

Exercise 8.9

Ashu is x years old while his mother Mrs. Veena is x^2 years old. Five years hence Mrs. Veena will be three times old as Ashu. Find their present ages.

Solution:

Given, Ashu's present age is x years and his mother Mrs. Veena is x^2 years.

After 5 years, Ashu age will be $(x + 5)$ years

And his mother Mrs. Veena age will be $(x^2 + 5)$ years

Given relationship between their ages can be expressed as:

$$x^2 + 5 = 3(x + 5)$$

$$x^2 + 5 = 3x + 15 \quad x^2 + 5 - 3x - 15 = 0$$

$$x^2 - 3x - 10 = 0$$

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

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

$x = 5$ or $x = -2$ (neglected) since, the age can never be negative

Hence, Ashu's present age is 5 years and his mother's age is 25 years.

1. The sum of the ages of a man and his son is 45 years. Five years ago, the product of their ages was four times the man's age at the time. Find their present ages.

Solution:

Let the present age of the man be x years

Then, the present age of his son will be $(45 - x)$ years

Five years ago, man's age $= (x - 5)$ years

And, his son's age $= (45 - x - 5) = (40 - x)$ years

Given relationship between their ages can be expressed as:

$$(x - 5)(40 - x) = 4(x - 5)$$

$$40x - x^2 + 5x - 200 = 4x - 20$$

$$-x^2 + 45x - 200 = 4x - 20$$

$$-x^2 + 45x - 200 - 4x + 20 = 0$$

$$-x^2 + 41x - 180 = 0$$

$$x^2 - 41x + 180 = 0 \quad \text{[By factorisation method]}$$

$$x(x - 36) - 5(x - 36) = 0$$

$$(x - 36)(x - 5) = 0$$

$$x = 36 \text{ or } x = 5,$$

But, the father's age can never be 5 years

Thus, when $x = 36$, $45 - x = 45 - 36 = 9$

Therefore, the man's present age is 36 years and his son's age is 9 years.

2. The product of Shikha's age five years ago and her age 8 years later is 30, her age at both times being given in years. Find her present age.

Solution:

Let's assume the present age of Shikha be x years

So, 8 years later, age of her $= (x + 8)$ years

R D Sharma Solutions For Class 10 Maths Chapter 8 - Quadratic Equations

Five years ago, her age = $(x - 5)$ years

Given relationship between the ages can be expressed as:

$$(x - 5)(x + 8) = 30$$

$$x^2 + 8x - 5x - 40 = 30$$

$$x^2 + 3x - 40 - 30 = 0$$

$$x^2 + 3x - 70 = 0 \quad [\text{By factorisation method}]$$

$$x(x - 7) + 10(x - 7) = 0$$

$$(x - 7)(x + 10) = 0$$

$$x = 7 \text{ or } x = -10 \text{ (neglected)}$$

Since, the age can never be negative.

Therefore, the present age of Shikha is 7 years.

3. The product of Ramu's age (in years) five years ago and his age (in years) nine years later is 15. Determine Ramu's present age.

Solution:

Let the present age of Ramu be x years

So, 9 years later, the age of him = $(x + 9)$ years

And, five years ago, his age = $(x - 5)$ years

Given relationship between the ages can be expressed as:

$$(x - 5)(x + 5) = 15$$

$$x^2 + 9x - 5x - 45 = 15$$

$$x^2 + 4x - 45 - 15 = 0$$

$$x^2 + 4x - 60 = 0$$

$$x^2 - 6x + 10x - 60 = 0$$

$$x(x - 6) + 10(x - 6) = 0$$

$$(x - 6)(x + 10) = 0$$

$x = 6$ or $x = -10$ (neglected) as the age can be never be negative.

Hence, the present age of Ramu is 6 years.