Online Class – X – 13 19 / 07 / 2021

2 . Circles – Class 1

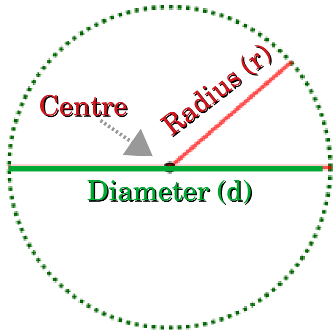
To view class

Previous Knowledge:

Basics of circle

- Fixing the pointed end of the compass at one spot and then drawing the compass around we get a circle.
  This fixed point is called the **centre** of the circle.

- The distance from the centre to the circle is called the **radius(r)** of a circle.
  Radii of a circle are equal .



- **Diameter(d)** of a circle is the line joining two points on the circle through its centre.

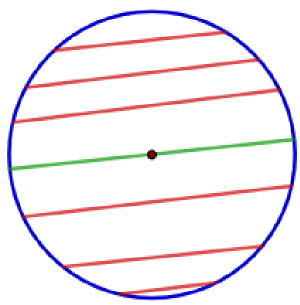
  Diameter is two times the radius .

$$d = 2r$$

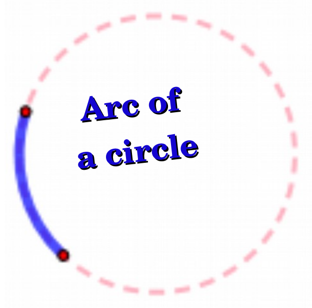
  Radius is half the diameter

$$r = \frac{d}{2}$$

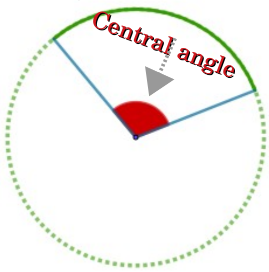
- The line joining any 2 points on a circle is a **chord**.
- We can draw many chords in a circle.
- **Diameter** is the longest chord of a circle.



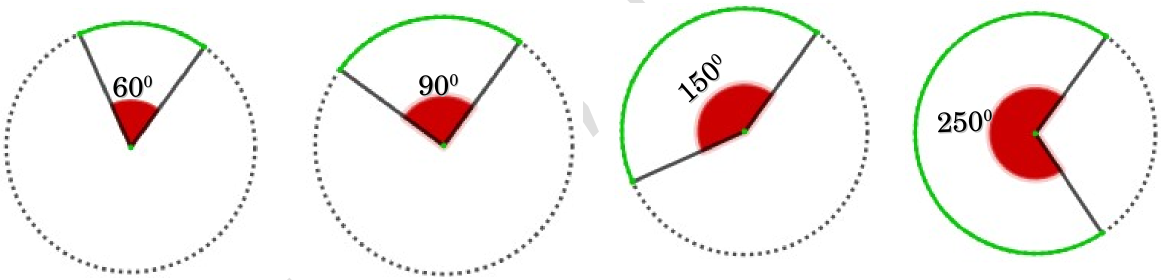
- **An arc is a part of a circle.**



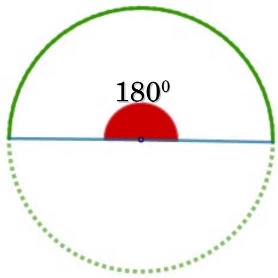
- **The angle formed by the line joining the endpoints of an arc to its centre is known as the central angle of that arc.**



- **The length of an arc of any circle depends on its central angle and the radius of that circle .**



- **When the central angle is 180°, the arc will be a semicircle (half of a circle).**

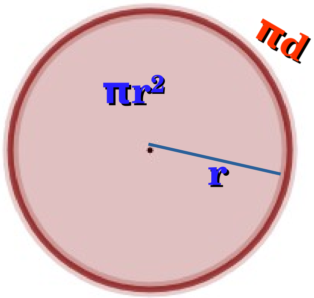


- **A sector is said to be a part of a circle made by the arc and its two radii.**

- **Area** of a circle = πr^2
- **Perimeter** of a circle = $2\pi r$ = πd

  where ' r ' is the radius of the circle ,

  $\pi \approx 3.14$

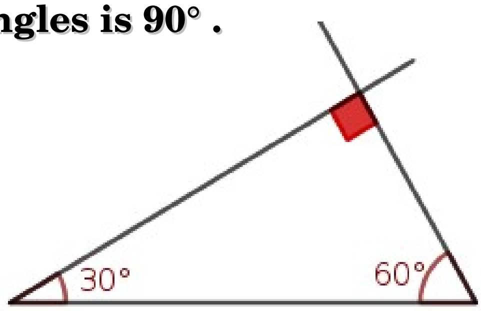


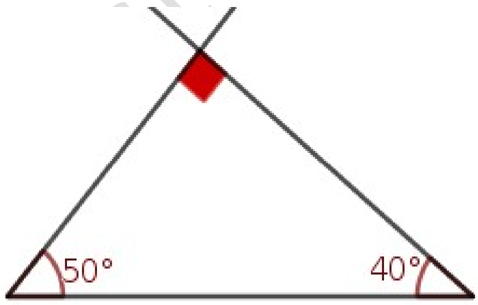
Activity 1

Draw a right triangle of hypotenuse 5 centimetres .

Method 1

Draw a line 5 centimetres long. Draw a triangle by drawing two angles at the ends of this line such that the sum of the angles is 90° .

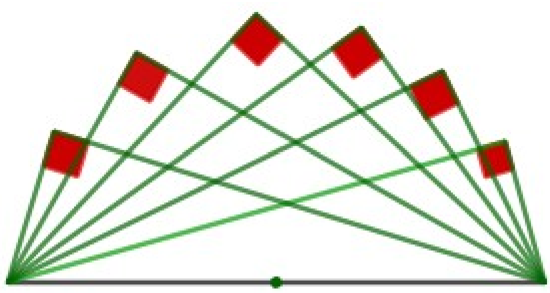




We can draw so many right triangles by changing the angles at the ends of the line such that their sum is 90^0 .

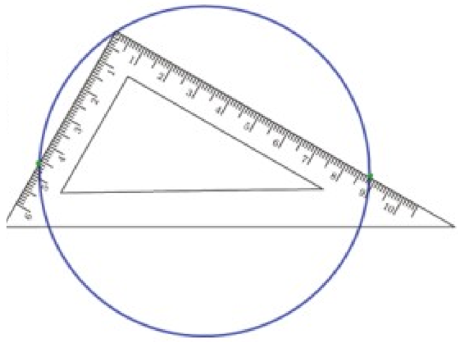
Some other pair of angles whose sum is 90° are

(20° ,70°), (45° ,45°),(15° ,75°),(35° ,55°) etc

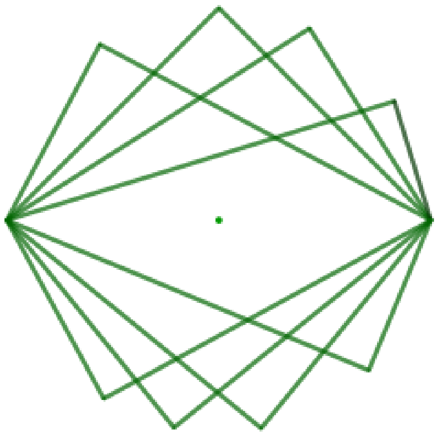


Method 2

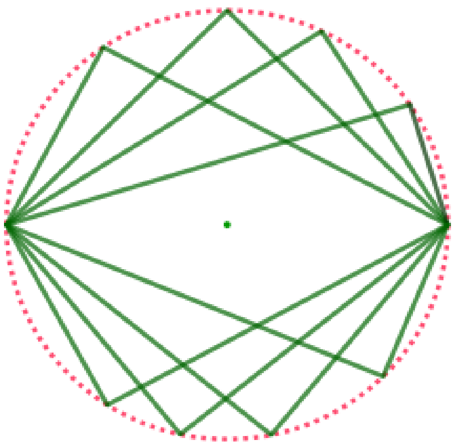
We can also use a set square to draw this.
Draw 5cm long line .
Then place a set square with the right angle on top and edges passing through the ends of the line.



By adjusting the set square we can draw so many right triangles. We can draw at the bottom of the line also .

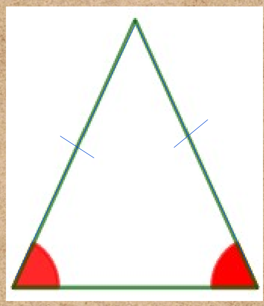


Drawing several such triangles and looking at the third vertices we can see all of them lie on a circle.



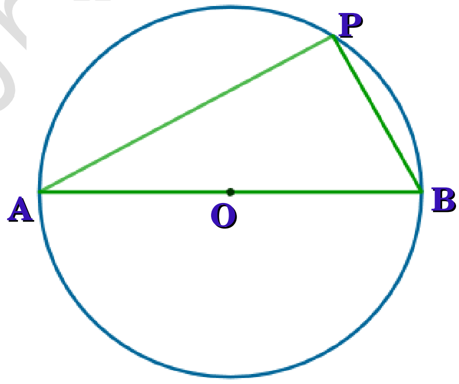
Previous Knowledge

- If two sides of a triangle are equal, then the angles opposite to these sides are also equal.
- If two angles of a triangle are equal, then the sides opposite to the equal angles are equal.
- A triangle with two sides equal, is called an isosceles triangle.
- Triangles with two angles equal are also isosceles.



Activity 2

In the figure , AB is a diameter and P is a point on the circle . Prove that the angle at P is 90°.

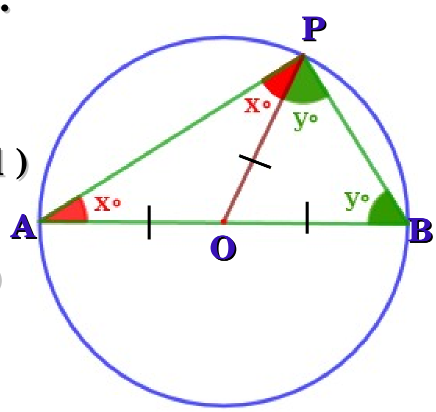


Ans)

Join P to the centre O of the circle. Line PO splits ∠P into two and △ APB into two triangles.

Let ∠APO = x° & ∠ BPO = y°

OA = OB = OP (Radii of a circle are equal)



△ AOP is an isosceles triangle (OA = OP)

So ∠ APO = ∠ A = x°

△ BOP is an isosceles triangle (OB = OP)

So ∠ BPO = ∠ B = y°

In triangle APB

$\angle A + \angle B + \angle APB = 180^\circ$

(Sum of the angles of a triangle is 180°)

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

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

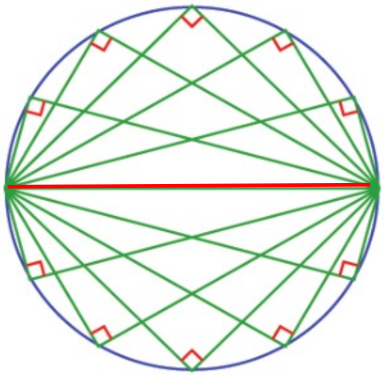
$$2(x^\circ + y^\circ) = 180^\circ$$

$$x^\circ + y^\circ = \frac{180^\circ}{2} = 90^\circ$$

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

or

Angle in a semicircle is right.



<u>Assignment</u>

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(5) Use a calculator to determine upto two decimal places, the perimeter and the area of the circle in the picture.