

20/10/2020  
TUESDAY

# MATHEMATICS

STD - X  
class - 47

Text book page no. 97, 98

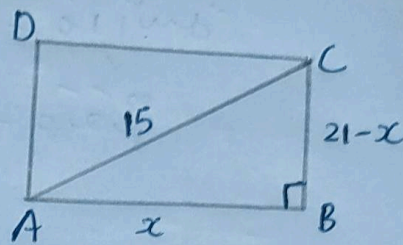
## Questions 1, 2 Answers

1) The perimeter of a rectangle is 42 metres and its diagonal is 15 metres. What are the lengths of its sides?

Ans) Let one side of the rectangle  
=  $x$  m

Since the perimeter is 42,  
 $\therefore$  length + breadth = 21

$\therefore$  Breadth =  $(21 - x)$  m



Using Pythagoras principle,  $(\text{Base}^2 + \text{Alt}^2 = \text{Hypo}^2)$

$$x^2 + (21 - x)^2 = 15^2$$

$$x^2 + 441 - 42x + x^2 = 225,$$

$$2x^2 - 42x + 441 - 225 = 0$$

$$\therefore 2x^2 - 42x + 216 = 0$$

$$x^2 - 21x + 108 = 0 \text{ (divided by 2)}$$

$$\therefore x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{21 \pm \sqrt{(-21)^2 - 4 \times 1 \times 108}}{2 \times 1}$$

$$a = 1$$

$$b = -21$$

$$c = 108$$

$$= \frac{21 \pm \sqrt{441 - 432}}{2}$$

$$= \frac{21 \pm \sqrt{9}}{2}$$

$$= \frac{21+3}{2}, \frac{21-3}{2}$$

$$= \underline{\underline{12}}, \underline{\underline{9}}$$

$$\therefore \text{Length} = \underline{\underline{12}} \text{ m}$$

$$\text{Breadth} = \underline{\underline{9}} \text{ m}$$

2) How many consecutive natural numbers starting from 1 should be added to get 300?

Ans) Sum of consecutive natural numbers from 1 to n  
 $= \frac{1}{2} n(n+1)$

Since the sum = 300,  $\therefore \frac{1}{2} n(n+1) = 300$

$n(n+1) = 600$ ,  $n^2 + n - 600 = 0$

$a = 1$

$b = 1$

$c = -600$

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

$= \frac{-1 \pm \sqrt{1^2 - 4 \times 1 \times (-600)}}{2} = \frac{-1 \pm \sqrt{1 + 2400}}{2}$

$= \frac{-1 \pm \sqrt{2401}}{2} = \frac{-1 + 49}{2}, \frac{-1 - 49}{2}$

$= \underline{\underline{24}} \quad \underline{\underline{08}} \quad -25$

since -25 is not a counting number, it is not acceptable. Take 24 consecutive natural numbers starting from 1 to get the sum 300.