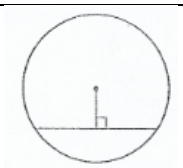
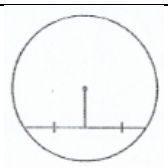
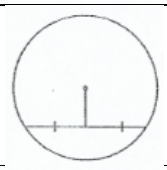
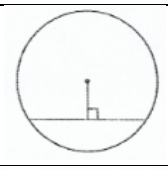
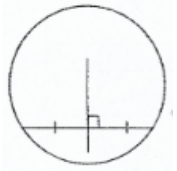
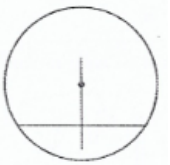
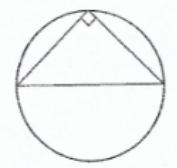
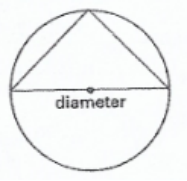
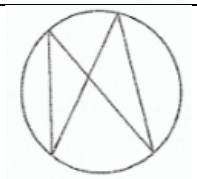
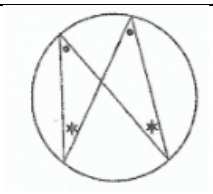
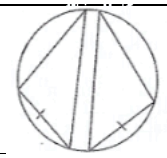
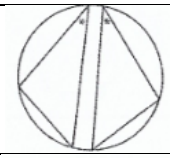
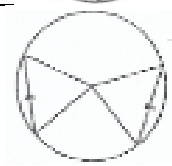
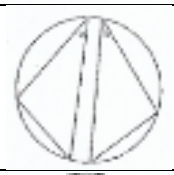
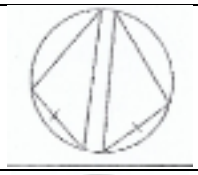
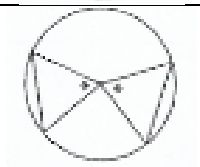
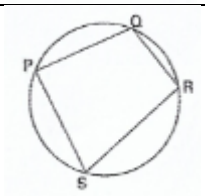
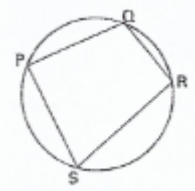
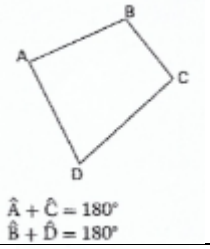
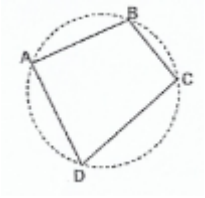
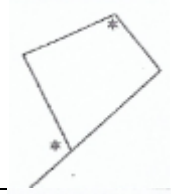
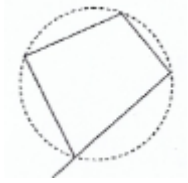
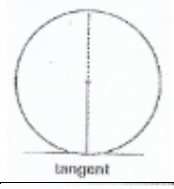
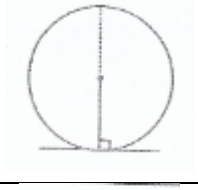
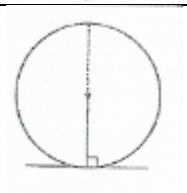
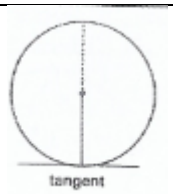
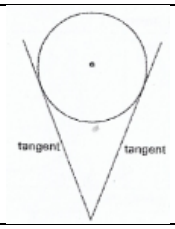
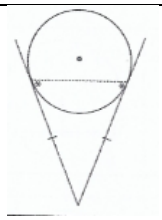
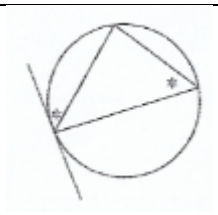
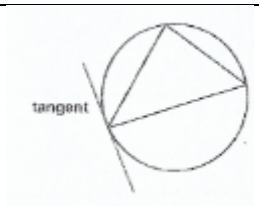
CIRCLE GEOMETRY THEOREMS

Key: a=theorem b=converse c, d, e= corollaries

Converse= used to prove something

	IF	THEN	THEOREM	STATEMENT	REASON
1a			If a line drawn from the centre of a circle is perpendicular to a chord, then it bisects the chord.	AM = MB	Line from centre ⊥ to chord
1b			If a line drawn from the centre of a circle bisects the chord, then it is perpendicular to the chord.	OM ⊥ AB	Line from centre to midpt of chord
1c Prove radius			If a line is a perpendicular bisector of a chord, then it passes through the centre of the circle.	O is centre of circle	Perp bisector of chord
2			The angle subtended by an arc at the centre of a circle is double the size of the angle subtended by the same arc at the circumference.	$O_1 = 2C$	L at centre = 2 x L at circum.
3a			If an angle is subtended by the diameter at the circumference of the circle, then its magnitude is 90.	C = 90°	L in semi-circle
3b prove diam			If the angle subtended by a chord at the circumference of the circle is 90, then the chord is a diameter.	AB is diameter of circle	Converse L in semi - circle OR chord subtends 90°
4a			If angles are subtended by the same chord on the same side of the circle, then they are equal.	A = B C = D	L's in same seg
4b Prove quad			If a line segment subtends equal angles at 2 points on the same side of the line segment, then the 4 points are concyclic.	ABCD is a cyclic quad	Converse L's in same seg OR line subtends equal L's on same side

4c			If chords are equal, then they subtend equal angles at the circumference of the circle.	A = B	Equal chords, Equal L's
4d			If chords are equal, then they subtend equal angles at the centre of the circle.	$O_1 = O_2$	Equal chords, Equal Ls
4e			If angles are equal at circumference, they are subtended by equal chords.	AB = DE	Equal L's equal chords
4f			If angles are equal at the centre, they are subtended by equal chords.	AB = DE	Equal L's equal chords
5a			If a quad is cyclic, then the opposite interior angles are supplementary.	P + R = 180° S + Q = 180°	Opp L's of cyclic quad
5b Prove quad			If the opposite interior angles of a quad are supplementary, then the quad is cyclic.	ABCD is a cyclic quad	Converse Opp L's of cyclic quad
6a			If the quad is cyclic, then the exterior angle is equal to the interior opposite.	DCE = A	Ext L cyclic quad
6b Prove quad			If the exterior angle of a quad is equal to the interior opposite, then the quad is cyclic.	ABCD is a cyclic quad	Converse ext L cyclic quad
7a			A tangent to a circle is perpendicular to the radius at the point of contact (axiom).	OB ⊥ AC	Tan ⊥ rad
7b Prove tan			If a line is drawn perpendicular to a radius at the point the radius meets the circle, then the line is a tangent.	ABC is a tangent	Converse tan ⊥ rad OR line ⊥ rad

8			If 2 tangents are drawn to a circle from the same point, then they are the same length.	AB = CB	Tan from same pt
9a			If a line is tangents to a circle, then the angle between the tangents and the chord drawn from the point of contact is equal to the angle in the alternate segment.	$B_1 = D$ $B_3 = E$	Tan chord theorem
9b Prove tan			If a line is drawn through the end point of a chord, making an angle with the chord equal to the angle in the alternate segment, then the line is a tangent to the circle.	ABC is tangent to circle	Converse Tan chord theorem