The following questions all relate to the diagram to the right. Where secants PS and PT intercept the circle at points Q and R

1) If $m\overset{\frown}{ST} = 160$ and $m\overset{\frown}{QR} = 90$, find $m\angle P$.

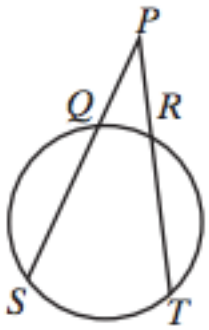
2) If $m\overset{\frown}{ST} = 100$ and $m\overset{\frown}{QR} = 40$, find $m\angle P$.

3) If $m\overset{\frown}{ST} = 170$ and $m\overset{\frown}{QR} = 110$, find $m\angle P$.

4) If $m\angle P = 40$ and $m\overset{\frown}{QR} = 86$, find $m\overset{\frown}{ST}$.

5) If $m\angle P = 60$ and $m\overset{\frown}{QR} = 50$, find $m\overset{\frown}{ST}$.

6) If $m\angle P = 25$ and $m\overset{\frown}{ST} = 110$, find $m\overset{\frown}{QR}$.



The following questions are for the diagram to their right. Where tangent PQ meets with secant PT at P

7) If $m\overset{\frown}{QT} = 170$ and $m\overset{\frown}{QR} = 70$, find $m\angle P$.

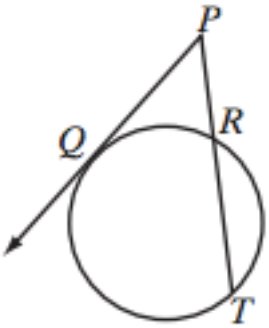
8) If $m\overset{\frown}{QT} = 120$ and $m\overset{\frown}{QR} = 30$, find $m\angle P$.

9) If $m\overset{\frown}{QR} = 70$ and $m\overset{\frown}{RT} = 120$, find $m\angle P$.

10) If $m\overset{\frown}{QR} = 50$ and $m\angle P = 40$, find $m\overset{\frown}{QT}$.

11) If $m\overset{\frown}{QR} = 60$ and $m\angle P = 35$, find $m\overset{\frown}{QT}$.

12) If $m\angle P = 30$ and $m\overset{\frown}{QR} = 120$, find $m\overset{\frown}{QT}$.

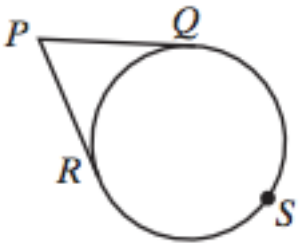


The following questions are for the diagram to their right. Where tangents PQ and PR meet at P

13) If $m\overset{\frown}{RQ} = 160$, find $m\angle P$.

14) If $m\overset{\frown}{RQ} = 80$, find $m\angle P$.

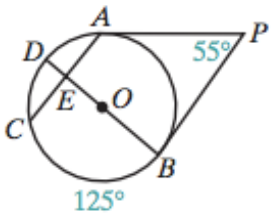
15) If $m\overset{\frown}{RSQ} = 260$, find $m\angle P$.



Extension

1)

In the diagram, $\overleftrightarrow{PA}$ and $\overleftrightarrow{PB}$ are tangent to circle O at A and B. Diameter $\overline{BD}$ and chord $\overline{AC}$ intersect at E, $m\overset{\frown}{CB} = 125$ and $m\angle P = 55$. Find:



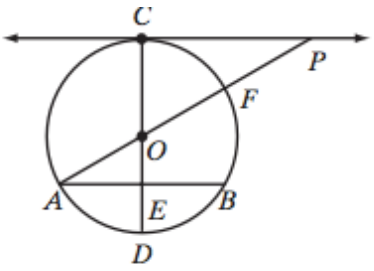
a. $m\overset{\frown}{AB}$ **b.** $m\overset{\frown}{AD}$ **c.** $m\overset{\frown}{CD}$

d. $m\angle DEC$ **e.** $m\angle PBD$ **f.** $m\angle PAC$

g. Show that $\overline{BD}$ is perpendicular to $\overline{AC}$ and bisects $\overline{AC}$.

2)

Tangent $\overleftrightarrow{PC}$ intersects circle O at C, chord $\overline{AB} \parallel \overleftrightarrow{CP}$, diameter $\overline{COD}$ intersects $\overline{AB}$ at E, and diameter $\overline{AOF}$ is extended to P.



a. Prove that $\triangle OPC \sim \triangle OAE$.

b. If $m\angle OAE = 30$, find $m\overset{\frown}{AD}$, $m\overset{\frown}{CF}$, $m\overset{\frown}{FB}$, $m\overset{\frown}{BD}$, $m\overset{\frown}{AC}$, and $m\angle P$.