

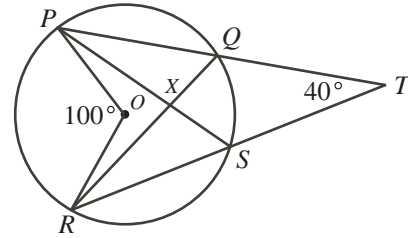


Intermediate Math Circles

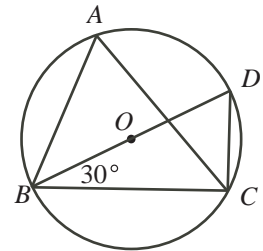
Wednesday October 31 2012

Problem Set 4

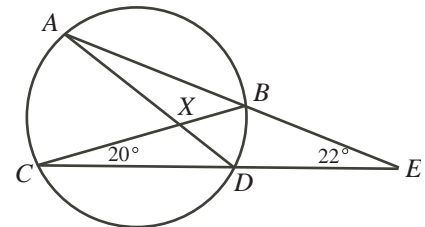
1. In the diagram, O is the centre of the circle. Determine the measure of $\angle QXS$.



2. Determine the measure of $\angle BAC$.



3. Determine the measure of $\angle ADC$ and of $\angle AXB$.

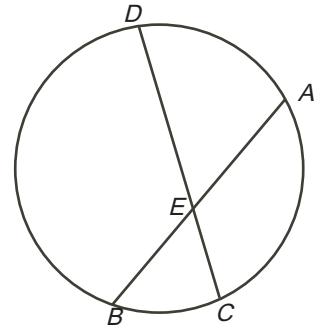




4. AB and CD are two intersecting chords in a circle.

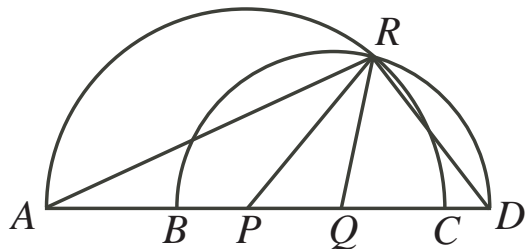
a) If $AE = 6$, $BE = 4$ and $CE = 8$, determine the length of DE .

b) If $AE = x$, $AB = 2x + 5$, $CE = x + 11$ and $CD = 2x + 7$, determine the value of x .



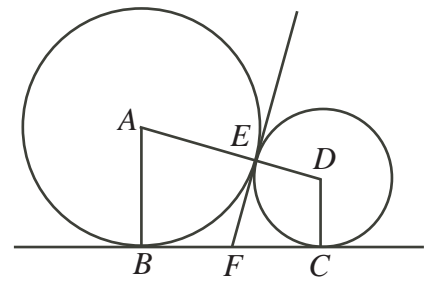
5. A *cyclic quadrilateral* is a quadrilateral that has all four of its vertices on the same circle. Prove that opposite angles are supplementary.

6. In the diagram, points B , P , Q , and C lie on line segment AD . The semi-circle with diameter AC has centre P and the semi-circle with diameter BD has centre Q . The two semi-circles intersect at R . If $\angle PRQ = 40^\circ$, determine the measure of $\angle ARD$.





7. In the diagram, a circle with centre A and radius 9 is tangent to a smaller circle with centre D and radius 4. Common tangents EF and BC are drawn to the circles making points of contact at E , B , and C . Determine the length of EF . (For this question you may have to use properties which make sense but are, as of yet, unproven.)



8. If O is the centre of the circle and $\angle BCD = 82^\circ$, what is the value of x in degrees?

