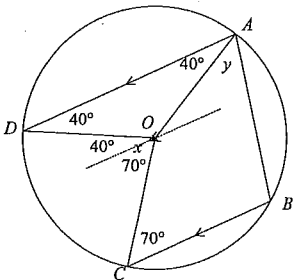
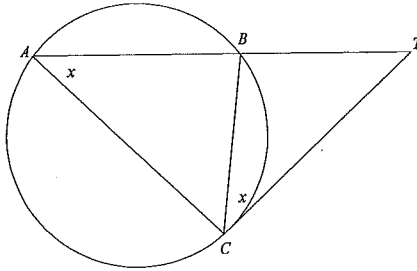


Circle geometry		Main Menu
	Solution	Criteria
14	$x = 2 \times \angle QPR = 2 \times 40^\circ = 80^\circ$ (angle at the centre is twice the angle at the circumference subtended by the same arc) $y = \angle QPR = 40^\circ$ (angles in the same segment standing on the same arc are equal).	1 Mark: D
15	 $x = 40^\circ + 70$ (alternate angles are equal, parallel lines) $= 110^\circ$ $\triangle ADO$ is isosceles ($AO = OD$ radii of the circle) $\angle ADO = \angle DAO = 40^\circ$ (base angles of an isosceles triangle) $\angle DOC = 2 \times \angle DAB$ (angle at the centre is twice the angle at the circumference subtended by the same arc) $110^\circ = 2 \times (y + 40^\circ)$ $2y = 30^\circ$ $y = 15^\circ$	1 Mark: C
16	$\angle RPS = \angle STR = 22^\circ$ (angles in the same segment standing on the same arc are equal). $\angle UTQ = 90^\circ$ (tangent is perpendicular to the radius through the point of contact) $\angle RTQ + \angle STU + \angle STR = 90^\circ$ $\angle RTQ + 25^\circ + 22^\circ = 90^\circ$ $\angle RTQ = 43^\circ$	1 Mark: C
17	$\angle PQS = \angle PRS$ (angles in the same segment standing on the same arc are equal).	1 Mark: D
18	$2x^\circ + 2y^\circ = 180$ (opposite angles in a cyclic quadrilateral are supplementary).	1 Mark: B

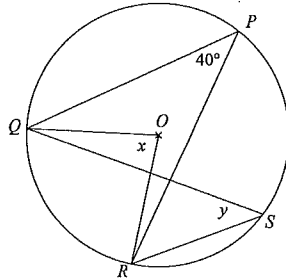
19	$\angle ACB = \angle EAB$ (angle between the tangent and the chord at the point of contact is equal to the opposite angle in the alternate segment)	1 Mark: A
20	 In $\triangle CBT$ and $\triangle ACT$ $\angle CTB = \angle CTA$ (same angle) $\angle TCB = \angle CAT$ (angle between the tangent and the chord equals the angle in the alternate segment) $\triangle CBT$ and $\triangle ACT$ are similar (equiangular) $\frac{CT}{AT} = \frac{BT}{CT}$ (corresponding sides in similar triangles) $CT^2 = AT \times BT$	1 Mark: D
21	$TA^2 = TB \times TC$ (Square of the length of the tangent from an external point is equal to the product of the intercepts of the secant passing through this point) $6^2 = (x + 9) \times x$ $36 = x^2 + 9x$ $x^2 + 9x - 36 = 0$ $(x + 12)(x - 3) = 0$ $\therefore x = -12$ or $x = 3$ Ignore $x = -12$ as x is a length. $\therefore x = 3$	1 Mark: C

Circle geometry

Solutions

Main Menu

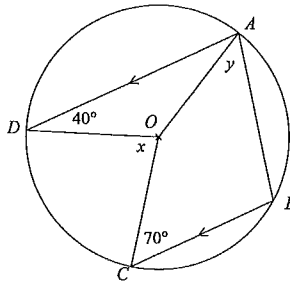
14 P, Q, R and S are points on a circle with centre O . $\angle QPR = 40^\circ$.



Why are the values of x and y ?

- (A) $x = 40^\circ$ and $y = 20^\circ$
- (B) $x = 40^\circ$ and $y = 40^\circ$
- (C) $x = 80^\circ$ and $y = 20^\circ$
- (D) $x = 80^\circ$ and $y = 40^\circ$

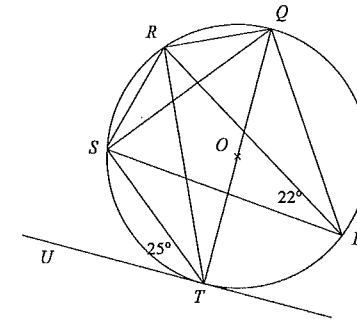
15 A, B, C and D are points on a circle with centre O . $\angle ADO = 40^\circ$ and $\angle BCO = 40^\circ$.



Why are the values of x and y ?

- (A) $x = 80^\circ$ and $y = 15^\circ$
- (B) $x = 80^\circ$ and $y = 30^\circ$
- (C) $x = 110^\circ$ and $y = 15^\circ$
- (D) $x = 110^\circ$ and $y = 30^\circ$

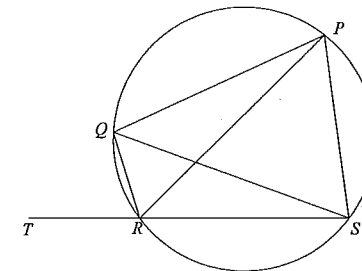
16 A circle with centre O has a tangent TU , diameter QT , $\angle STU = 25^\circ$ and $\angle RPS = 22^\circ$.



What is the size of $\angle RTQ$?

- (A) 22°
- (B) 25°
- (C) 43°
- (D) 47°

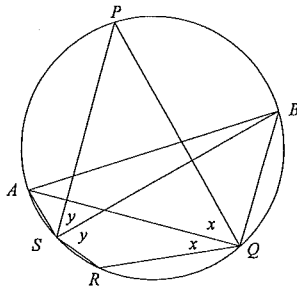
17 $PQRS$ is a cyclic quadrilateral. SR is produced to T and $\angle PRS = \angle QRT$.



Why is $\angle PQS = \angle PRS$?

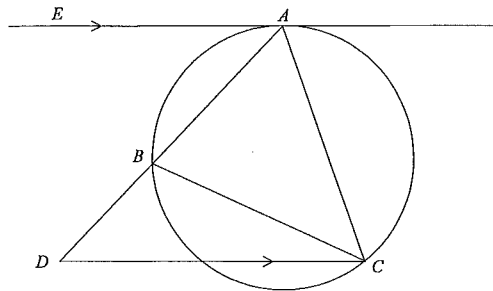
- (A) Angle at the circumference is equal to the angle in the alternate segment.
- (B) Angle between the tangent and a chord is equal to the angle in the alternate segment.
- (C) Angle between the two chords in the same segment are equal.
- (D) Angles in the same segment standing on the same arc are equal.

- 18 $PQRS$ is a cyclic quadrilateral. A and B are points on the circle such that $\angle PQA = \angle AQR = x^\circ$ and $\angle PSB = \angle BSR = y^\circ$.



Why is $2x^\circ + 2y^\circ = 180^\circ$?

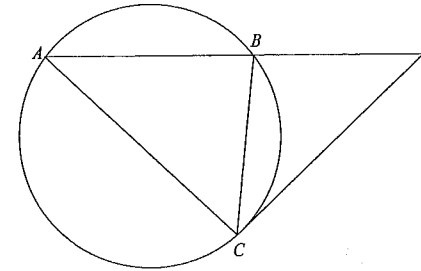
- (A) Angles in the same segment standing on the same arc are equal.
 - (B) Opposite angles in a cyclic quadrilateral are supplementary.
 - (C) Angle at the circumference is equal to the angle in the alternate segment
 - (D) Angles in the same segment standing on the same arc are supplementary.
- 19 A, B and C are points on a circle. The line AE is a tangent to the circle at A and AB is produced to D so that CD is parallel to AE .



Why is $\angle ACB = \angle EAB$?

- (A) Angle between the tangent and the chord at the point of contact is equal to the angle in the alternate segment
- (B) Angles in the same segment standing on the same arc are equal.
- (C) Angle between the tangent and the chord at the point of contact is equal to the angle in the circumference.
- (D) Angle at the circumference is equal to the angle in the alternate segment.

- 20 CT is a tangent to the circle ABC , and AB is a secant intersecting the circle in A and B . The line AB intersects CT at T .

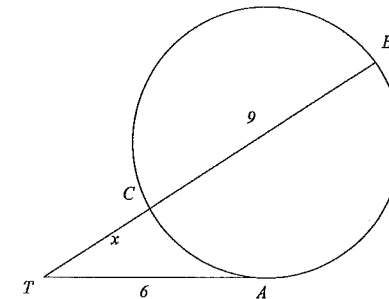


Not to scale

Which of the following statements is correct?

- (A) $CT^2 = AC \times BC$
- (B) $CT^2 = AB \times BC$
- (C) $CT^2 = AC \times BT$
- (D) $CT^2 = AT \times BT$

- 21 Line TA is a tangent to the circle at A and TB is a secant meeting the circle at B and C .



Given that $TA = 6$, $CB = 9$ and $TC = x$, what is the value of x ?

- (A) -12
- (B) 2
- (C) 3
- (D) 4