

QUADRATIC EQUATIONS

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10th Maths - Chapter 4

This is Problem-2.1 from Exercise 4.2

1. Represent the following situations mathematically: (i) John and Jivanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marbles they now have is 124. We would like to find out how many marbles they had to start with.

Solution: :

Required quadratic equation is : let the number of marbles John had be x.

Then the number of marbles Jivanti had = $45 - x$

The number of marbles left with John, when he lost 5 marbles = $x - 5$

The number of marbles left with Jivanti, when she lost 5 marbles = $45 - x - 5 = 40 - x$

Given that product of number of marbles = 124

$$(x - 5)(40 - x) = 124 \quad (1)$$

$$40x - x^2 - 200 + 5x = 124 \quad (2)$$

$$-x^2 + 45x - 200 = 124 \quad (3)$$

$$-x^2 + 45x - 200 = 124 \quad (4)$$

$$-x^2 + 45x - 324 = 0 \quad (5)$$

$$x^2 - 45x + 324 = 0 \quad (6)$$

$$x^2 - 36x - 9x + 324 = 0 \quad (7)$$

$$x(x - 36) - 9(x - 36) = 0 \quad (8)$$

$$(x - 36)(x - 9) = 0 \quad (9)$$

$$x = 36 \text{ or } x = 9 \quad (10)$$

while, john had 36 marbles. Then jivanti will have 9 marbles.