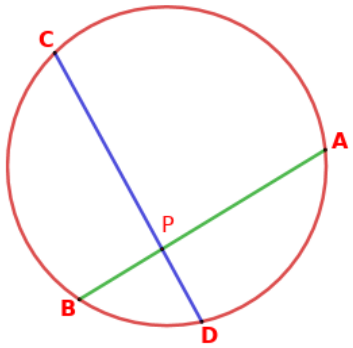
MATHEMATICS ONLINE CLASS X ON 17-08-2021

CIRCLES

click

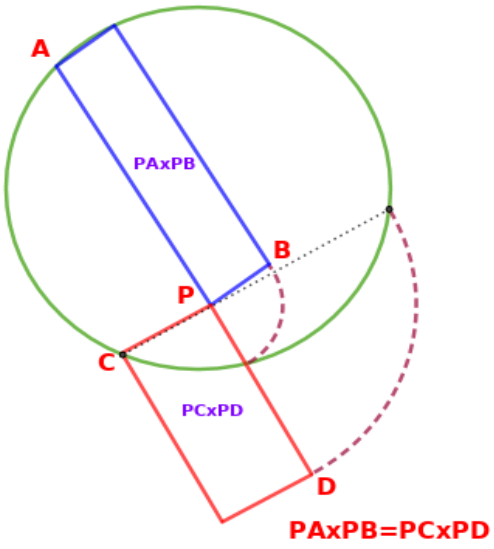
Discussed in previous class

If two non diametrical chords AB and CD intersecting at a point P inside the circle.
We get PA × PB = PC × PD

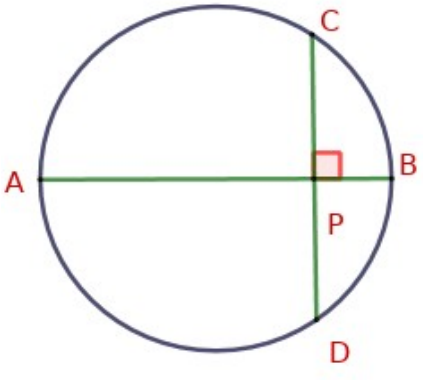


IF TWO CHORDS OF A CIRCLE INTERSECT WITHIN THE CIRCLE THEN THE PRODUCT OF THE PARTS OF THE TWO CHORDS ARE EQUAL

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 × PB = PC × PD
Also, AB ⊥ CD.



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

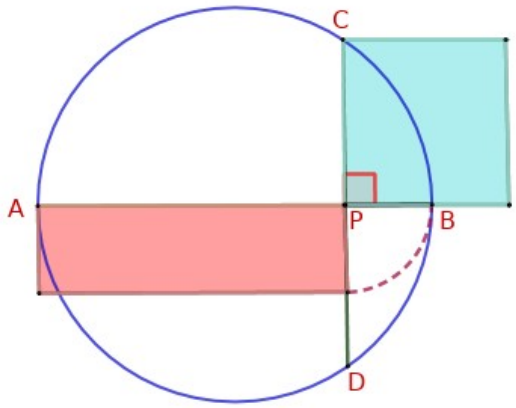
Now we have $PA \times PB = PC \times PC$

$PA \times PB = PC^2$

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 $PA \times PB = PC^2$

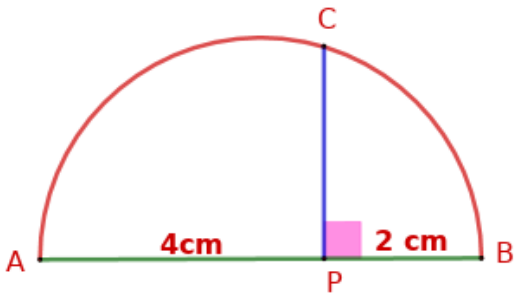
The product of the parts, into which a diameter of a circle is cut by a perpendicular chord is equal to the square of half of the chord

$PA \times PB = PC^2$ 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

$PA \times PB = PC^2$

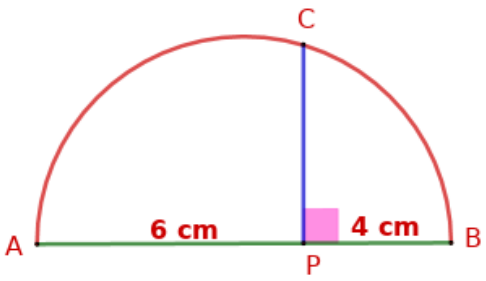
$4 \times 2 = PC^2$

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

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

Question

In the figure, PA = 6 cm, PB = 4 cm.
Find PC.



Answer

PA = 6 cm, PB = 4 cm

$PA \times PB = PC^2$

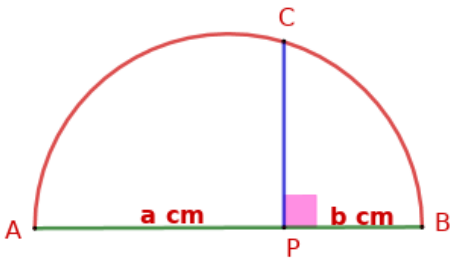
$6 \times 4 = PC^2$

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

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

Question

In the figure, PA = a cm, PB = b cm. Find PC.



Answer

PA = a cm, PB = b cm

$PA \times PB = PC^2$

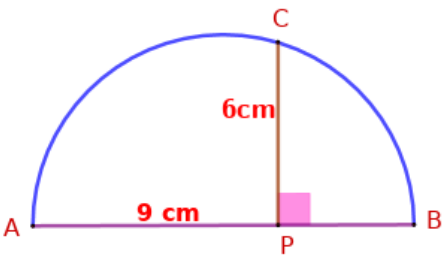
$a \times b = PC^2$

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

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

Question

In the figure, PA = 9 cm, PC = 6 cm.
Find PB.



Answer

PA = 9 cm, PC = 6 cm

$PA \times PB = PC^2$

$9 \times PB = 6^2$

$9 \times PB = 36$

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

Costructions

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

We can apply the idea,

$PA \times PB = PC^2$

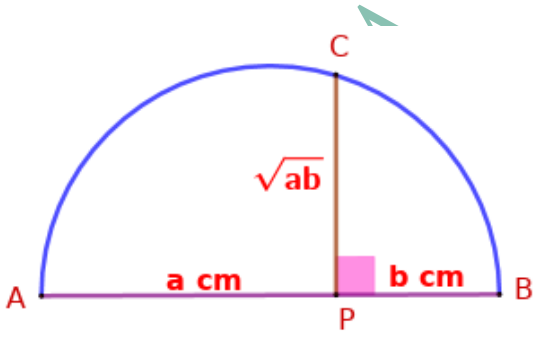
If PC = $\sqrt{12}$ cm ,

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

PA = 4 cm , PB = 3 cm or

PA = 6 cm , PB = 2 cm or

PA = 12 cm , PB = 1 cm



4	3
6	2
12	1

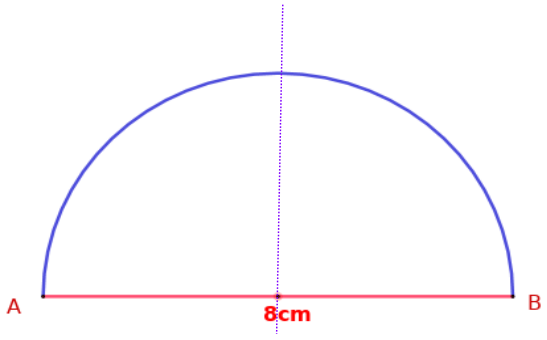
Here we take PA = 6 cm , PB = 2 cm

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

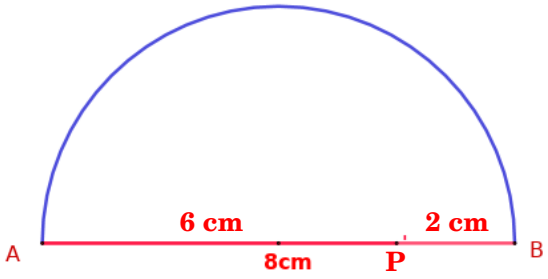
Steps:

1. Draw a line AB of length 6 + 2 = 8 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 cm and PB = 2 cm
5. Draw a perpendicular to AB through P.
6. Mark the intersecting point of semicircle and this perpendicular as C.

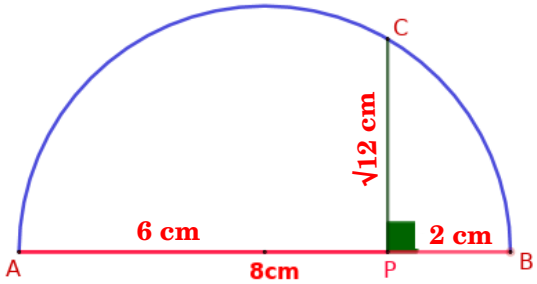
Step : 1



Step : 2 , 3



Step : 4



Step : 5 , 6

2) Draw a square of area 15 cm^2

We can apply the idea,

$PA \times PB = PC^2$

Here $PC^2 = 15$

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

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

Take PA = 5 cm , PB = 3 cm

Steps:

1 Draw a line AB of length 5 + 3 = 8 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 cm and PB = 3 cm

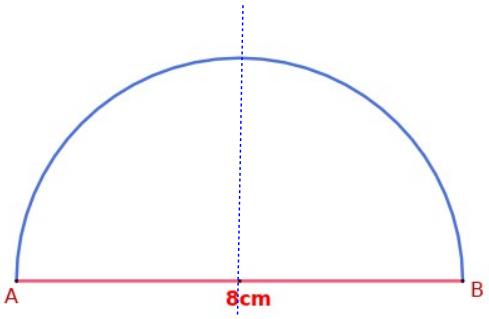
5 Draw a perpendicular to AB through P.

6 Mark the intersecting point of semicircle and this perpendicular as C.

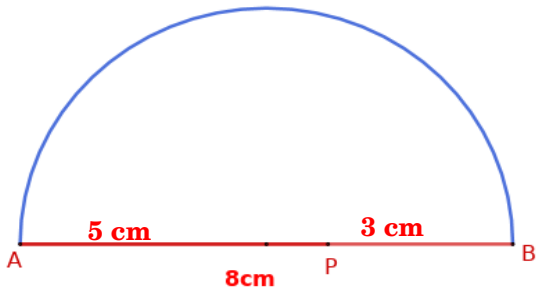
The length of PC = $\sqrt{15}$ cm

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

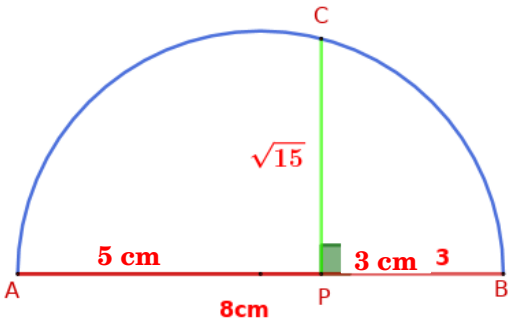
Step : 1



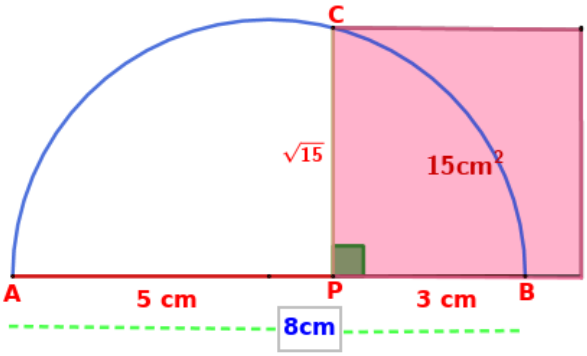
Step : 2 , 3



Step : 4



Step : 5 , 6



Step : 7

ASSIGNMENT

Draw a square of area 21 cm^2