# Exercise 4.2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(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 ~~for~~ 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 = $45-x-5$.

$= 40-x$.

~~$x=x$~~ $\Rightarrow (x-5)(40-x)$

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

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

$\Rightarrow -x^2 + 45x - 2000 = 124$.

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

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

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.

94) let the consecutive integer $x, x+1$.

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

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

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

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

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

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

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

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

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

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

$\Rightarrow x=13, \quad x=-14$ (impossible).

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

95) let the base of triangle be $x$.

Then altitude be $(x-7)$

By Pythagoras theorem

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

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

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

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

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

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

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

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

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

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

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

$\Rightarrow \boxed{x = 12}, \; \boxed{x = -5}$ Impossible.

$\Rightarrow$ Base $= 12$ cm

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

Q6) Let there be $x$ articles.

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

Total production cost $= x(3+2x) = 90$.

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

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

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

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

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

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

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

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