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.

$$(x)^2 + (x + 1)^2 = 365 \tag{1}$$
$$x^2 + x^2 + 1 + 2x = 365 \tag{2}$$
$$2x^2 + 2x = 365 - 1 \tag{3}$$
$$2(x^2 + x) = 364 \tag{4}$$
$$x^2 + x - 182 = 0 \tag{5}$$

By formula method of finding x we get,

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

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

$$x = \frac{-1 \pm \sqrt{1 - 728}}{2} \tag{8}$$

$$x = \frac{-1 \pm \sqrt{729}}{2} \tag{9}$$

$$x = \frac{-1 \pm 27}{2} \tag{10}$$

1st condition

$$x = \frac{-1 + 27}{2} \tag{11}$$

$$x = \frac{26}{2} \tag{12}$$

$$x = 13 \tag{13}$$

2nd condition

$$x = \frac{-1 - 27}{2} \tag{14}$$

$$x = \frac{-28}{2} \tag{15}$$

$$x = -14 \tag{16}$$

since,according to the question we have to find positive integers,
x=13
x+1=13+1=14