

11 August, 2024

Assignment

Saturday

Subject : Science and Ability (Math)

Q1) The sum of two numbers is 18 and the product of these two numbers is 56. What are the numbers?

Let

$$1^{\text{st}} \text{ number} = x$$

$$2^{\text{nd}} \text{ number} = y$$

According to given condition

$$x + y = 18 \rightarrow \text{(i)}$$

$$xy = 56 \rightarrow \text{(ii)}$$

$$x = 18 - y \rightarrow \text{(iii)}$$

Put value of  $x$  in eq (ii)

$$(18 - y)y = 56$$

$$18y - y^2 = 56$$

$$y^2 - 18y + 56 = 0$$

$$a = 1, b = -18, c = 56$$

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2a$$

$$= \frac{-(-18) \pm \sqrt{(-18)^2 - 4(1)(56)}}{2(1)}$$

$$2(1)$$

$$= \frac{18 \pm \sqrt{324 - 224}}{2}$$

$$2$$

$$y = \frac{18 \pm \sqrt{100}}{2}$$

$$2$$

$$y = \frac{18 \pm 10}{2}$$

$$2$$

$$y = \frac{18 + 10}{2} \quad | \quad y = \frac{18 - 10}{2}$$

$$y = \frac{28}{2} \quad | \quad y = \frac{8}{2}$$

$$y = 14 \quad | \quad y = 4$$

Put value of  $y$  in eq (iii)

$$x = 18 - y \quad | \quad x = 18 - y$$

$$x = 18 - 14 \quad | \quad x = 18 - 4$$

$$x = 4 \quad | \quad x = 14$$

$$(4, 14) \quad | \quad (14, 4)$$

$$S.S = \{(4, 14), (14, 4)\}$$

←—————→

Shortcut

Simplify it and write the final answer in the form of a statement

Q1) The sum of three consecutive prime number is 287. find the square of the middle term.

Let  $6x-1$ ,  $6x+1$  and  $6x'+1$  be three consecutive prime numbers.

According to the given condition

$$6x-1 + 6x+1 + 6x'+1 = 287$$

$$18x + 1 = 287$$

$$18x = 287 - 1$$

$$18x = 286$$

$$x = \frac{286}{18}$$

$$x = 15.88...$$

$$x = 15.88...$$

$$x = 16$$

$$x' = 15$$

$$6x-1 = 89$$

15.88..
9   143
9
53
45
80
72
86
72
8

$$6x-1 = 6(16)-1 = 96-1$$

$$= 95$$

$$6x-1 = 6(16)+1 = 96+1$$

$$= 97$$

$$6x'+1 = 6(15)+1$$

$$90+1 = 91$$

$$91, 95, 97$$

But it is not prime number

2<sup>nd</sup> Method

No need for 2 methods. You can use any one

Three consecutive numbers are 89, 91, 97

Square of middle

$$\text{term} = (91)^2$$

$$= 8281$$

$$6x-1 = 6(15)-1$$

$$= 90-1 = 89$$

$$6x+1 = 6(15)+1 = 90+1 = 91$$

$$6x'+1 = 6(16)+1 =$$

$$= 96+1 = 97$$

Question: Why we can't we choose  $x=16$ ?