Chapter 4:- Quadratic Equations

Ex 4.4

Question 3.Is it possible to design a rectangular mango grove whose length is twice its breadth, and the area is 800 m²? If so, find its length and breadth.

Solution:

Let breadth of the rectangular be x m

Then, the length of rectangular will be 2x m.

According to question, we have

$$\text{Length} \times \text{Breadth} = \text{Area}$$

$$\Rightarrow \quad x \times 2x = 800$$

$$\Rightarrow \quad 2x^2 = 800$$

$$\Rightarrow \quad x^2 = 400 = (20)^2$$

$$\Rightarrow \quad x = 20$$

Hence, the rectangular mango grove is **possible** to design whose breadth is **20 m** and length is **40 m**.

Answer

Question 4.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.

Solution:

Let the age of one friend be x years.

then the age of the other friend will be (20 - x) years.

4 years ago,

Age of 1st friend = (x - 4) years

Age of 2nd friend = (20 - x - 4) = (16 - x) years

A/q we get that,

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

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

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

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

Comparing this equation with ax2 + bx + c = 0, we get

a = 1, b = -20 and c = 112

Discriminant = $b^2 - 4ac$

= $(-20)^2 - 4 \times 112$

= 400 - 448 = -48

$b^2 - 4ac < 0$

Therefore, there will be no real solution possible for the equations. Such type of condition doesn't exist. Answer

Question 5.Is it possible to design a rectangular park of perimeter 80 m and area 400 m^2? If so, find its length and breadth.

Solution:

Let the length and breadth of the park be l and b.

Perimeter = 2 (l + b) = 80

l + b = 40

Or, b = 40 - l

Area = l×b = 400

$\Rightarrow$l(40 - l) = 400

$\Rightarrow$ 40l - l^2 = 400

$\Rightarrow$ l^2 - 40l + 400 = 0

Comparing this equation with al^2 + bl + c = 0, we get

a = 1, b = -40, c = 400

Discriminant = $b^2 - 4ac$

$\Rightarrow$ $(-40)^2 - 4 \times 400$

= 1600 - 1600 = 0

$\Rightarrow$ $b^2 - 4ac = 0$

Therefore, this equation has equal real roots. And hence, this situation is possible.

Root of this equation, l = -b/2a

l = (40)/2(1) = 40/2 = 20

Therefore, length of park, l = 20 m

And breadth of park, b = 40 - l = 40 - 20 = 20 m. Answer