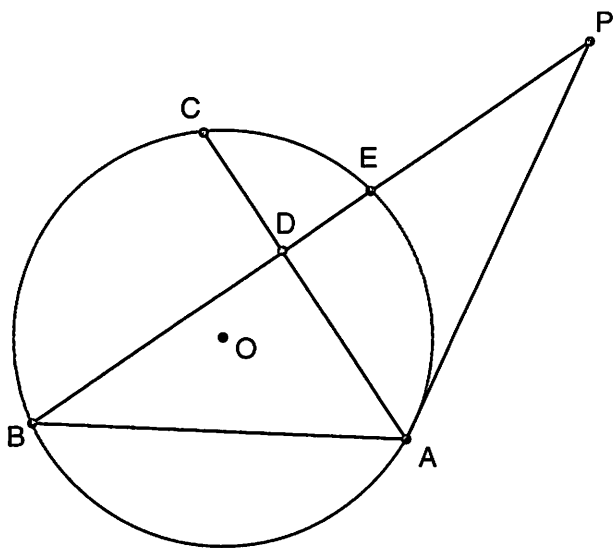




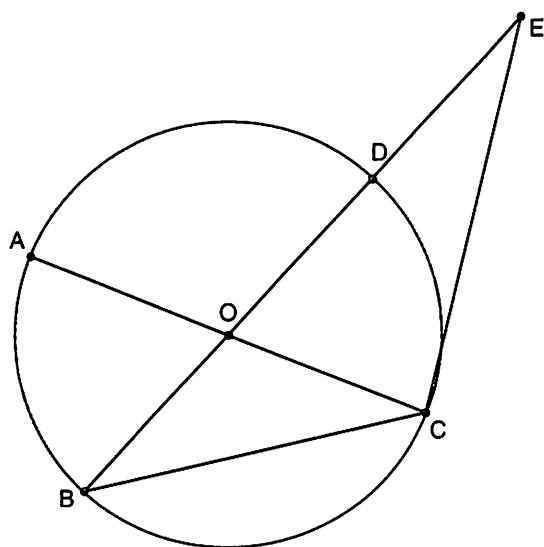
#1) In circle O, tangent $\overline{PA}$ and secant $\overline{PEDB}$ are drawn. Chords AC and BE intersect at D. If the $m\widehat{CE} = 30$, $m\widehat{AB} = 150$, and $m\angle CAB = 50$, find the following:

a) $m\widehat{BC}$

b) $m\angle EBA$

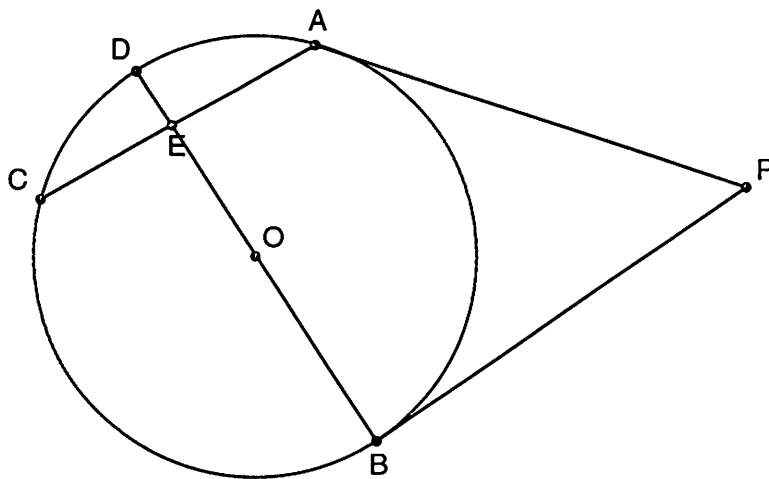
c) $m\angle P$

d) $m\angle PAC$



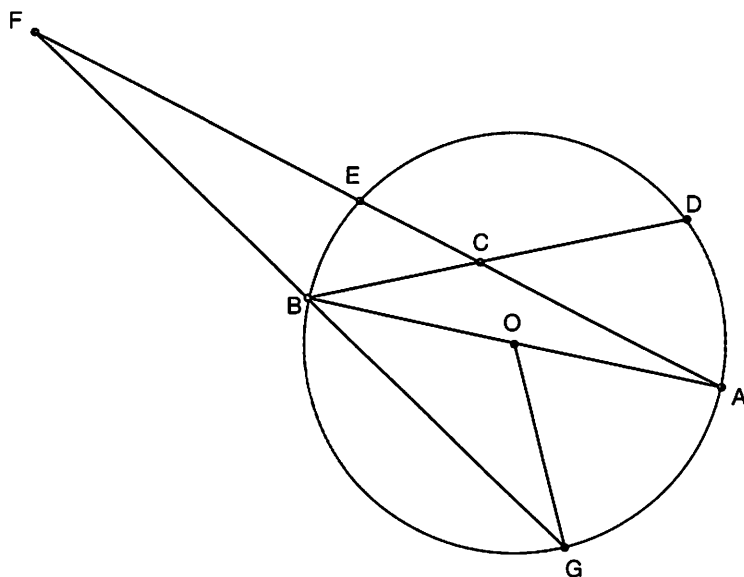
#2. $\overline{AC}$ is a diameter of circle O. Segment $\overline{BODE}$ is a secant, and $\overline{EC}$ is a tangent. Chord $\overline{BC}$ is drawn. If $m\widehat{AB} : m\widehat{BC} : m\widehat{CD} = 1 : 2 : 1$, and $m\widehat{DA} = 120$, find:

a) $m\widehat{BC}$	b) $m\angle BOC$
c) $m\angle BEC$	d) $m\angle ACE$
e) $m\angle DBC$	



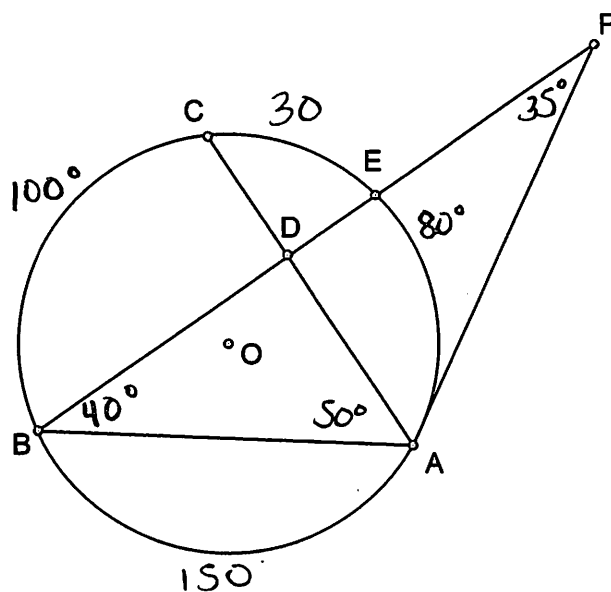
#3) $\overline{PA}$ and $\overline{PB}$ are tangent to circle O at A and B. Diameter $\overline{BD}$ and chord $\overline{AC}$ intersect at E, $m\widehat{CB} = 120$, and $m\angle P = 50$. Find:

a) $m\widehat{AB}$	b) $m\widehat{AD}$
c) $m\widehat{CD}$	d) $m\angle DEC$
e) $m\angle PAC$	



#4) $\overline{AB}$ is a diameter in circle O. $\overline{FECA}$ and $\overline{FBG}$ are secants. Chord $\overline{BD}$, radius $\overline{OG}$ are drawn. If the ratio of $\widehat{AD} : \widehat{DE} : \widehat{EB} = 3 : 4 : 2$, and $m\widehat{BG} = 100$, find:

a) $m\widehat{DE}$	b) $m\angle ECD$
c) $m\angle AFG$	d) $m\angle DBF$
e) $m\angle DBA$	f) $m\angle OGB$



#1) In circle O, tangent $\overline{PA}$ and secant $\overline{PEDB}$ are drawn. Chords AC and BE intersect at D. If the $m\widehat{CE} = 30$, $m\widehat{AB} = 150$, and $m\angle CAB = 50$, find the following:

a) $m\widehat{BC}$

$$\begin{aligned}
 &= 2(m\angle CAB) \\
 &= 2(50^\circ) \\
 &= 100^\circ
 \end{aligned}$$

b) $m\angle EBA$

$$\begin{aligned}
 m\widehat{EA} &= 80^\circ \\
 m\angle EBA &= \frac{1}{2}(80^\circ) \\
 &= 40^\circ
 \end{aligned}$$

c) $m\angle P$

$$\begin{aligned}
 &= \frac{1}{2}(m\widehat{BA} - m\widehat{EA}) \\
 &= \frac{1}{2}(150 - 80) \\
 &= 35^\circ
 \end{aligned}$$

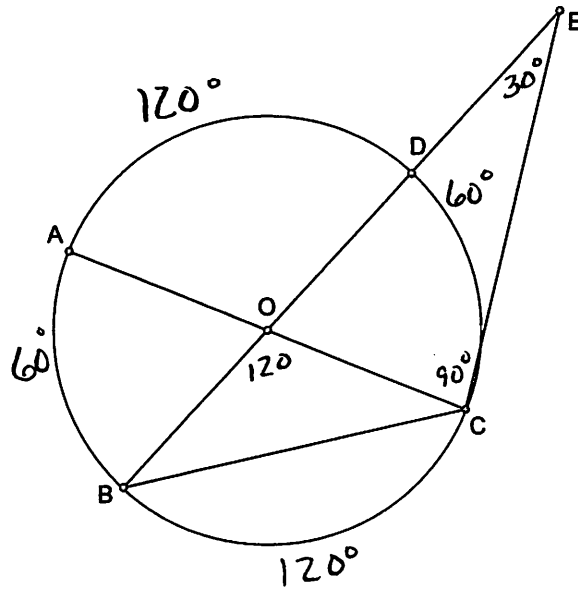
d) $m\angle PAC$

$$\begin{aligned}
 &= \frac{1}{2}(m\widehat{BCA}) \\
 &= \frac{1}{2}(110) \\
 &= 55^\circ
 \end{aligned}$$

$$1x + 2x + 1x = 240$$

$$4x = 240$$

$$x = 60$$



#2. $\overline{AC}$ is a diameter of circle O. Segment $\overline{BODE}$ is a secant, and $\overline{EC}$ is a tangent. Chord $\overline{BC}$ is drawn. If $m\widehat{AB} : m\widehat{BC} : m\widehat{CD} = 1 : 2 : 1$, and $m\widehat{DA} = 120$, find:

a) $m\widehat{BC}$

$$\begin{aligned} &= 2x \\ &= 2(60) \\ &= 120^\circ \end{aligned}$$

b) $m\angle BOC$

$$= 120^\circ$$

c) $m\angle BEC$

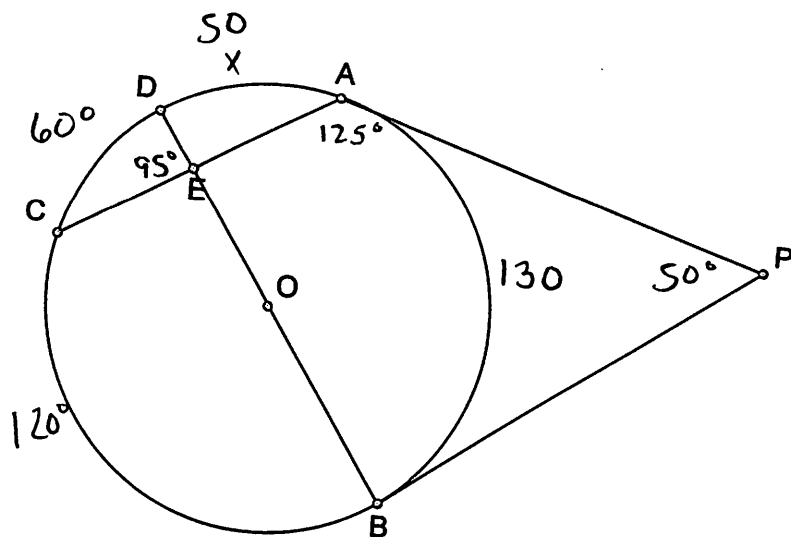
$$\begin{aligned} &= \frac{1}{2}(m\widehat{BC} - m\widehat{DC}) \\ &= \frac{1}{2}(120 - 60) \\ &= 30^\circ \end{aligned}$$

d) $m\angle ACE$

$$\begin{aligned} &= \frac{1}{2}(m\widehat{ADC}) \\ &= \frac{1}{2}(180) \\ &= 90^\circ \end{aligned}$$

e) $m\angle DBC$

$$\begin{aligned} &= \frac{1}{2}(m\widehat{DC}) \\ &= \frac{1}{2}(60^\circ) \\ &= 30^\circ \end{aligned}$$



#3) $\overline{PA}$ and $\overline{PB}$ are tangent to circle O at A and B. Diameter $\overline{BD}$ and chord $\overline{AC}$ intersect at E, $m\widehat{CB} = 120$, and $m\angle P = 50$. Find:

a) $m\widehat{AB}$

$$= 180 - m\widehat{AD}$$

$$= 180 - 50$$

$$= 130^\circ$$

b) $m\widehat{AD}$

$$\angle P = \frac{1}{2} (m\widehat{ACB} - m\widehat{AB})$$

$$50 = \frac{1}{2} (180 + x - (180 - x))$$

$$50 = \frac{1}{2} (2x)$$

$$50 = x \quad m\widehat{AD} = 50^\circ$$

c) $m\widehat{CD}$

$$= 60^\circ$$

d) $m\angle DEC$

$$= \frac{1}{2} (m\widehat{DC} + m\widehat{AB})$$

$$= \frac{1}{2} (60 + 130)$$

$$= 95^\circ$$

e) $m\angle PAC$

$$= \frac{1}{2} (m\widehat{CBA})$$

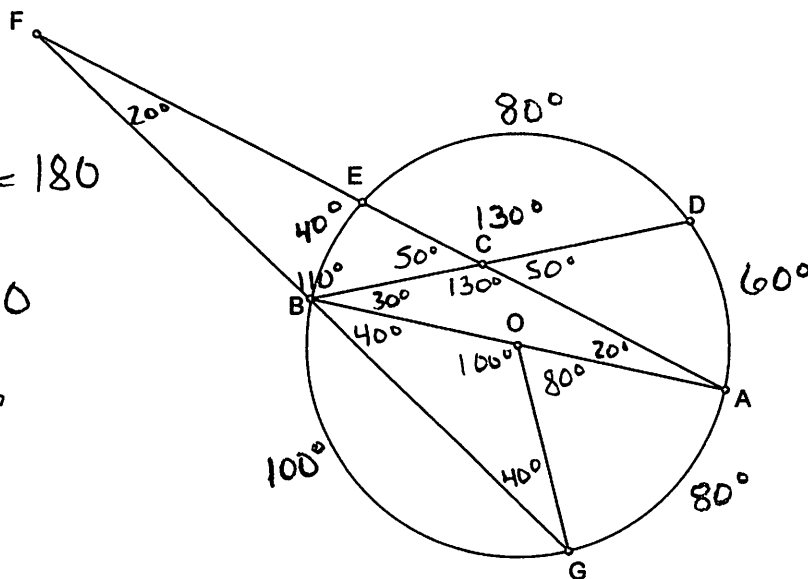
$$= \frac{1}{2} (250)$$

$$= 125^\circ$$

$$3x + 4x + 12x = 180$$

$$9x = 180$$

$$x = 20^\circ$$



#4) $\overline{AB}$ is a diameter in circle O. $\overline{FECA}$ and $\overline{FBG}$ are secants. Chord $\overline{BD}$, radius $\overline{OG}$ are drawn. If the ratio of $\widehat{AD} : \widehat{DE} : \widehat{EB} = 3 : 4 : 2$, and $m\widehat{BG} = 100$, find:

a) $m\widehat{DE}$

$$= 4x$$

$$= 4(20^\circ)$$

$$= 80^\circ$$

b) $m\angle ECD$

$$= \frac{1}{2} (m\widehat{ED} + m\widehat{BGA})$$

$$= \frac{1}{2} (80 + 180)$$

$$= 130^\circ$$

c) $m\angle AFG$

$$= \frac{1}{2} (m\widehat{AG} - m\widehat{EB})$$

$$= \frac{1}{2} (80 - 40)$$

$$= 20^\circ$$

d) $m\angle DBF$

$$= 180^\circ - 50^\circ - 20^\circ$$

$$= 110^\circ$$

e) $m\angle DBA$

$$= \frac{1}{2} (m\widehat{DA})$$

$$= \frac{1}{2} (60^\circ)$$

$$= 30^\circ$$

f) $m\angle OGB$

$$= 180^\circ - 100^\circ - 40^\circ$$

$$= 40^\circ$$