $x(55 - x)$.

$$\Rightarrow x(55-x) = 750$$

$$\Rightarrow 55x - x^2 = 750$$

$$\Rightarrow -x^2 + 55x - 750 = 0$$

$$\Rightarrow x^2 - 55x + 750 = 0$$

This is the required equation.

3) let the first number be x

Then another number will be $27-x$.

$$x(27-x) = 182$$

$$\Rightarrow 27x - x^2 = 182$$

$$\Rightarrow -x^2 + 27x - 182 = 0$$

$$\Rightarrow x^2 - 27x + 182 = 0$$

$$\Rightarrow x^2 + (-14-13)x + 182 = 0$$

$$\Rightarrow x^2 - 14x - 13x + 182 = 0$$

$$\Rightarrow x(x-14) - 13(x-14) = 0$$

$$\Rightarrow (x-13)(x-14) = 0$$

$$\Rightarrow x-13=0, x-14=0$$

$$\Rightarrow x=13, x=14$$

\therefore Hence, the required numbers are 13 and 14.

84) let the consecutive integer $n, n+1$.

$$\Rightarrow n^2 + (n+1)^2 = 365.$$

$$\Rightarrow n^2 + n^2 + 1^2 + 2n \times n \times 1 = 365.$$

$$\Rightarrow 2n^2 + 2n + 1 - 365 = 0.$$

$$\Rightarrow 2n^2 + 2n - 364 = 0.$$

$$\Rightarrow n^2 + n - 182 = 0.$$

$$\Rightarrow n^2 + (14-13)n - 182 = 0.$$

$$\Rightarrow n^2 + 14n - 13n - 182 = 0.$$

$$\Rightarrow n(n+14) - 13(n+14) = 0$$

$$\Rightarrow (n-13)(n+14) = 0$$

$$\Rightarrow n-13=0, \quad n+14=0.$$

$$\Rightarrow n=13, \quad n=-14 \text{ (impossible)}.$$

\therefore Hence, the two integers are 13 and $13+1=14$.

85) let the base of triangle be n .

Then altitude be $(n-7)$

By Pythagoras theorem

$$13^2 = n^2 + (n-7)^2$$

$$169 = n^2 + n^2 + 7^2 - 2(n)(7)$$

$$169 = 2n^2 + 49 - 14n$$

$$2n^2 + 49 - 14n - 169$$

$$2n^2 - 14n - 120 = 0$$

$$\Rightarrow x^2 - 7x - 60 = 0$$

$$\Rightarrow x^2 + (5-12)x - 60 = 0$$

$$\Rightarrow x^2 + 5x - 12x - 60 = 0$$

$$\Rightarrow x(x+5) - 12(x+5) = 0$$

$$\Rightarrow (x-12)(x+5) = 0$$

$$\Rightarrow x-12=0, x+5=0$$

$$\Rightarrow \boxed{x=12}, \boxed{x=-5} \text{ impossible.}$$

$$\Rightarrow \text{Base} = 12 \text{ cm}$$

$$\Rightarrow \text{Altitude} = x-7 = 12-7 = 5 \text{ cm.}$$

Q6) let there be x articles.

Then the production cost of each article $= 3+2x$.

$$\text{Total production cost} = x(3+2x) = 90.$$

$$\Rightarrow 3x + 2x^2 = 90$$

$$\Rightarrow 2x^2 + 3x - 90 = 0$$

$$\Rightarrow 2x + 15x - 12x - 90 = 0.$$

$$\Rightarrow 2x(x-6) + 15(x-6) = 0.$$

$$\Rightarrow (2x+15)(x-6) = 0.$$

$$\Rightarrow x=6, -\frac{15}{2} \text{ (Number can be negative).}$$

\therefore so, no. of articles = 6 and the cost of each article = ₹ 15.

— x x x —