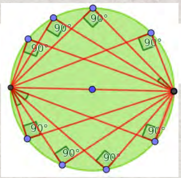
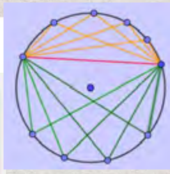
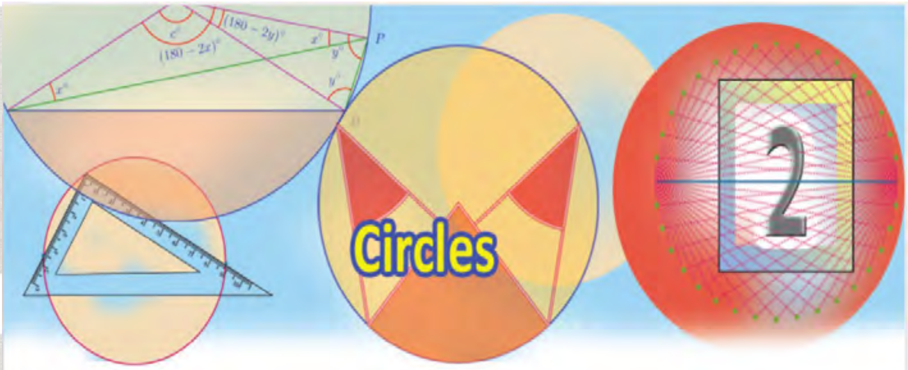


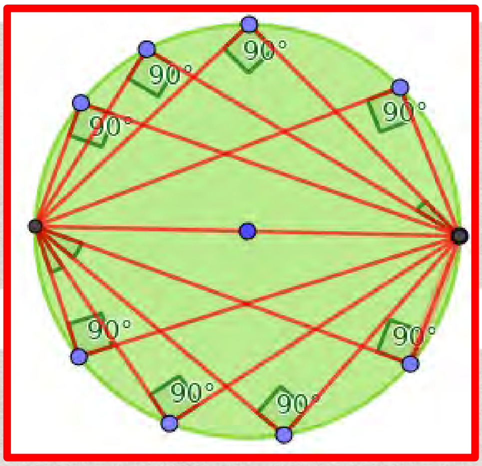
STANDARD 10





IMPORTANT IDEAS

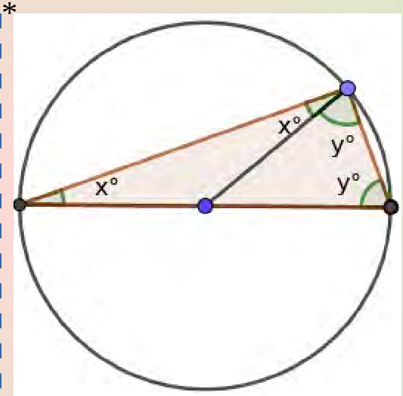
RIGHT ANGLES AND CIRCLES



See Dears....
ANGLE IN A SEMICIRCLE
IS 90°

* If we join the ends of a diameter of a circle to a point on the circle, we get a right angle.

*



$x + y + (x+y) = 180^\circ$

$2(x+y) = 180^\circ$

$x+y = \frac{180}{2}$

$\underline{x+y = 90^\circ}$

Dears...
This is the secret of
The angle
At any point on the
Semicircle
Becomes 90°

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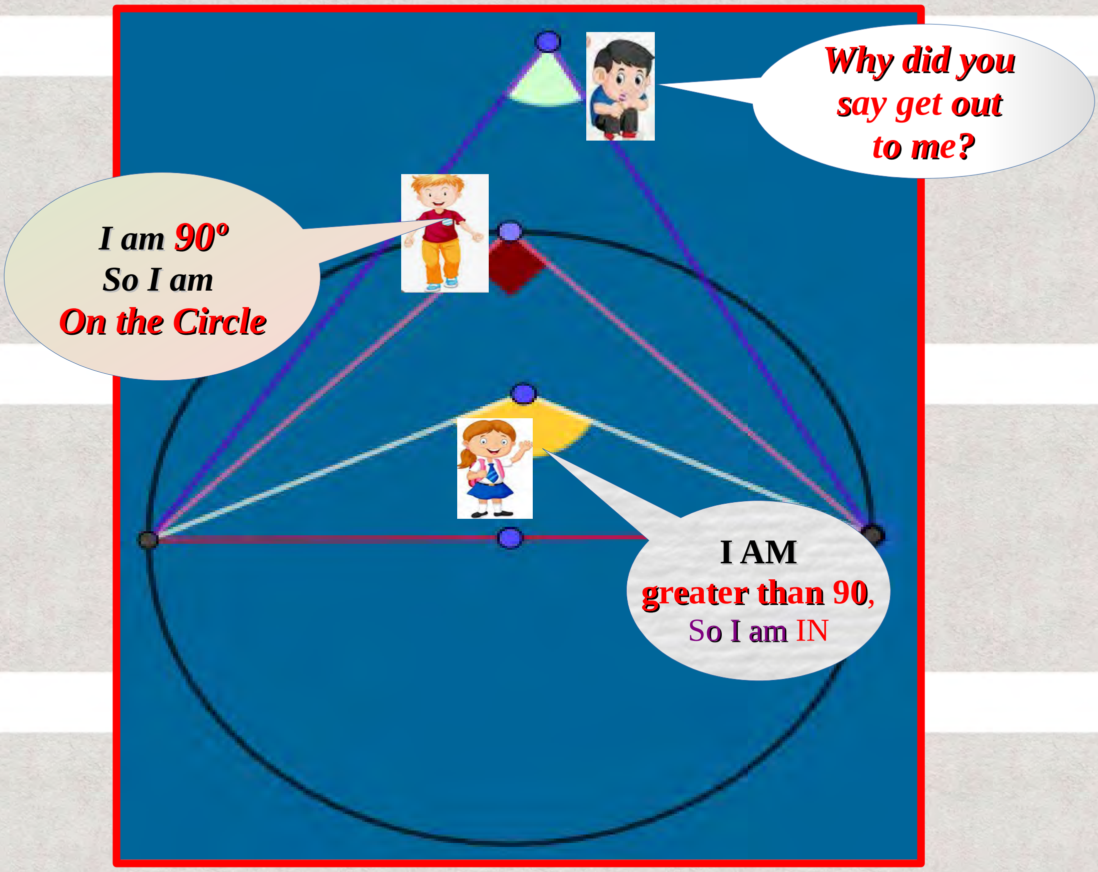
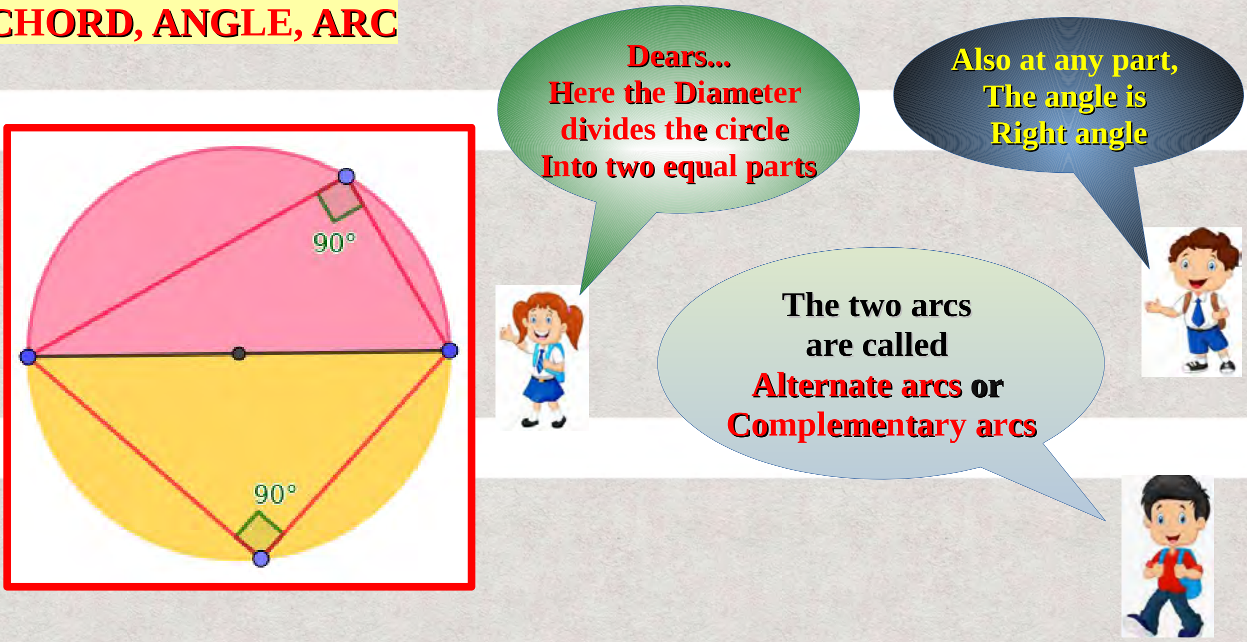
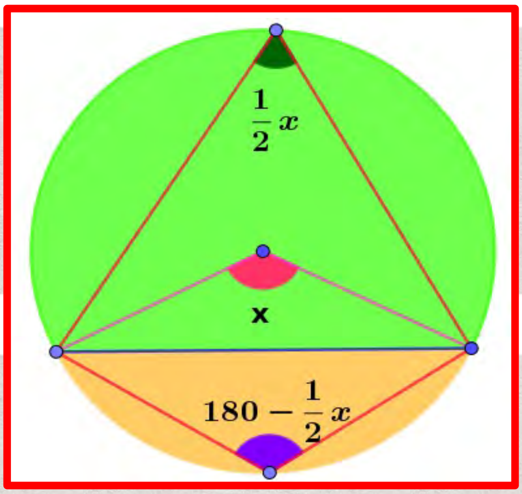


If we join the ends of a diameter of a circle to a point on the circle, we get a right angle.

* *If we join the ends of the diameter to a point inside the circle, then the angle >90º*
* *If we join the ends of the diameter to a point outside the circle, then the angle < 90º*

CHORD, ANGLE, ARC





“ Here the chord is not a diameter”

Dears....
Here the angles at the points on the circle are not 90º
Isn’t it?

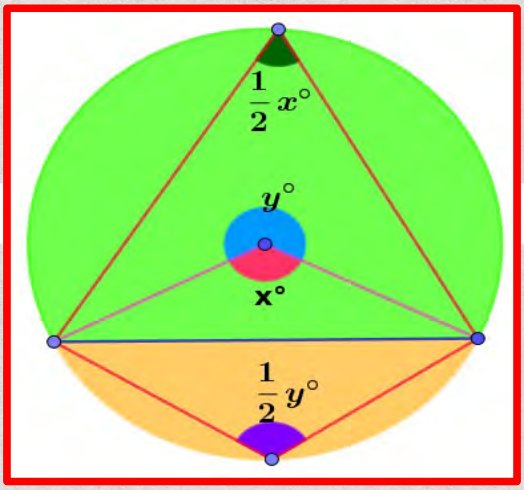
*

Any chord which is not a diameter splits the circle into unequal parts. The angle got by joining any point on the larger part to the ends of the chord is half the angle got by joining the centre of the circle to these ends. The angle got by joining any point on the smaller part to the ends of the chord is half the angle at the centre subtracted from 180º.

The angle made by any arc of a circle on the alternate arc is half the angle made at the centre.

Dears......
You know....here
At the centre,
$x^\circ+y^\circ=360^\circ$

$$\frac{1}{2}x+\frac{1}{2}y=180^\circ$$



All angles made by an arc on the alternate arc are equal; and a pair of angles on an arc and its alternate are supplementary

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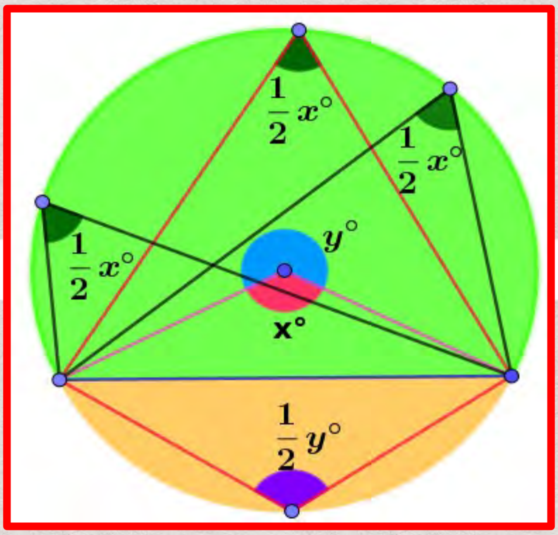


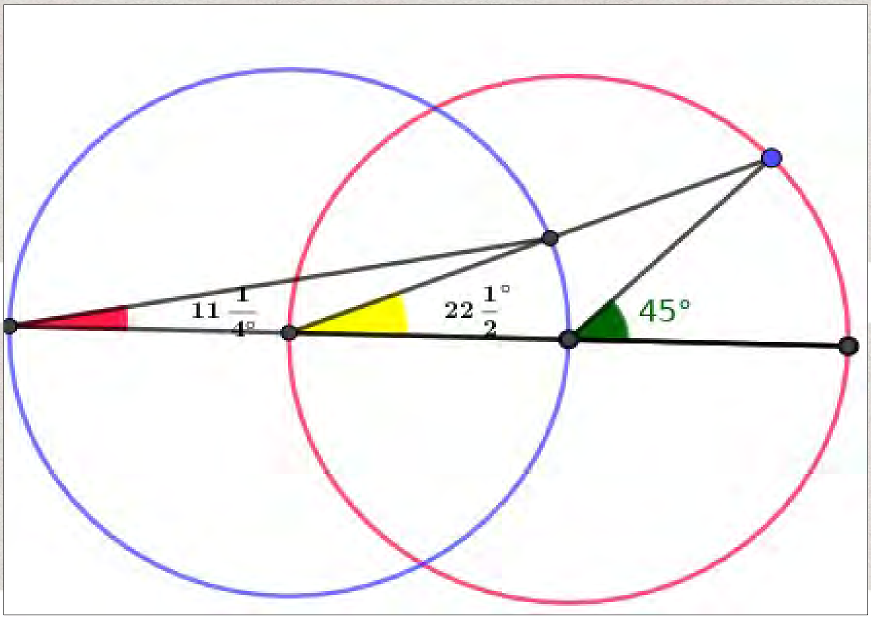
Friends.....
"The sum of angles
On the Alternate arcs are
supplementary"

Don't forget ...
All angles made by an
Arc are same!!

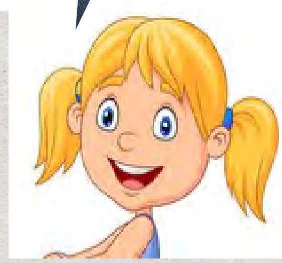
CONSTRUCTION

Idea: Half Angles

1. Example: Draw angles $22\frac{1}{2}^\circ and 11\frac{1}{4}^\circ$



"WOW!!"



The angle made by any arc of a circle on the alternate arc is half the angle made at the centre.

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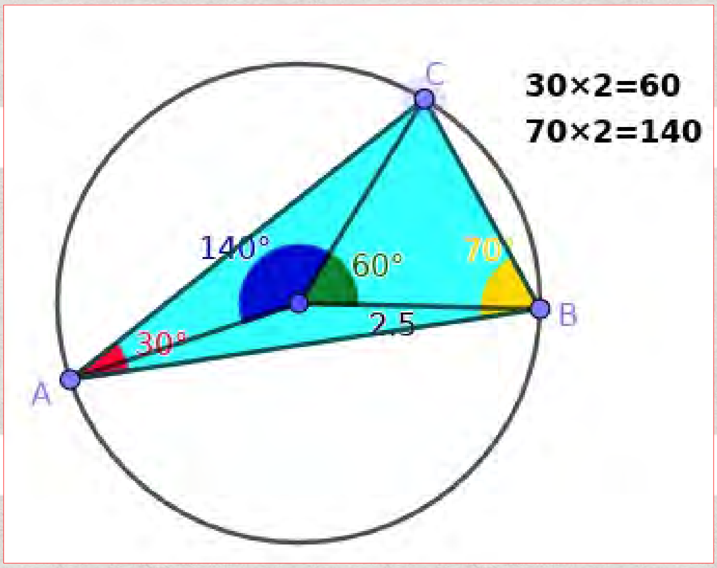
Dears...
We can also use this idea to draw the triangle with specified angles and circumradius.

Yes...yes...
First draw the circle and Measure the double of Given Angles At the centre

CONSTRUCTION

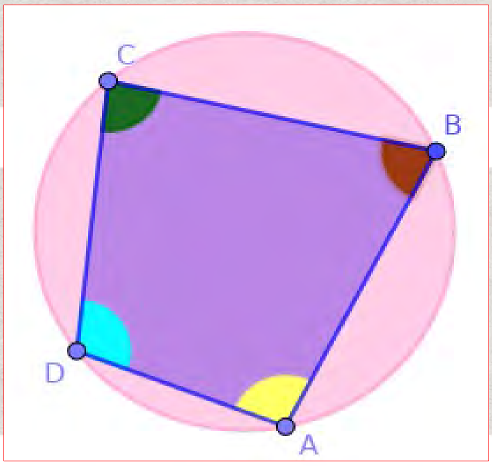
Idea: Half Angles

2. Example: Draw a triangle of angles 30º, 70º and of circumradius 2.5 centimetres.



Here
ΔABC is the Required triangle

CIRCLE AND QUADRILATERAL



Here it is!
Quadrilateral ABCD is a Cyclic Quadrilateral

***∠A + ∠C = 180º**
***∠B + ∠D = 180º**

If all four vertices of a quadrilateral are on a circle, then its opposite angles are supplementary.

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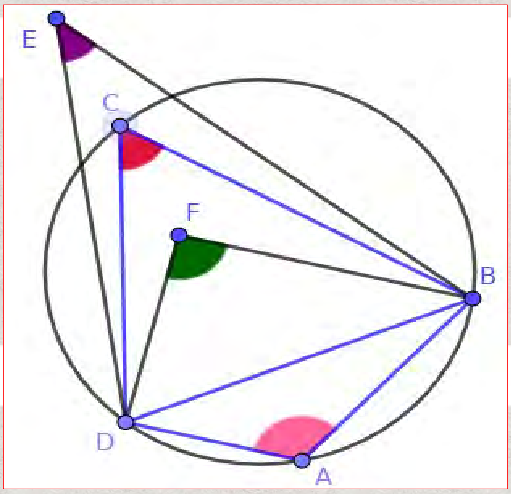


* $\angle A + \angle C = 180^\circ$
* $\angle A + \angle F > 180^\circ$
* $\angle A + \angle E < 180^\circ$

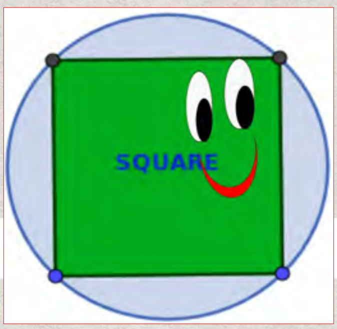
Oh! Here,
$\angle A$ and $\angle C$ are not 90°
Even they are on the circle
How is it?

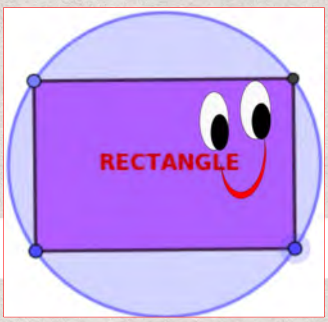
Friend....
I got it!
$\angle A$ and $\angle C$ are in the
Alternate arcs. So
They are supplementary!

If one vertex of a quadrilateral is outside the circle drawn through the other three veritces, then the sum of the angles at this vertex and the opposite vertex is less than 180°, if it is inside the circle, the sum is more than 180°.

Here,
Opposite angles of these quadrilaterals are always supplimentary

We are Always
Cyclic Quadrilaterals





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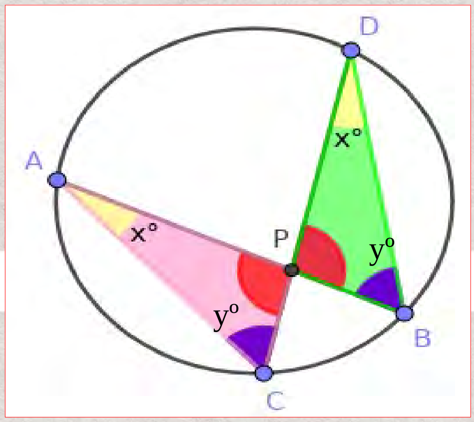
TWO CHORDS



∠A=∠D and ∠C=∠B

So Δ PAC and Δ PBD are similar.

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

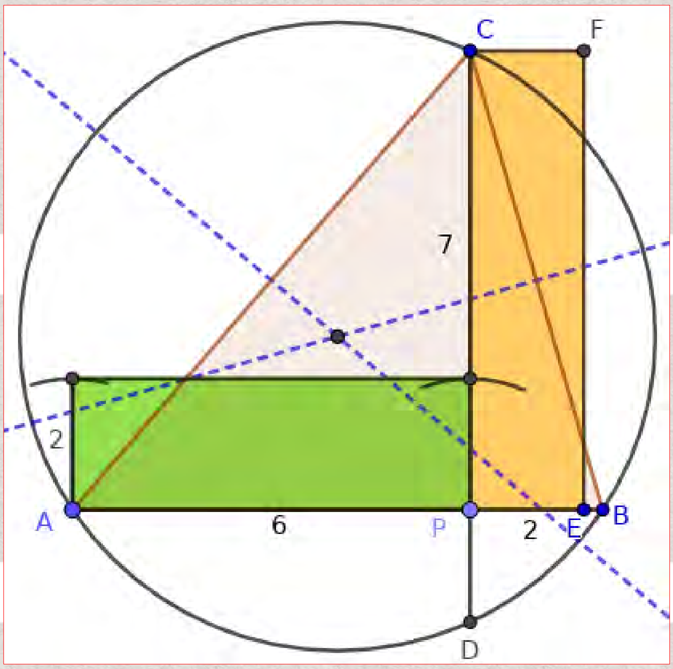
And PA X PB = PC X PD

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

CONSTRUCTION

Idea: PA X PB = PC X PD

3. Draw a rectangle of width 6cm and height 2cm. Draw another rectangle of the same area with width 7cm.

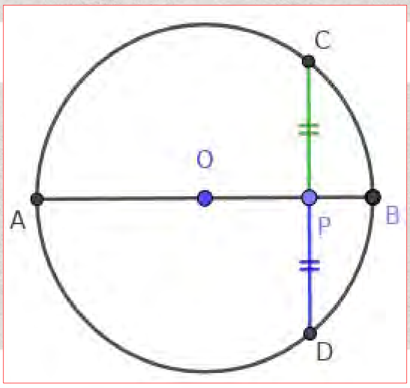


*Draw the rectangle with the width 6cm and height 2cm.

* Extend 6cm to 2cm more to get 8cm as base. (AB=8cm)
* Extend the height of the rectangle to 5cm more to get total 7cm as the new required length.
* Join AC and BC to get ΔABC
* Draw the perpendicular bisectors of any two sides of ΔABC to get the Circum centre.
* Draw circumcircle of ΔABC.
* Now PC=7cm is the length of the new rectangle and PD is its breadth.
* Take these lengths on compass to Complete the new rectangle PEFC.
* Then areas of both rectangles are Equal since PA X PB = PC X PD

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

TWO CHORDS



The perpendicular from the centre to a chord bisects the chord.

∴ PC = PD

PA X PB = PC X PD

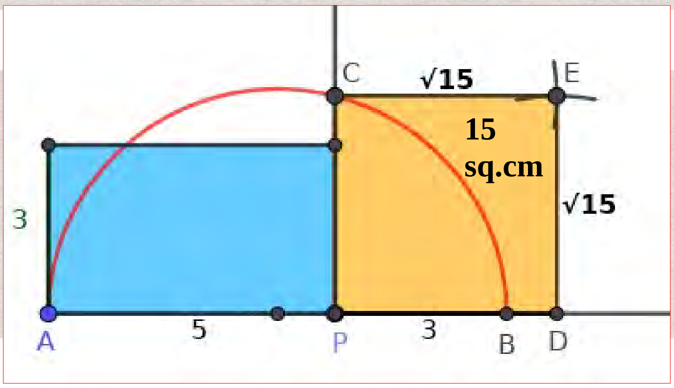
∴ PA X PB = PC^2

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.

CONSTRUCTION

Idea: *PA X PB = PC^2*

4. Draw a rectangle of width 5 centimetres and height 3 centimetres. Draw a square of the same area.



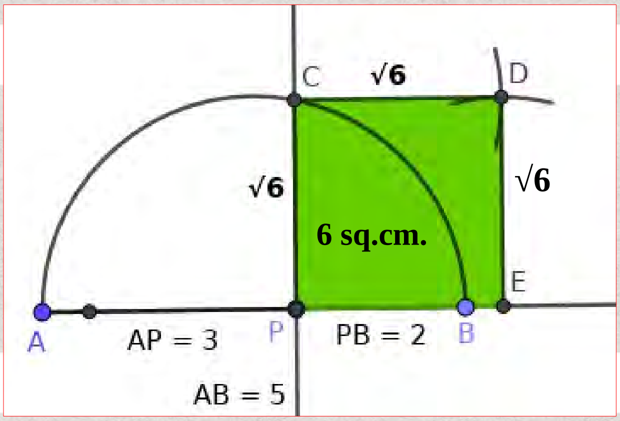
* Draw the rectangle with length 5cm and breadth 3cm.
* Extend AP to 3cm more to get AB = 8cm.
* Draw a semicircle with AB as the Diameter.
* Extend the breadth to meet the Semicircle at C.
* PC is the side of the required Square.
* Complete the square with PC as one Side.
* PDEC is the required square with Area 15 sq.cm using the idea

PA X PB = PC^2

CONSTRUCTION

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

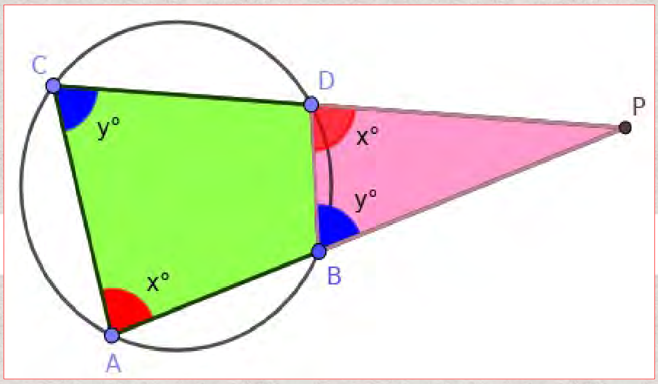
5. **Draw a square of area 6 square centimetres (Without drawing the rectangle).**



* Draw a line AB=5 cm and mark a Point P, 3cm away from A.
* Draw a semicircle with AB as Diameter.
* Draw a perpendicular to AB at P.
* Let it meet the semicircle at C
* PC=√6 is the side of the new Square and area 6 sq.cm.
* The quadrilateral PCDE is the Required Square.

TWO CHORDS

In the picture, chords AB and CD of the circle are extended to meet at P. Then **PA × PB = PC × PD.**



* Consider ΔPBD and ΔPAC
* ∠PAC=∠PDB and ∠PCA=∠PBD (any outer angle of a cyclic quadrilateral is equal to the Inner angle at the opposite vertex)
* ∠P is common to both triangles
* So ΔPBD and ΔPAC are similar.
* $$\frac{PB}{PD} = \frac{PC}{PA}$$
* **PA X PB = PC X PD**

****