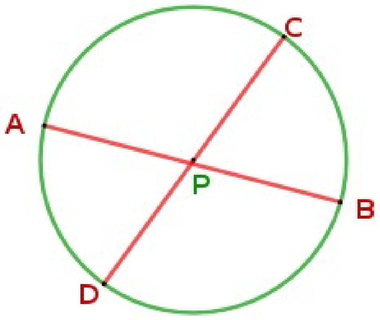
Online Class – X – 23 **12 / 08 / 2021**

2 . Circles – Class 11

To view class

Two chords

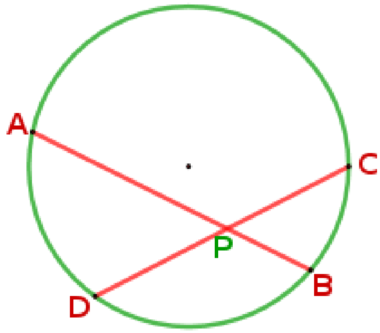
* Any two diameters of a circle intersect at the centre, and the length of the four pieces are equal.



PA = PB = PC = PD

(*Radii of a circle are equal*)

* When two chords which are not diameters intersect within the circle we get four pieces which are not equal.

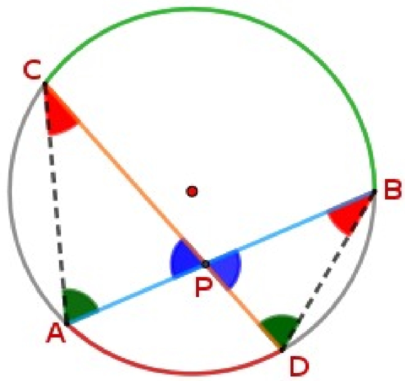


* **Finding the relation between the four parts PA, PB ,PC & PD, when the chords AB & CD intersect within the circle at P.**

Consider two chords AB & CD which are not diameters of the circle.

The chords AB & CD intersect at P.

Draw AC & BD



We can see,

$\angle A = \angle D$

$\angle C = \angle B$

All angles made by an arc on its alternate arc are equal

Consider △ APC & △ DPB

Since two angles of both triangles are equal, third angles are also equal.

So △ APC & △ DPB are similar triangles.

Since sides opposite to equal angles of similar triangles are in proportion.

$$\frac{PC}{PB} = \frac{PA}{PD}$$

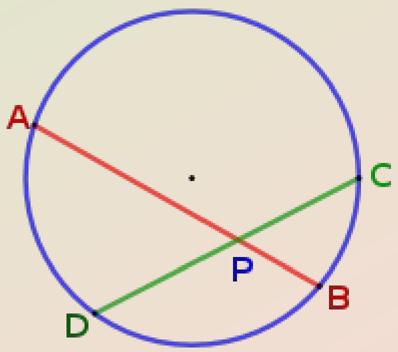
Cross multiplying we get,

$$\boxed{PA \times PB = PC \times PD}$$

Here PA, PB are parts of the chord AB and
PC, PD are parts of the chord CD.

So we can say,

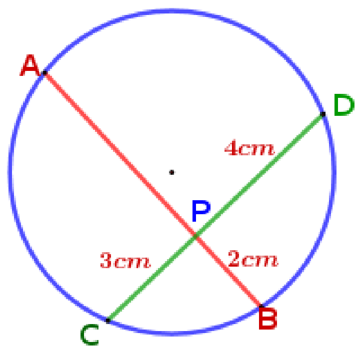
If two chords of a circle intersect within the circle, then the products of the parts of the two chords are equal.



$$\boxed{PA \times PB = PC \times PD}$$

Q) In the figure two chords AB and CD intersect at a point P . PB = 2 cm, PC = 3 cm , PD = 4 cm . Find the length of AB .

Ans)



$PA \times PB = PC \times PD$

$PA \times 2 = 3 \times 4$

$PA = \frac{12}{2}$

$PA = 6$ cm

$AB = PA + PB$

$= 6 + 2 = 8$cm

Geometrical interpretation

We can interpret the product of two lengths as an area.

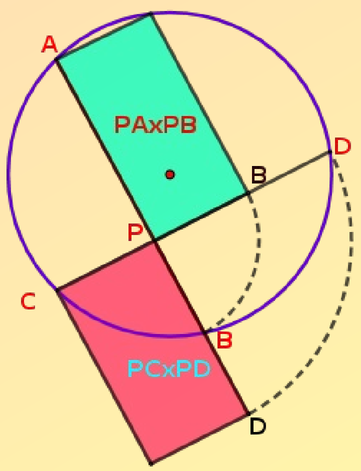
So,

$PA \times PB$ = Area of the rectangle with sides PA and PB

$PC \times PD$ = Area of the rectangle with sides PC and PD

So the relation $PA \times PB = PC \times PD$ can be put in geometric language as below:

If two chords of a circle intersect within a circle, then the rectangles formed by the parts of the same chord have equal area.



$PA \times PB = PC \times PD$

Assignment

The chords AB and CD of a circle intersect at a point P .
If PA = 9 cm , PD = 12 cm , AB = 13 cm ,
find the lengths of PB , PC and CD ?