Online Class – X – 25 17 / 08 / 2021

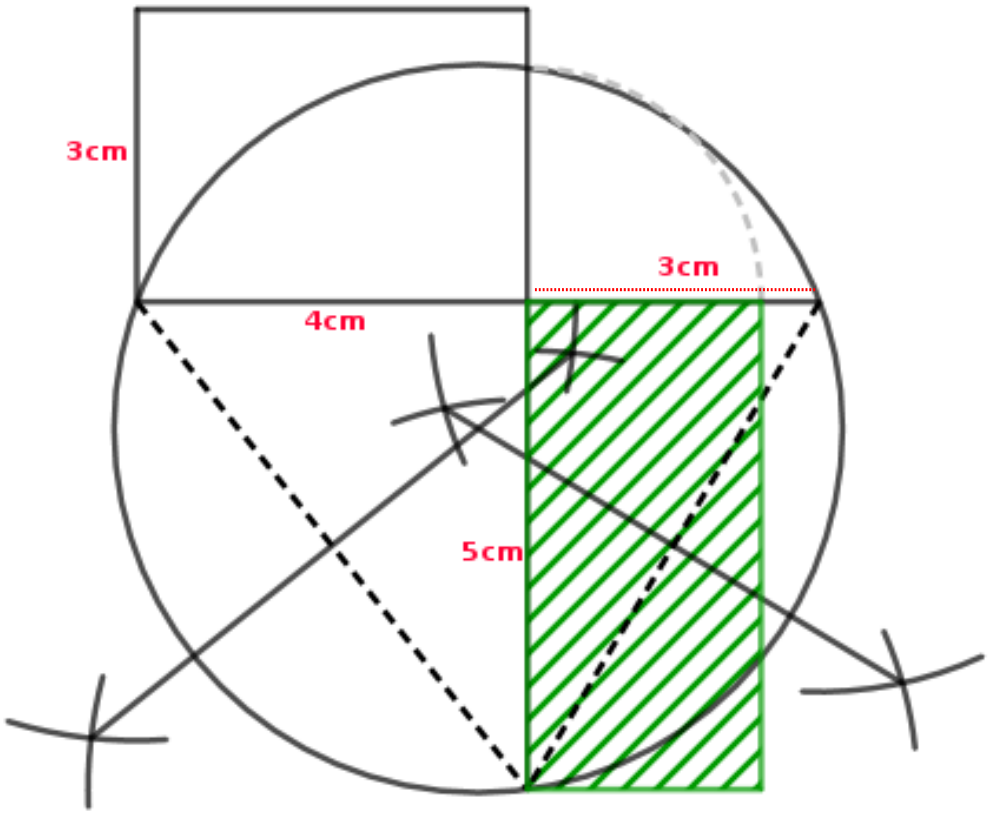
2 . Circles – Class 13

To view class

Assignment Answer

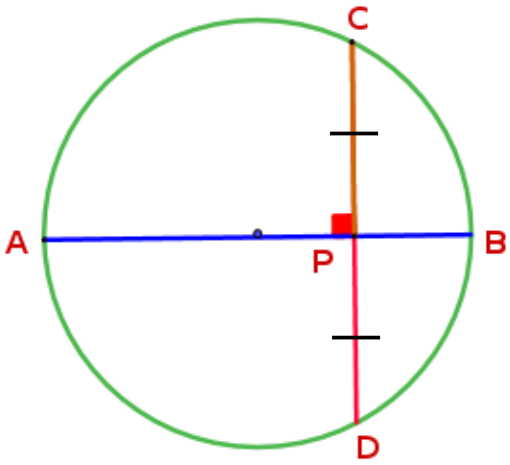
Q) Draw a rectangle of length 4 centimetres and width 3 centimetres.
Draw another rectangle of the same area with one side 5 centimetres.

Ans)



Finding the relation between parts of two intersecting chords – when one chord is a diameter and other chord is perpendicular to the diameter

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



Since the chords AB & CD intersect at P.

$$PA \times PB = PC \times PD \ldots\ldots \quad (1)$$

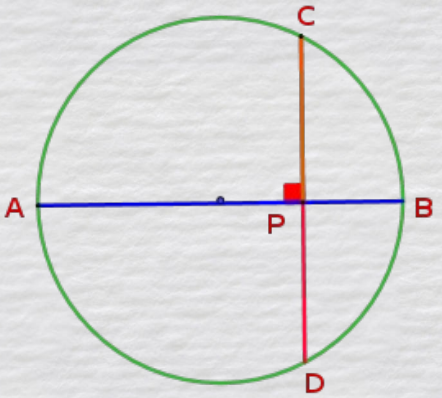
We know, the perpendicular drawn from the centre of a circle bisects the chord.
So AP bisects CD
∴ PC = PD

Substituting in (1) we have,

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

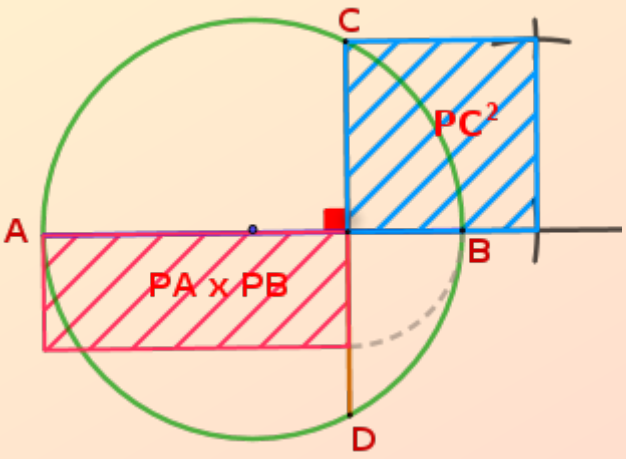
The product of the parts into which a diameter of a circle is cut by a perpendicular chord, is equal to the square of half the chord.

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



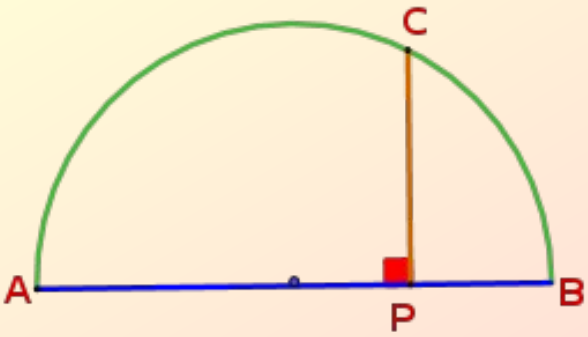
The relation $PA \times PB = PC^2$ can be put in geometric language as below:

The area of the rectangle formed of parts into which a diameter of a circle is cut by a perpendicular chord is equal to the area of the square formed by half the chord.



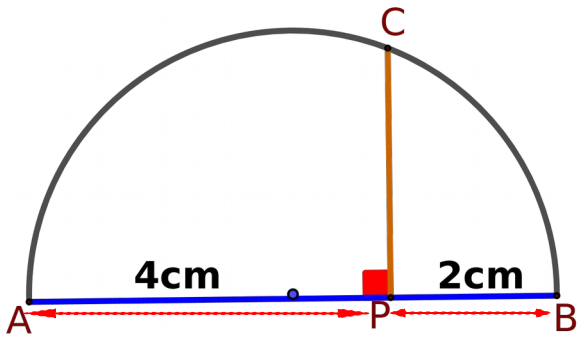
$PA \times PB = PC^2$

Since AB is the diameter , by considering the semi circle we can observe above relation as ,



$PA \times PB = PC^2$

Q1) In the picture PA = 4cm, PB = 2cm, find PC ?



Ans) Given PA = 4cm, PB = 2cm

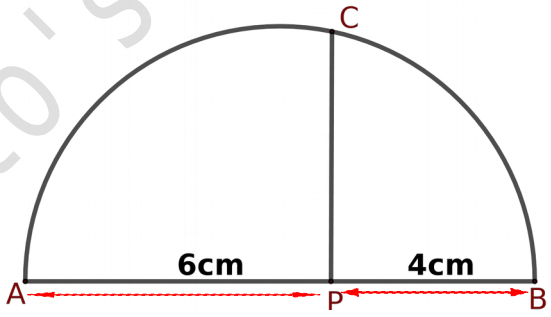
$PA \times PB = PC^2$

$4 \times 2 = PC^2$

$PC^2 = 8$

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

Q2) In the picture PA = 6cm, PB = 4cm, find PC ?



Ans) Given PA = 6 cm, PB = 4 cm

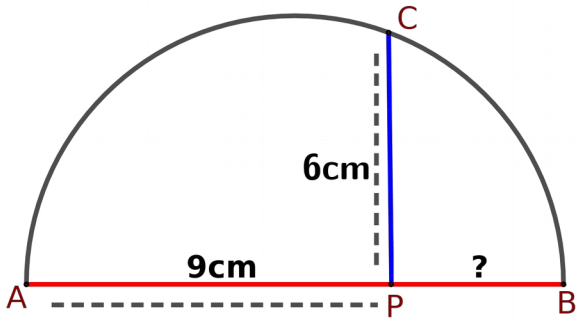
$PA \times PB = PC^2$

$6 \times 4 = PC^2$

$PC^2 = 24$

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

Q3) In the picture PA = 9cm, PC = 6cm, find PB ?



Ans) Given PA = 9 cm, PC = 6 cm

$PA \times PB = PC^2$

$9 \times PB = 6^2$

$9 \times PB = 36$

$PB = \frac{36}{9}$

$\therefore PB = 4$ cm

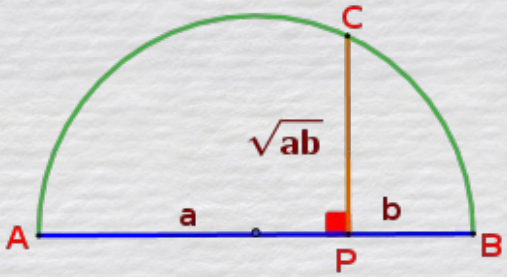
Let PA = a , PB = b

$PA \times PB = PC^2$

$a \times b = PC^2$

$PC^2 = ab$

$PC = \sqrt{ab}$



If PA = a , PB = b
then PC = $\sqrt{ab}$

We can use this relation to draw lines of irrational lengths like $\sqrt{8}$, $\sqrt{15}$, $\sqrt{24}$ etc .

Construction 4

Q1) Draw a line of length $\sqrt{12}$ cm.

Ans)

Find two numbers whose product is 12.

4 , 3 6 , 2 12 , 1 are the numbers.

Choose any pair, let us choose 6 , 2 .

Steps

1 : Draw line AB of length 6 + 2 = 8 cm .

2 : Mark the mid point .

3 : Draw a semicircle with AB as diameter .

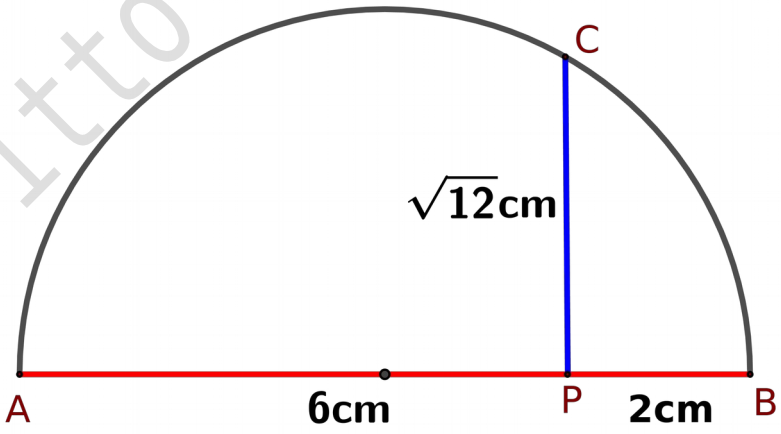
4 : Mark the point P on AB such that AP = 6cm and PB = 2cm.

5 : Through P draw line CP perpendicular to AB.

$6 \times 2 = PC^2$

$PC^2 = 12$

$PC = \sqrt{12}$ cm



Q2) Draw a square of area $15cm^2$.

Ans) Given , area of square = $15cm^2$

$\therefore$ side of square = $\sqrt{15}$ cm

Find two numbers whose product is 15.

5 , 3 15 , 1 are the numbers.

Choose any pair, let us choose 5 , 3 .

Steps

1 : Draw line AB of length 5 + 3 = 8 cm.

2 : Mark the mid point.

3 : Draw a semicircle with AB as diameter .

4 : Mark the point P on AB such that AP = 5cm and PB = 3cm.

5 : Through P draw line CP perpendicular to AB.

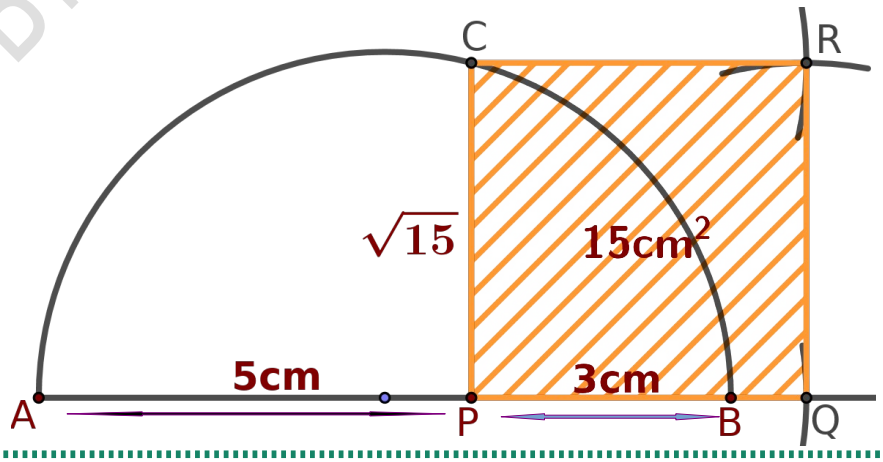
$5 \times 3 = PC^2$

$PC^2 = 15$

$PC = \sqrt{15}$ cm

6 : Extend line PB, measure PC on the compass, using this measurement with P as centre draw an arc on this line and mark the point Q.

7 : With the same measurement draw arcs by keeping the compass at Q & C to obtain the point R. Complete the square PQRC.



Assignments

Q1) Draw a line of length $\sqrt{7}$ cm .

Q2) Draw a square of area 8 cm^2 .

Q3) Draw a square of area 24 cm^2 .