

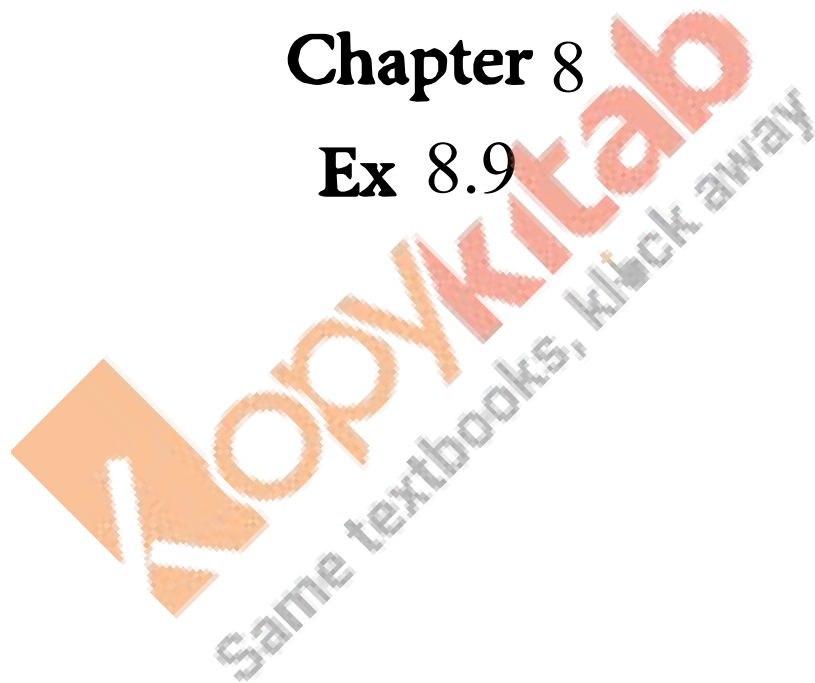
**RD SHARMA**

**Solutions**

**Class 10 Maths**

**Chapter 8**

**Ex 8.9**



**Q.1: 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.**

**Sol:**

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

Then, acc. to question,

Five years later, Ashu is  $(x + 5)$  years

And his mother Mrs. Veena is  $(x^2 + 5)$  years

So,

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

$$x^2 + 5 = 3x + 15$$

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

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

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

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

$$x = 5 \text{ or } x = -2$$

Since, the age can never be negative

Therefore, ashu's present age is 5 years and his mother's age is 25 years.

**Q.2: 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.**

**Sol:**

Let the present age of the man be  $x$  years

Then, present age of his son is =  $(45 - x)$  years

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

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

Then, acc. To question,

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

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

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

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

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

$$x^2 - 36x - 5x + 180 = 0$$

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

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

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

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

Therefore, when  $x = 36$ ,

$$45 - x = 45 - 36 = 9$$

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

**Q.3: 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.**

**Sol:**

Let the present age of Shikha be  $x$  years

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

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

Then, acc. To question,

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

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

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

$$x^2 + 3x - 70 = 0$$

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

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

$$x = 7 \text{ or } x = -10$$

Since, the age can never be negative

Hence, the present age of shikha is = 7 years.

**Q.4: 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.**

**Sol:**

let the present age of ramu be x years

Then, 9 years later, age of her =  $(x + 9)$  years

Five years ago, her age =  $(x - 9)$  years

Then, acc. to question,

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

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

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

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

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

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

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

$$x = 6 \text{ or } x = -10$$

Since, the age can be never be negative

Therefore, the present age of ramu is = 6 years

**Q.5: Is the following situation possible? if so, determine their present ages.**

**The sum of the ages of two friends is 20 years. four years ago, the product of their ages in years was 48.**

**Sol:**

let the present age of two friends be x years and  $(20 - x)$  years respectively

Then, 4 years later, the age of two friends will be  $(x - 4)$  years and  $(20 - x - 4)$  years

Then, acc. To the question

$$(x - 4)(20 - x - 4) = 48$$

$$(x - 4)(16 - x) = 48$$

$$16x - x^2 - 64 + 4x = 48$$

$$-x^2 + 20x - 64 - 48 = 0$$

$$x^2 - 20x + 112 = 0$$

Let the discriminant of the above quadratic eqn.

$$D = b^2 - 4ac$$

Here,  $a = 1$ ,  $b = -20$ ,  $c = 112$

$$D = (-20)^2 - (4 \times 1 \times 112) = 400 - 448 = -48$$

Since,  $D < 0$

The above question does not have real roots.

Hence, the given situation is not possible.

**Q.6: A girl is twice as old as her sister. Four years hence, the product of their ages (in years) will be 160. Find their present ages.**

**Sol:**

let the present age of girl be  $x$  years then, age of her sister  $(x/2)$  years

Then, 4 years later, age of girl =  $(x + 4)$  years and her sister's age be  $(x/2 + 4)$  years

Then, acc. to the question,

$$(x+4)(x/2+4)=160(x+4)(\frac{x}{2}+4)=160$$

$$(x + 4) (x + 8) = 160 \times 2$$

$$x^2 + 8x + 4x + 32 = 320$$

$$x^2 + 12x - 288 = 0$$

$$x^2 - 12x + 24x - 288 = 0$$

$$x(x - 12) + 24(x - 12) = 0$$

$$(x - 12) (x + 24) = 0$$

$$x = 12 \text{ or } x = -24$$

Since, the can never be negative,

Therefore, the present age of the girl is = 12 years.

And her sister's age will be,

$$x^2 = 12 \times \frac{x}{2} = \frac{12}{2} = 6 \text{ years.}$$

**Q.7: The sum of the reciprocals of Rehman's ages (in years) 3 years ago and 5 years from now is  $\frac{1}{3}$ . Find his present age.**

**Sol:** let the present age of Rehman be  $x$  years

Then, 5 years late, age of her =  $(x + 5)$  years

Five years ago, her age =  $(x - 3)$  years

Acc. To question,

$$\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3} \quad \frac{x+5+x-3}{(x-3)(x+5)} = \frac{1}{3} \quad \frac{2x+2}{x^2+5x-3x-15} = \frac{1}{3} \quad 2x+2x^2+5x-3x-15 = 13$$

$$x^2 + 2x - 15 = 6x + 6$$

$$x^2 + 2x - 15 - 6x - 6 = 0$$

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

$$x^2 - 7x + 3x - 21 = 0$$

$$x(x - 7) + 3(x - 7) = 0$$

$$(x - 7)(x + 3) = 0$$

$$x = 7 \text{ or } x = -3$$

Since, the age can never be negative

Therefore, the present age of Rehman be = 7 years.