

MATHEMATICS ONLINE CLASS X ON 17-08-2021

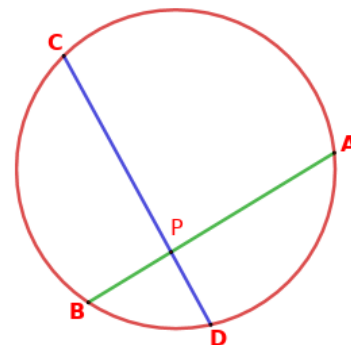
CIRCLES



**Discussed in previous class**

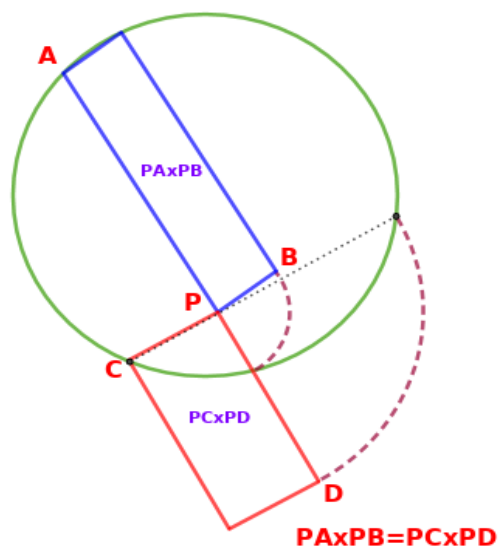
If two non diametrical chords AB and CD intersecting at a point P inside the circle.

We get  $PA \times PB = PC \times PD$



**IF TWO CHORDS OF A CIRCLE INTERSECT WITHIN THE CIRCLE THEN THE PRODUCT OF THE PARTS OF THE TWO CHORDS ARE EQUAL**

**IF TWO CHORDS OF A CIRCLE INTERSECT WITHIN THE CIRCLE, THEN THE RECTANGLE FORMED BY THE PARTS OF THE SAME CHORD HAVE EQUAL AREA.**

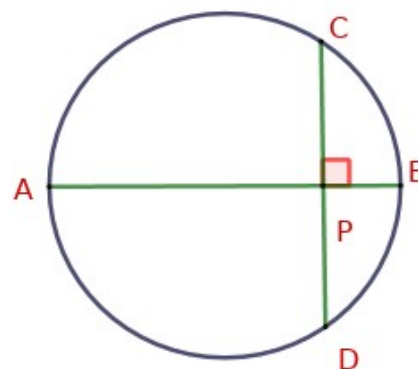


**Note:**

In the figure, AB is a diameter and CD is a chord perpendicular to AB.

We know that  $PA \times PB = PC \times PD$

Also,  $AB \perp CD$ .



We know that the perpendicular from the centre of a circle to a chord bisects the chord.  $\therefore$  we get  $PC = PD$

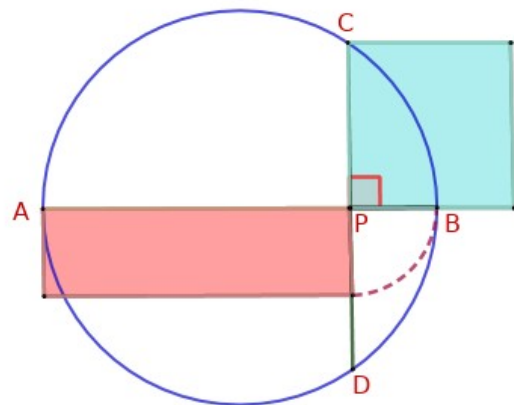
Now we have  $PA \times PB = PC \times PD$

$$PA \times PB = PC^2$$

If two chords AB and CD intersect at a point P within the circle in which AB is a diameter and CD is perpendicular to AB, then  $PA \times PB = PC^2$

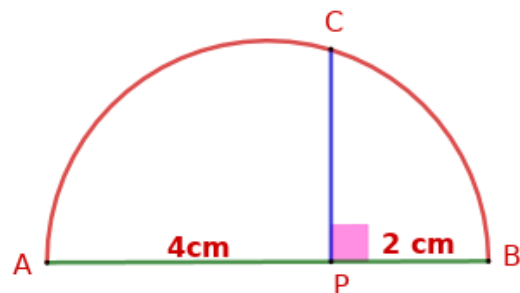
The product of the parts, into which a diameter of a circle is cut by a perpendicular chord is equal to the square of half of the chord

$PA \times PB = PC^2$  means "Area of a rectangle with sides PA and PB is equal to the area of square with side PC."



### Question

In the figure,  $PA = 4$  cm,  $PB = 2$  cm.  
Find PC.



### Answer

$PA = 4$  cm,  $PB = 2$  cm

$$PA \times PB = PC^2$$

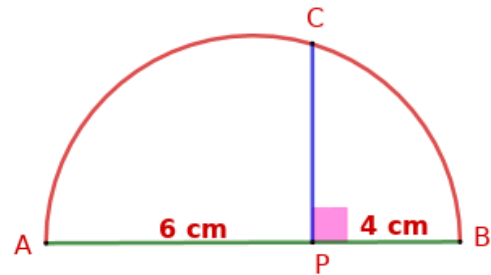
$$4 \times 2 = PC^2$$

$$PC^2 = 4 \times 2 = 8$$

$$\therefore PC = \sqrt{8} \text{ cm}$$

### Question

In the figure,  $PA = 6 \text{ cm}$ ,  $PB = 4 \text{ cm}$ .  
Find  $PC$ .



### Answer

$PA = 6 \text{ cm}$ ,  $PB = 4 \text{ cm}$

$$PA \times PB = PC^2$$

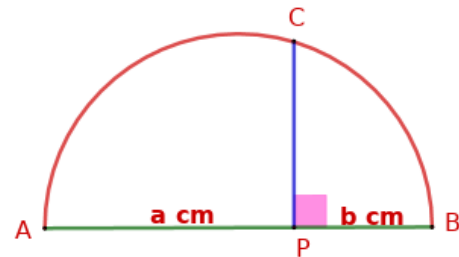
$$6 \times 4 = PC^2$$

$$PC^2 = 6 \times 4 = 24$$

$$\therefore PC = \sqrt{24} \text{ cm}$$

### Question

In the figure,  $PA = a \text{ cm}$ ,  $PB = b \text{ cm}$ . Find  $PC$ .



### Answer

$PA = a \text{ cm}$ ,  $PB = b \text{ cm}$

$$PA \times PB = PC^2$$

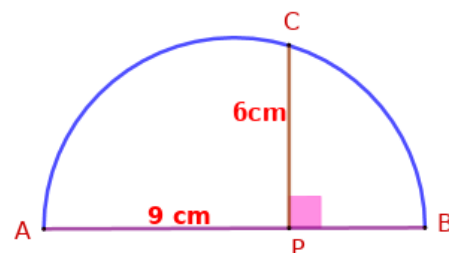
$$a \times b = PC^2$$

$$PC^2 = a \times b = ab$$

$$\therefore PC = \sqrt{ab} \text{ cm}$$

### Question

In the figure,  $PA = 9 \text{ cm}$ ,  $PC = 6 \text{ cm}$ .  
Find  $PB$ .



**Answer**

$PA = 9 \text{ cm}, PC = 6 \text{ cm}$

$PA \times PB = PC^2$

$9 \times PB = 6^2$

$9 \times PB = 36$

$\therefore PB = \frac{36}{9} = 4 \text{ cm}$

**Costructions**

1) Draw a line of length  $\sqrt{12}$  cm

We can apply the idea,

$PA \times PB = PC^2$

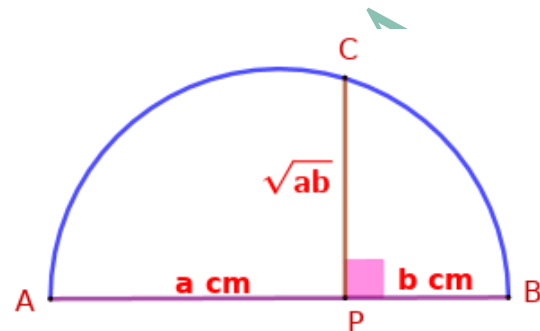
If  $PC = \sqrt{12}$  cm ,

then  $PC^2 = 12 \text{ cm}^2$  we can take

$PA = 4 \text{ cm}, PB = 3 \text{ cm}$  or

$PA = 6 \text{ cm}, PB = 2 \text{ cm}$  or

$PA = 12 \text{ cm}, PB = 1 \text{ cm}$



|    |   |
|----|---|
| 4  | 3 |
| 6  | 2 |
| 12 | 1 |

Here we take  $PA = 6 \text{ cm}, PB = 2 \text{ cm}$

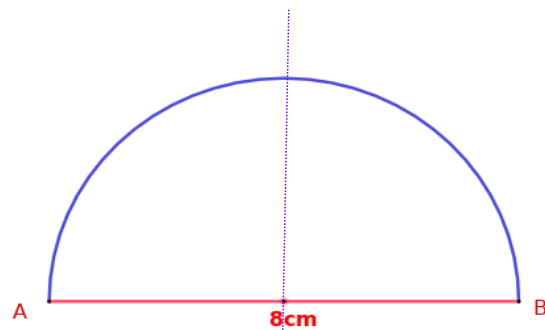
(You can take the lengths of PA and PB as your choice)

**Steps:**

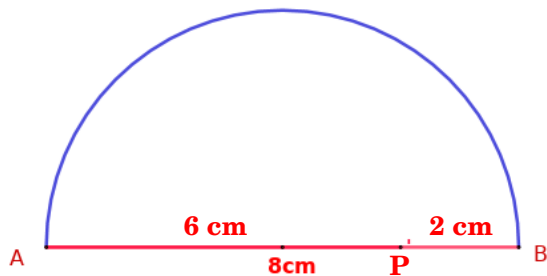
- 1 Draw a line AB of length  $6 + 2 = 8 \text{ cm}$
- 2 Mark the midpoint of AB.(Using scale or by drawing the perpendicular bisector of AB)
- 3 Draw a semicircle with diameter AB.
- 4 Mark a point P such that  $AP = 6 \text{ cm}$  and  $PB = 2 \text{ cm}$
- 5 Draw a perpendicular to AB through P.
- 6 Mark the intersecting point of semicircle and this perpendicular as C.



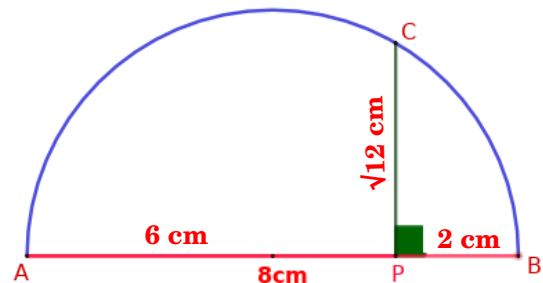
Step : 1



Step : 2 , 3



Step : 4



Step : 5 , 6

2) Draw a square of area  $15 \text{ cm}^2$

We can apply the idea,

$$PA \times PB = PC^2$$

$$\text{Here } PC^2 = 15$$

$$\therefore PC = \sqrt{15} \text{ cm}$$

ie; we have to draw a line of length  $\sqrt{15} \text{ cm}$

Take  $PA = 5 \text{ cm}$  ,  $PB = 3 \text{ cm}$

**Steps:**

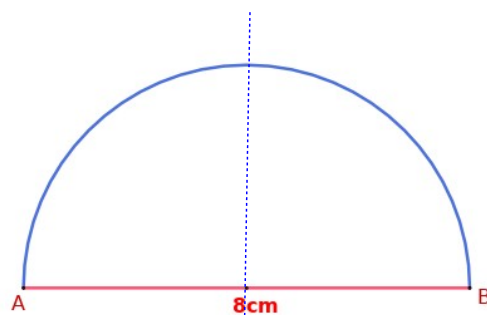
- 1 Draw a line AB of length  $5 + 3 = 8 \text{ cm}$
- 2 Mark the midpoint of AB.(Using scale or by drawing the perpendicular bisector of AB)
- 3 Draw a semicircle with diameter AB.
- 4 Mark a point P such that  $AP = 5 \text{ cm}$  and  $PB = 3 \text{ cm}$
- 5 Draw a perpendicular to AB through P.
- 6 Mark the intersecting point of semicircle and this perpendicular as C.

The length of  $PC = \sqrt{15} \text{ cm}$

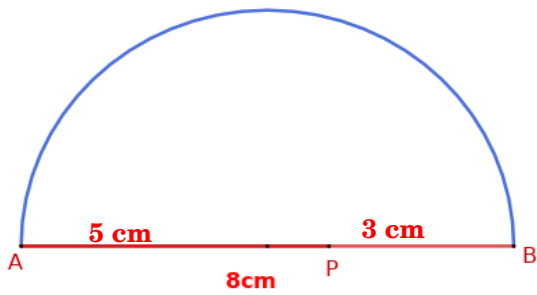
7 Draw a square of side  $\sqrt{15} \text{ cm}$ . The area of the square will be  $15 \text{ cm}^2$



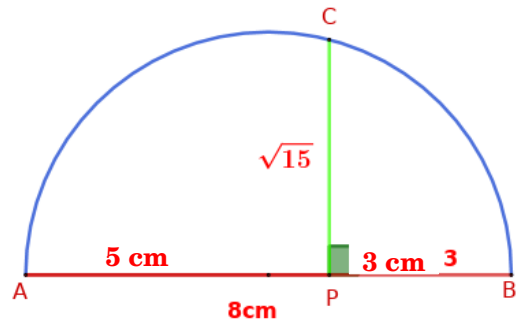
Step : 1



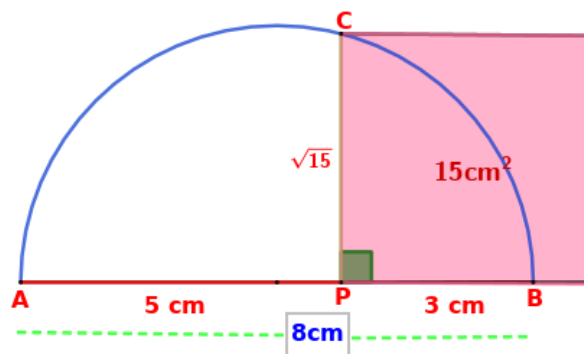
Step : 2 , 3



Step : 4



Step : 5, 6



Step : 7

### ASSIGNMENT

Draw a square of area  $21\text{ cm}^2$