Chapter 4:- Quadratic Equations

Ex 4.3

Question 5. In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

Solution:

Let Shefali's marks in Mathematics be x.

Then, her marks in English will be $30 - x$.

According to the question, we have:

$$(x + 2)(30 - x - 3) = 210$$

$$\Rightarrow (x + 2)(27 - x) = 210$$

$$\Rightarrow -x^2 + 25x + 54 = 210$$

$$\Rightarrow x^2 - 25x + 156 = 0$$

$$\Rightarrow x^2 - 12x - 13x + 156 = 0$$

$$\Rightarrow (x - 12)(x - 13) = 0$$

$$\Rightarrow x = 12 \text{ or } x = 13 = 0$$

If $x = 12$, then marks in Mathematics = **12** and in English = $30 - 12$ = **18**.

If $x = 13$, then mark in Mathematics = **13** and in English = $30 - 13$ = **17**.

Question 6.The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.

Question 7.The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

Question 8. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

Question 9.Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

Question 10.An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bengaluru (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains.

Question 11.Sum of the areas of two squares is 468 m^2. If the difference of their perimeters is 24 m, find the sides of the two squares.

Solution:

Let the side of smaller square be x and that of larger square be y.

Then, perimeter of smaller square will be $4x$ and that of larger square will be $4y$.

According to the question, we have:

$4y - 4x = 24$

$\Rightarrow \quad y - x = 6$ [Dividing both sides by 4]

$\Rightarrow \quad y = x + 6$ ...(i)

Also given that the sum of squares of areas is 468 m^2.

$\therefore \quad x^2 + y^2 = 468$

$\Rightarrow \quad x^2 + (x + 6)^2 = 468$ [From (i)]

$\Rightarrow \quad x^2 + x^2 + 12x + 36 = 468$

$\Rightarrow \quad 2x^2 + 12x - 432 = 0$

$\Rightarrow \quad x^2 + 6x - 216 = 0$

$\therefore \quad D = b^2 - 4ac$

$= (6)^2 - 4 \times 1 \times (-216) = 36 + 864$

$= 900$

$\therefore \quad x = \dfrac{-b \pm \sqrt{D}}{2a}$

$= \dfrac{-6 \pm \sqrt{900}}{2 \times 1} = \dfrac{-6 \pm 30}{2}$

Either $x = \dfrac{-6 + 30}{2}$ or $\dfrac{-6 - 30}{2}$

$\Rightarrow \quad x = 12$ or $x = -18$

Since the length of the side of a square cannot be negative, so $x = -18$ is rejected.

$\therefore \quad x = 12$ and $y = 12 + 6 = 18$

Hence, the sides of the two squares are **12 m** and **18 m.**

Ans