CLASS 9 ACADEMIC PROGRAM-2020

HIGHER MATH

Lecture : M-18

Chapter 8 : Circle

উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

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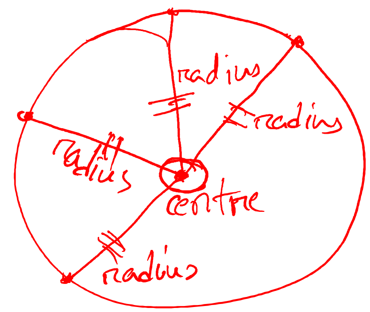
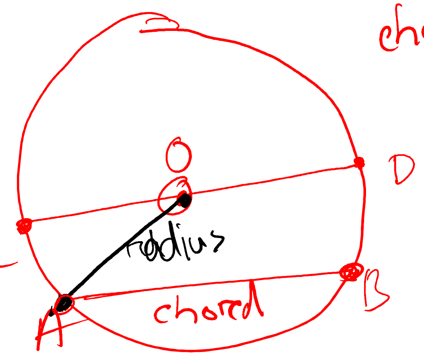
(Circle)

Terms:

- Centre
- Interior of circle
- Exterior of Circle
- Chord
- Radius & Diameter



Centre — include ⇒ diameter; exclude ⇒ – } chord

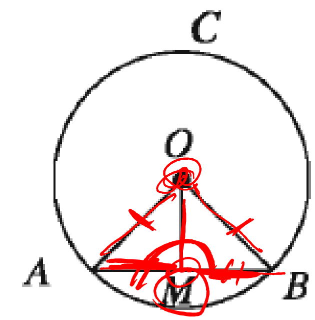


chord { AB ⇒ centre ✗ → chord; CD ⇒ centre ✓ → diameter, chord }

AB ✗, CD ✓ → chord

dia

Theorem 17: The line segment drawn from the center of a circle to bisect a chord other than diameter is perpendicular to the chord.



$AB \Rightarrow$ chord | $AM = BM$

$OA = OB =$ radius

$\triangle OAM$ & $\triangle OBM$,

$OA = OB =$ radius

$AM = BM \Rightarrow M$ middle point

$OM \Rightarrow$ common

$\triangle OAM \cong \triangle OBM$

$\angle AMO = \angle BMO$

$\angle AMO + \angle BMO = 180^\circ$

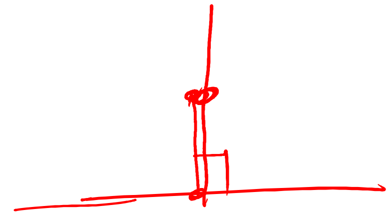
$\Rightarrow \angle AMO = \angle BMO = 90^\circ \Rightarrow \boxed{OM \perp AB}$

$AB \Rightarrow$ chord

$OM \Rightarrow$ bisect

$AM = BM$

$OM \perp AB$ prove



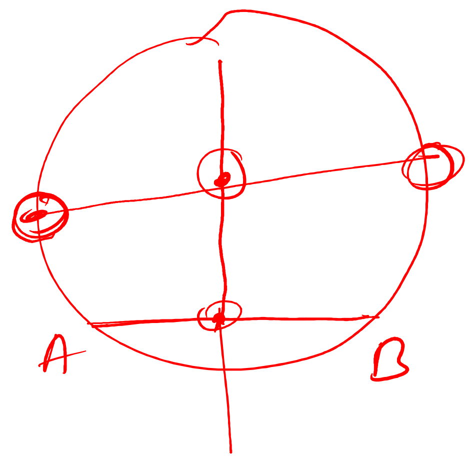
Poll Question 01

The perpendicular bisector of any chord passes through what?

(a) Two end points of diameter

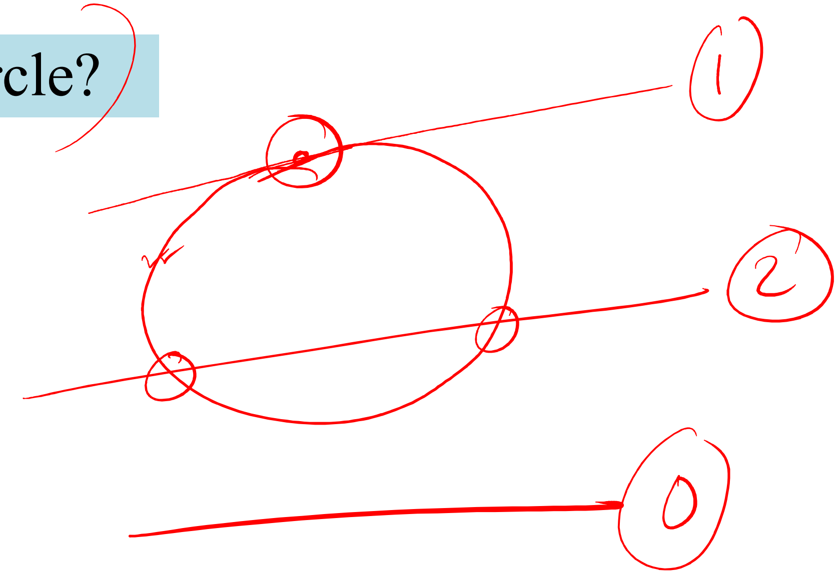
(b) Centre of the circle

(c) None



Poll Question 02

How many points can a line intersect in a circle?



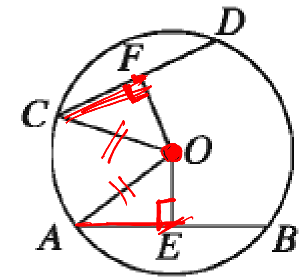
(a) 1

(b) 2

(c) 3

(d) Infinte

Theorem 18: All equal chords of a circle are equidistant from the centre.



ΔOCF ; ΔOAE ;

$OC = OA$ = radius

$\angle OFC = \angle OEA = 90^\circ$

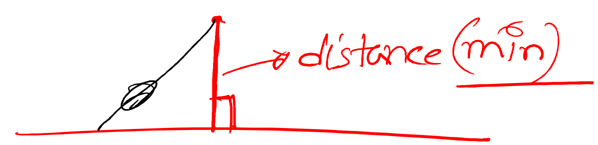
$CF = \frac{1}{2}CD = \frac{1}{2}AB = AE$

$\Delta OCF \cong \Delta OAE$

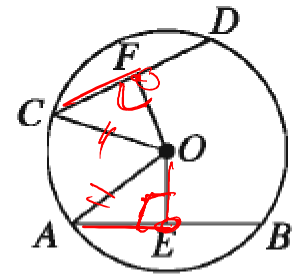
$\boxed{OF = OE}$ equidistant

$AB = CD$

$\boxed{OF = OE}$



Theorem 19: Chords equidistant from the Centre of a circle are equal.



$\triangle OCF$; $\triangle OAE$

$OC = OA = radius$

$\angle OFC = \angle OEA = 90^\circ$

$OF = OE$

$\triangle OCF \cong \triangle OAE$

$CF = AE$

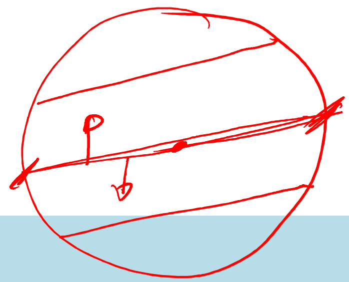
$\frac{1}{2}CD = \frac{1}{2}AB \Rightarrow \boxed{AB = CD}$ proved

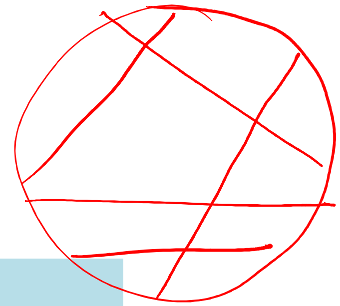
$OF = OE$

$AB = CD$

Poll Question 03

Which is true ?



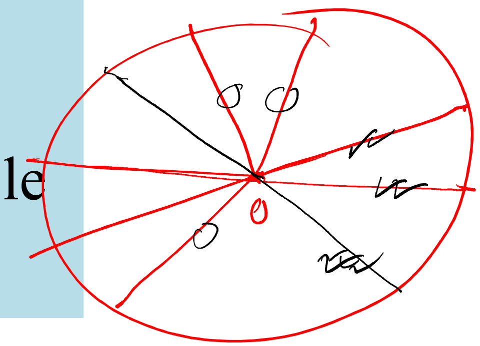


(a) A circle has only two chords.

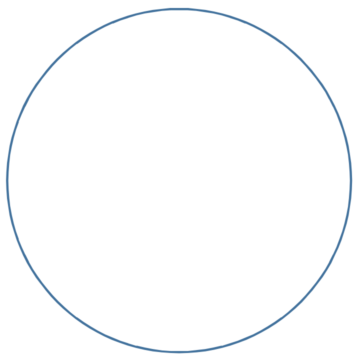
(b) The diameter is the greatest chord

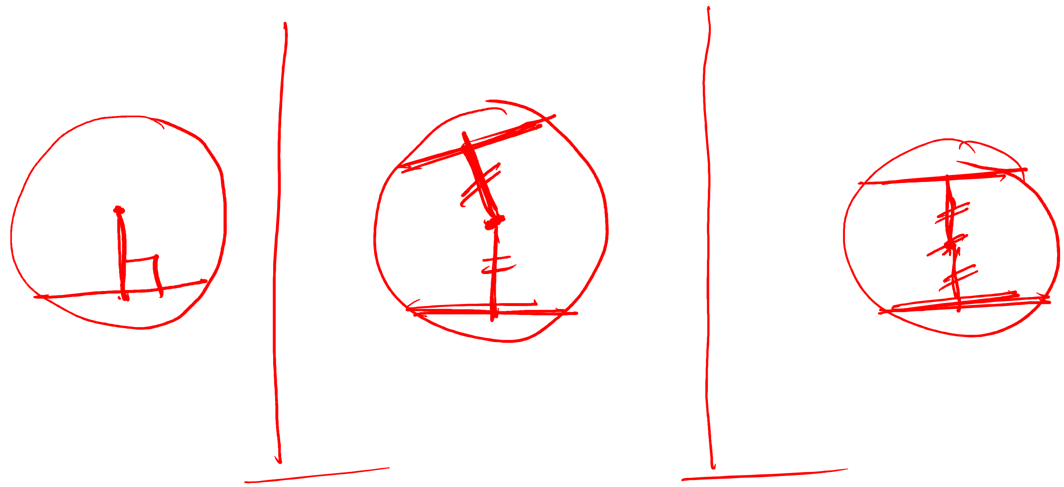
(c) There is only two radius and one diameter in a circle

(d) None

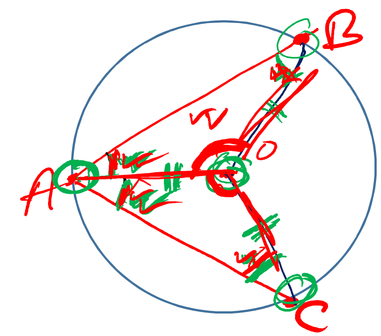


EXERCISE 8.1





2. Two chords AB and AC of a circle subtend equal angles with the radius passing through A. Prove that, AB=AC.



$\triangle AOB$ & $\triangle AOC$ -

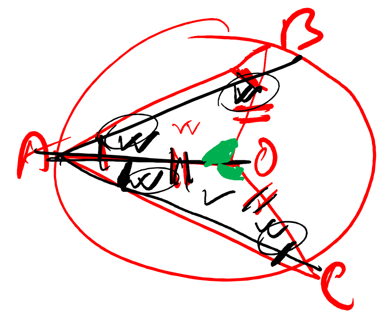
$\angle OAB = \angle OAC$

$\angle OBA = \angle OCA$

$\angle AOB = \angle AOC$

$OA \Rightarrow$ common side

$OB = OC =$ radius



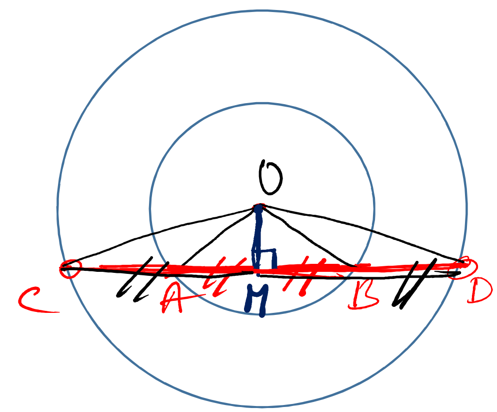
$\triangle AOB \cong \triangle AOC \Rightarrow \quad AB = AC$

4. A chord AB of one of the two concentric circles intersects the other circle at points C and D .prove that, AC=BD

$\because OM \perp \boxed{AB} \Rightarrow OM \perp \boxed{CD}$

(chord inner circle) (chord outer circle)

O ⇒ centre



$AM = BM$ —— (1)

$CM = DM$ —— (2)

$(2)-(1) \Rightarrow CM - AM = DM - BM$

$\Rightarrow \boxed{AC = BD}$ [proved]

AC = BD

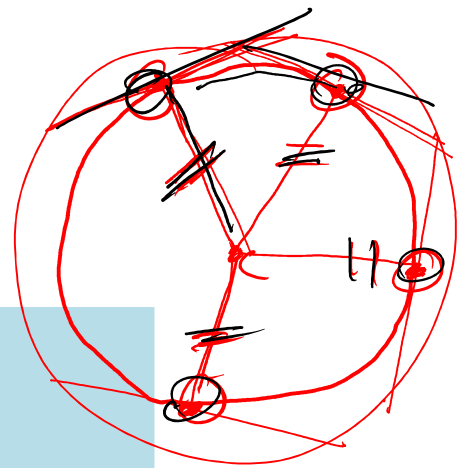
Poll Question 04

Which points are concyclic?

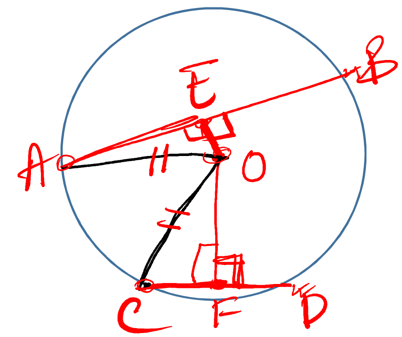
(a) Middle points of equal chords. equidistant

(b) Middle points of any chords.

(c) Middle point of dia and two equal chords



7. Show that, of the two chords of a circle the bigger chord is nearer to the center than the smaller.



$\triangle OAE$, $\triangle OCF \Rightarrow$ right angled triangle

$\triangle OAE \Rightarrow \boxed{OA^2} = OE^2 + AE^2$ —(1)

$\triangle OCF \Rightarrow \boxed{OC^2} = OF^2 + CF^2$ —(2)

$OA = OC =$ radius

$OA^2 = OC^2$

$\Rightarrow OE^2 + AE^2 = OF^2 + CF^2$

$\Rightarrow AE^2 - CF^2 = \boxed{OF^2 - OE^2}$

$(+ve) = (+ve) \Rightarrow OF^2 > OE^2$

$\Rightarrow \boxed{OF > OE}$

Proved

$AB > CD$

$\boxed{OF > OE}$

$AB > CD$ | $6 > 4$

$\frac{1}{2}AB > \frac{1}{2}CD$ | $3 > 2$

$AE > CF$ | $2 > 1$

$AE^2 > CF^2$ | $4 > 1$

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