



Exercise 4.3

$$(ii) \frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30} \text{ where } x \neq -4, 7$$

$$\Rightarrow \frac{(x-7) - (x+4)}{(x-4)(x-7)} = \frac{11}{30}$$

$$\Rightarrow \frac{-11}{(x-4)(x-7)} = \frac{11}{30}$$

$$\Rightarrow -30 = x^2 - 7x + 4x - 28$$

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

Comparing equation  $x^2 - 3x + 2 = 0$  with general form  $ax^2 + bx + c = 0$ ,

We get  $a = 1$ ,  $b = -3$  and  $c = 2$

Using quadratic formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  to solve equation,

$$x = \frac{3 \pm \sqrt{(3)^2 - 4(1)(2)}}{2 \times 1}$$

$$\Rightarrow x = \frac{3 \pm \sqrt{1}}{2}$$

$$\Rightarrow x = \frac{3 + \sqrt{1}}{2}, \frac{3 - \sqrt{1}}{2}$$

$$\Rightarrow x = 2, 1$$

**Q4.** The sum of reciprocals of Rehman's ages (in years) 3 years ago and 5 years from now is 13. Find his present age.

**Ans.** Let present age of Rehman =  $x$  years

Age of Rehman 3 years ago =  $(x - 3)$  years.

Age of Rehman after 5 years =  $(x + 5)$  years

According to the given condition:

$$\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$$

$$\Rightarrow \frac{(x+5) + (x-3)}{(x-3)(x+5)} = \frac{1}{3}$$

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

$$\Rightarrow 6x + 6 = x^2 - 3x + 5x - 15$$

$$\Rightarrow x^2 - 4x - 15 - 6 = 0$$

$$\Rightarrow x^2 - 4x - 21 = 0$$

Comparing quadratic equation  $x^2 - 4x - 21 = 0$  with general form  $ax^2 + bx + c = 0$ ,

We get  $a = 1$ ,  $b = -4$  and  $c = -21$

Using quadratic formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{4 \pm \sqrt{(4)^2 - 4(1)(-21)}}{2 \times 1}$$

$$\Rightarrow x = \frac{4 \pm \sqrt{16 + 84}}{2}$$

$$\Rightarrow x = \frac{4 \pm \sqrt{100}}{2} = \frac{4 \pm 10}{2}$$

$$\Rightarrow x = \frac{4+10}{2}, \frac{4-10}{2}$$

$$\Rightarrow x = 7, -3$$

We discard  $x = -3$ . Since age cannot be in negative.

Therefore, present age of Rehman is 7 years.

**Q5.** 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.

**Ans.** Let Shefali's marks in Mathematics =  $x$

Let Shefali's marks in English =  $30 - x$

If, she had got 2 marks more in Mathematics, her marks would be =  $x + 2$

If, she had got 3 marks less in English, her marks in English would be =  $30 - x - 3 = 27 - x$

According to given condition:

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

$$\Rightarrow 27x - x^2 + 54 - 2x = 210$$

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

Comparing quadratic equation  $x^2 - 25x + 156 = 0$   
with general form  $ax^2 + bx + c = 0$ ,

We get  $a = 1$ ,  $b = -25$  and  $c = 156$

Applying Quadratic Formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{25 \pm \sqrt{(25)^2 - 4(1)(156)}}{2 \times 1}$$

$$\Rightarrow x = \frac{25 \pm \sqrt{625 - 624}}{2}$$

$$\Rightarrow x = \frac{25 \pm \sqrt{1}}{2}$$

$$\Rightarrow x = \frac{25+1}{2}, \frac{25-1}{2}$$

$$\Rightarrow x = 13, 12$$

Therefore, Shefali's marks in Mathematics = 13 or 12

Shefali's marks in English =  $30 - x = 30 - 13 = 17$

Or Shefali's marks in English =  $30 - x = 30 - 12 = 18$

Therefore, her marks in Mathematics and English are (13, 17) or (12, 18).

\*\*\*\*\*END\*\*\*\*\*