

Quadratic equations

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10th Maths - Chapter 4

This is Problem-4 from Exercise 4.2

1. Find the two positive consecutive integers whose sum of squares is 365.

Solution:

Given Data,

Sum of the squares of two numbers = 365

Let, the positive integers be x and $x+1$.

So, According to the question.

$$(x)^2 + (x + 1)^2 = 365 \quad (1)$$

$$x^2 + x^2 + 1 + 2x = 365 \quad (2)$$

$$2x^2 + 2x = 365 - 1 \quad (3)$$

$$2(x^2 + x) = 364 \quad (4)$$

$$x^2 + x - 182 = 0 \quad (5)$$

By formula method of finding x we get,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (6)$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(1)(182)}}{2(1)} \quad (7)$$

$$x = \frac{-1 \pm \sqrt{1 - 728}}{2} \quad (8)$$

$$x = \frac{-1 \pm \sqrt{729}}{2} \quad (9)$$

$$x = \frac{-1 \pm 27}{2} \quad (10)$$

1st condition

$$x = \frac{-1 + 27}{2} \quad (11)$$

$$x = \frac{26}{2} \quad (12)$$

$$x = 13 \quad (13)$$

2nd condition

$$x = \frac{-1 - 27}{2} \quad (14)$$

$$x = \frac{-28}{2} \quad (15)$$

$$x = -14 \quad (16)$$

since, according to the question we have to find positive integers,

$x=13$

$x+1=13+1=14$