

GOOD HOPE SCHOOL(F.4 – F.6)
Properties of Circle

No.	Diagram	Given Condition	Conclusion	Abbreviation
1		$OM \perp AB$	$AM = MB$	\perp from centre to chord bisects chord
2		$AM = MB$	$OM \perp AB$	line joining centre to mid-pt of chord \perp chord
3		$CM \perp AB$ and $AM = MB$	CM passes through O	\perp bisector of chord passes through centre
4		$AB = PQ$	$OM = ON$	equal chords, equidistant from centre
5		$OM = ON$	$AB = CD$	chords equidistant from centre are equal
6		The angle at the centre and the angle at the circumference <u>are subtended by the same arc (i.e. arc AB in this case)</u>	$\angle AOB = 2\angle ACB$	\angle at centre twice \angle at Θ^{ce}
7		AB is a diameter and C is a point on circle	$\angle ACB = 90^\circ$	\angle in semi-circle
8		$\angle ACB = 90^\circ$	AB is diameter	converse of \angle in semi-circle
9		AB is a chord	$\angle ACB = \angle ADB$	\angle s in the same segment

No.	Diagram	Given Condition	Conclusion	Abbreviation
10		ABCD is a cyclic quadrilateral	$\angle A + \angle C = 180^\circ$ $\angle B + \angle D = 180^\circ$	opp. \angle s, cyclic quad.
11		One side of a cyclic quadrilateral is produced to form an exterior angle	$\angle ADC = \angle EBC$	ext. \angle , cyclic quad.
12		$\angle ACB = \angle ADB$ and both C and D are on the same side of AB	A, B, C and D are concyclic	converse of \angle s in the same segment
13		$\angle A + \angle D = 180^\circ$ $\angle B + \angle C = 180^\circ$	A, B, C and D are concyclic	opp. \angle s supp.
14		ABE is a straight line $\angle ACD = \angle DBE$	A, B, C and D are concyclic	ext. \angle = int. opp. \angle
15(i)		$\angle AOB = \angle COD$	$AB = CD$	equal \angle s, equal chords
15(ii)		$AB = CD$	$\angle AOB = \angle COD$	equal chords, equal \angle s
16(i)		$\angle AOB = \angle COD$	$\widehat{AB} = \widehat{CD}$	equal \angle s, equal arcs

No.	Diagram	Given Condition	Conclusion	Abbreviation
16(ii)		$\widehat{AB} = \widehat{CD}$	$\angle AOB = \angle COD$	equal arcs, equal \angle s
17(i)		$\widehat{AB} = \widehat{CD}$	$AB = CD$	equal arcs, equal chords
17(ii)		$AB = CD$	$\widehat{AB} = \widehat{CD}$	equal chords, equal arcs
18		$\angle AOB : \angle COD = m : n$	$\widehat{AB} : \widehat{CD} = m : n$	arcs prop. to \angle s at centre
19		$\angle ADB : \angle BDC = m : n$	$\widehat{AB} : \widehat{BC} = m : n$	arcs prop. to \angle s at \odot^{ce}
21		AB is the tangent to the circle at the point T	$AB \perp OT$	tangent \perp radius
22		$ATB \perp OT$	ATB is the tangent to the circle at T .	converse of tangent \perp radius
23(i)		Two tangents drawn from an external point T meet the circle at points P and Q	$TP = TQ$	tangent prop.

No.	Diagram	Given Condition	Conclusion	Abbreviation
23(ii)		Two tangents drawn from an external point T meet the circle at points P and Q	$\angle TOP = \angle TOQ$	tangent prop.
23(iii)		Two tangents drawn from an external point T meet the circle at points P and Q	$\angle OTP = \angle OTQ$	tangent prop.
24		PQ is the tangent to the circle at point A	$\angle BCA = \angle BAP$	\angle in alt. segment
25		$\angle BCA = \angle BAP$	PQ is the tangent to the circles at A	converse of \angle in alt. segment
26	 Touching externally Touching internally	Two circles touch each other (either externally or internally)	$OA O'$ and $OO'A$ are straight lines	prop. of two touching circles