

- **Quadrilateral:** A figure made up of four line segments is called a quadrilateral.

A quadrilateral has four sides and four angles. A quadrilateral is always named in a cyclic manner.

Look at the adjacent figure.

It is quadrilateral PQRS.

Sides: PQ, QR, RS and SP

Vertices: P, Q, R and S

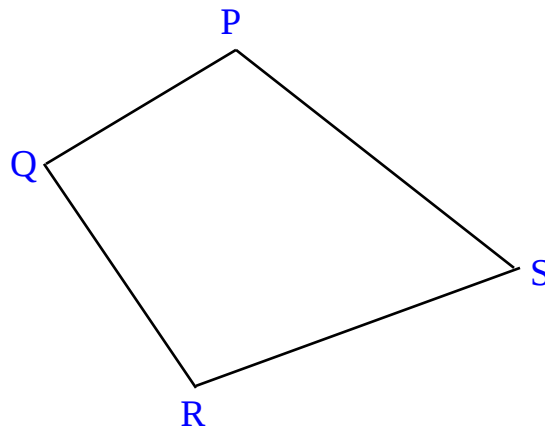
Angles: $\angle PQR$, $\angle QRS$, $\angle RSP$ and $\angle SPQ$
or $\angle P$, $\angle Q$, $\angle R$ and $\angle S$.

Adjacent sides: (PQ, QR), (QR, RS),
(RS, SP) and (SP, PQ)

Opposite sides: (PQ, RS) and (QR, SP)

Opposite angles: ($\angle P$, $\angle R$) and ($\angle Q$, $\angle S$)

Adjacent angles: ($\angle P$, $\angle Q$) ($\angle Q$, $\angle R$) ($\angle R$, $\angle S$) and ($\angle S$, $\angle P$)



- **Circle:** A circle is the set of all those points in a plane whose distance from a fixed point remains constant.

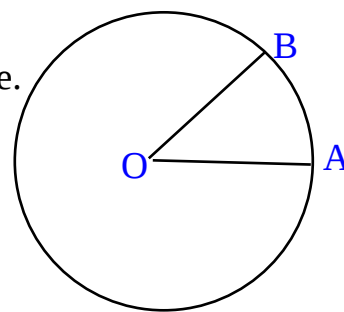
OR

A circle is the path of a moving point at the same distance from a fixed point.

Centre: The fixed point is called the *centre* of the circle. 'O' is the centre of the circle in the adjacent figure.

Radius: The constant distance is known as the *radius* of the circle. OA and OB are the radii of the circle.

All the radii of a circle are equal.



Diameter: A line segment passing through the centre of the circle and having its end points on the circle is called a *diameter*.

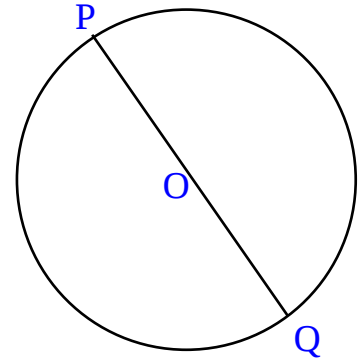
PQ is a diameter of the circle having its centre at O. Also OP and OQ are two radii of the circle.

$\therefore OP = OQ \Rightarrow O$ is the midpoint of PQ.

Thus, the centre of a circle divides the diameter into two equal parts.

Hence, Diameter = $2 \times$ radius.

The centre of the circle is the mid-point of every diameter of the circle. Thus, diameters of a circle are concurrent and the common point is the centre of the circle.

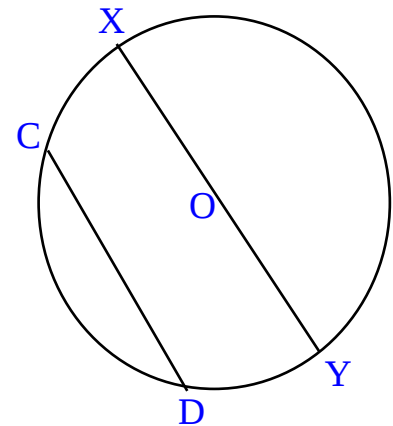


Chord of a circle: A line segment with its end points lying on a circle is called a *chord* of the circle. By this definition, the diameter of a circle is also its chord.

It will be the longest chord of a circle.

In the adjacent figure, XY and CD are two chords of the circle with centre O.

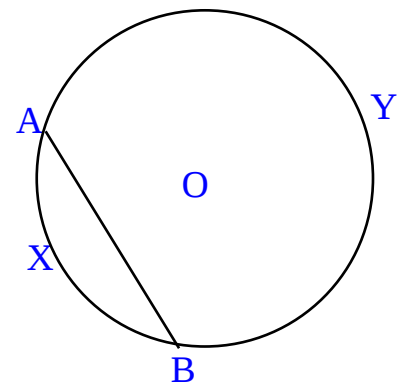
Is chord XY the diameter of the circle also?



Arc of a circle: A continuous piece of a circle is called an *arc* of the circle. OR we can also say, an ARC is a portion of a circle.

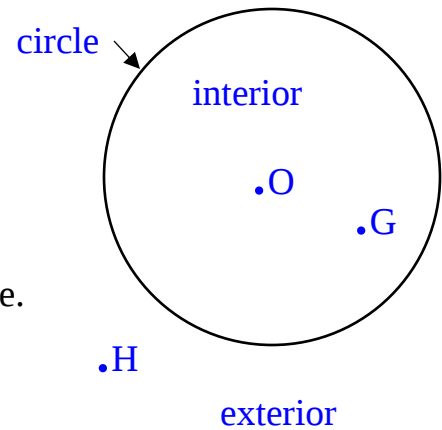
Let A and B be two points of the circle with centre O and radius r, such that the line segment AB is not a diameter of the circle.

The points A and B divide the circle into two parts one smaller than the other part. Each part is an arc of the circle. The *minor arc* is shown by AXB and the *major arc* by AYB.



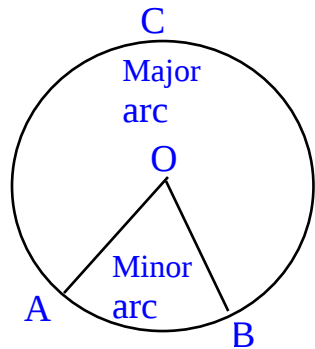
Interior of the circle: The set of points which lie inside the circle is known as interior of the circle. For example, in the adjacent figure, point G is in the interior of the circle.

Exterior of the circle: The set of points which lie outside the circle is known as exterior of the circle. For example, in the adjacent figure, point H is in the exterior of the circle.

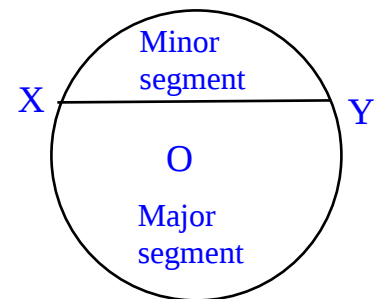


Circular Region: the part of the plane of the circle that consists of the circle and its interior is called the circular region.

Sector of a circle: A region in the interior of a circle enclosed by an arc on one side and a pair of radii on the other two sides is called a *sector*. In the figure, the OAB is the *minor sector* and ACB is the *major sector*.



Segment of a circle: A region in the interior of a circle enclosed by an arc and a chord is called a segment of a circle. In the figure, XY divides the circular region in two parts – *Minor Segment* and *Major Segment*.



Circumference: The distance around the circle is called the *circumference* of the circle. In other words, the length of the boundary of the interior of a circle is its *circumference*. OR The perimeter of a circle is its *circumference*.

Semi-circle: The end points of a diameter of a circle divide the circle into two equal parts. Each part is called a *semi-circle*. i.e. A semi-circle is *half of a circle*.

Example 1: Define the following terms:

(a) circle (b) radius (c) centre (d) diameter (e) chord

Answer 1: (a) **Circle:** A *circle* is the path of a moving point at the same distance from a fixed point.

(b) **Radius:** The constant distance is known as the *radius* of the circle. Allth radii of a circle are equal.

(c) **Centre:** The fixed point of a circle is called the *centre* of the circle.

(d) **Diameter:** A line segment passing through the centre of the circle and having its end points on the circle is called a *diameter*. Diameter is twice the radius.

(e) **Chord:** A line segment with its end points lying on a circle is called a *chord* of the circle. A diameter is the longest chord of a circle.

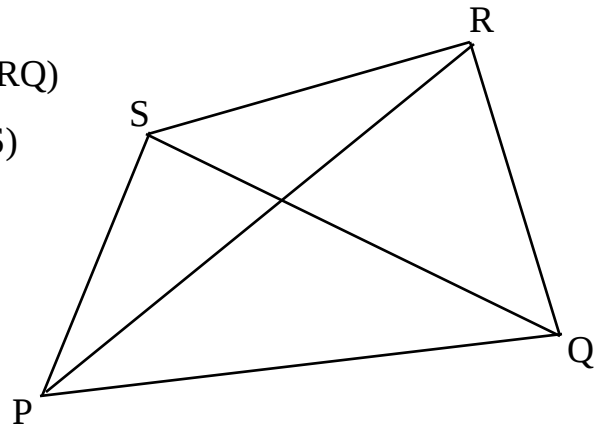
Example 2: Draw a quadrilateral PQRS. Write two pairs of (i) adjacent angles (ii) adjacent sides. (iii) Also name its two diagonals.

Answer 2: Two pairs of

(i) adjacent sides are: (PS, PQ) and (SR, RQ)

(ii) adjacent angles are ($\angle P$, $\angle Q$), ($\angle R$, $\angle S$)

(iii) Two diagonals are: PR and QS



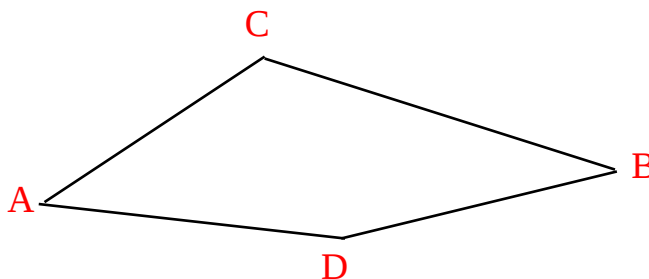
Assignment:

- 1) Complete exercises 4.5 and 4.6 of textbook.
- 2) Complete the worksheet given along with this module.

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WORKSHEET 3

- 1) Draw a circle with centre O and mark the following using colours:
- (a) Diameter AB (b) Radius OP (c) chord CD
(d) segment RS (e) minor arc APB (f) major arc
(g) point Q in the exterior of the circle (h) point Z in the interior of the circle
- 2) Is the given figure quadrilateral ABCD? If not, write the correct name of the quadrilateral. Also write the sides and angles of the quadrilateral.



- 3) How many circles can be drawn to pass through two given points?
- 4) How many circles can be drawn to pass through three given points?
- 5) **Fill in the blanks.**
- a) The diameter of a circle is _____ times its radius.
- b) The diameter of a circle is the _____ chord of a circle.
- c) A radius of a circle is a line segment with one end at _____ and the other end at _____
- d) Every point on a circle is _____ from its centre.
- e) A chord of a circle is a line segment with its end points on the _____
- f) The diameter of a circle passes through _____
- g) The total number of diameters of a circle are _____
- h) All radii of a circle are _____