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, $O$ is the centre of the circle, $AN$ is tangent to the circle at $A$. $P$ lies on the circle, and $PN$ is perpendicular to $AN$. If $AN = 15$ and $PN = 9$, determine the radius of the circle.

8. 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.)

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