

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 = $45 - x$ (Why?).

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 = $45 - x - 5 = 40 - x$

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

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

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

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

$$(Given that product = 124) \quad (5)$$

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

$$= x^2 - 45x + 324 = 0 \quad (7)$$

$$= x^2 - 36x - 9x + 324 = 0 \quad (8)$$

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

$$= (x - 36)(x - 9) = 0 \quad (10)$$

$$(11)$$

while, john had 36 marbles. Then jivanti will have 6 marbles.