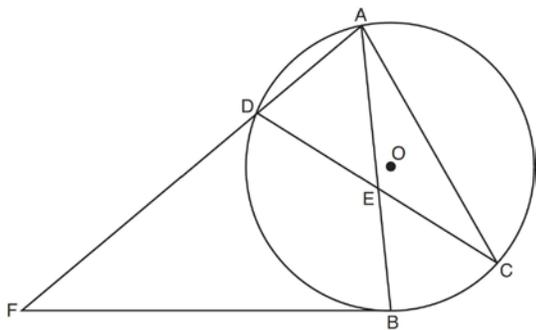


G.C.A.2: Chords, Secants and Tangents 18

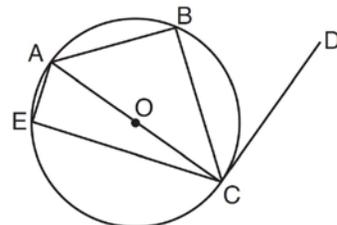
- 1 What is the greatest possible number of points of intersection of a triangle and a circle?
 1) 6
 2) 2
 3) 3
 4) 4

- 2 Chords \overline{AB} and \overline{CD} intersect at E in circle O , as shown in the diagram below. Secant \overline{FDA} and tangent \overline{FB} are drawn to circle O from external point F and chord \overline{AC} is drawn. The $m\widehat{DA} = 56$, $m\widehat{DB} = 112$, and the ratio of $m\widehat{AC} : m\widehat{CB} = 3 : 1$.



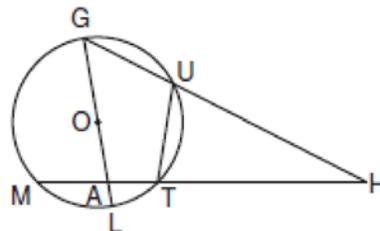
Determine $m\angle CEB$. Determine $m\angle F$. Determine $m\angle DAC$.

- 3 In circle O shown below, diameter \overline{AC} is perpendicular to \overline{CD} at point C , and chords \overline{AB} , \overline{BC} , \overline{AE} , and \overline{CE} are drawn.

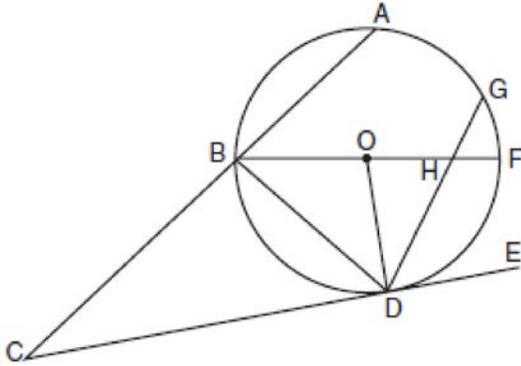


Which statement is *not* always true?

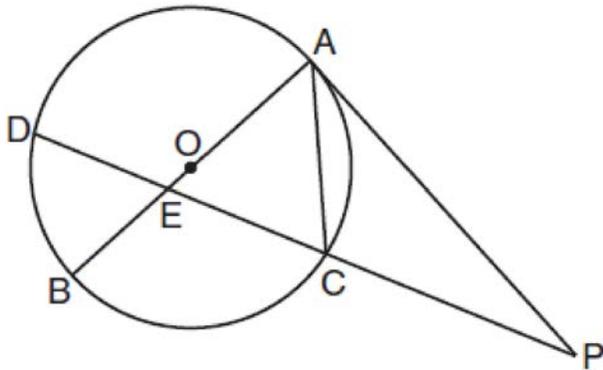
- 1) $\angle ACB \cong \angle BCD$
 2) $\angle ABC \cong \angle ACD$
 3) $\angle BAC \cong \angle DCB$
 4) $\angle CBA \cong \angle AEC$
- 4 Given circle O with diameter \overline{GOAL} ; secants \overline{HUG} and \overline{HTAM} intersect at point H ; $m\widehat{GM} : m\widehat{ML} : m\widehat{LT} = 7 : 3 : 2$; and chord $\overline{GU} \cong$ chord \overline{UT} . Find the ratio of $m\angle UGL$ to $m\angle H$.



- 5 In the accompanying diagram, circle O has radius \overline{OD} , diameter \overline{BOHF} , secant \overline{CBA} , and chords \overline{DHG} and \overline{BD} ; \overline{CE} is tangent to circle O at D ; $m\widehat{DF} = 80$; and $m\widehat{BA} : m\widehat{AG} : m\widehat{GF} = 3 : 2 : 1$. Find $m\widehat{GF}$, $m\angle BHD$, $m\angle BDG$, $m\angle GDE$, $m\angle C$, and $m\angle BOD$.



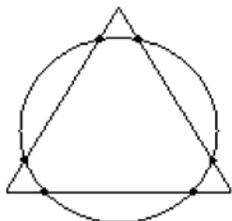
- 6 In the accompanying diagram, \overline{PA} is tangent to circle O at A , chord \overline{AC} and secant \overline{PCED} are drawn, and chords \overline{AOB} and \overline{CD} intersect at E . If $m\widehat{AD} = 130$ and $m\angle BAC = 50$, find $m\angle P$, $m\angle BEC$, and $m\angle PCA$.



G.C.A.2: Chords, Secants and Tangents 18

Answer Section

1 ANS: 1



REF: 010208a

2 ANS:

$$52, 40, 80. \quad 360 - (56 + 112) = 192. \quad \frac{192 - 112}{2} = 40. \quad \frac{112 + 48}{2} = 80$$

$$\frac{1}{4} \times 192 = 48$$

$$\frac{56 + 48}{2} = 52$$

REF: 081238ge

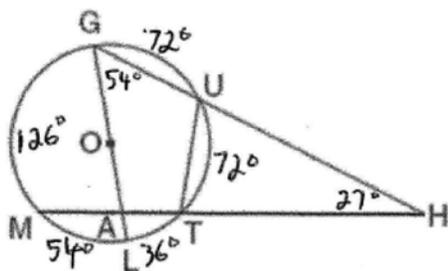
3 ANS: 1

REF: 061520geo

4 ANS:

2:1. \widehat{GM} and \widehat{ML} form a semi-circle and measure 126° ($\frac{7}{10} \times 180$) and 54° ($\frac{3}{10} \times 180$), respectively.

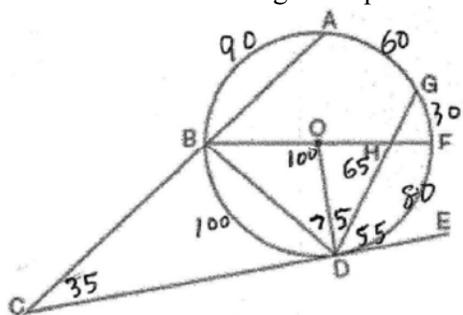
\widehat{LT} measures 36° . \widehat{GM} and \widehat{ML} form a semi-circle and measure 126° . \widehat{GUT} measures 144° ($180 - 36$). Equal chords intercept equal arcs. Because chord $\overline{GU} \cong$ chord \overline{UT} , \widehat{GU} and \widehat{UT} each measures 72° ($\frac{144}{2}$). $m\widehat{UTL} = 108$ ($72 + 36$). The measure of an inscribed angle is half that of its intercepted arc. So $m\angle UGL = 54$. The angle formed by a tangent and a secant is equal to half the difference between the intercepted arcs. $\frac{126 - 72}{2} = 27$. The ratio of $m\angle UGL$ to $m\angle H$ is 54:27, or 2:1.



REF: 080333b

5 ANS:

30, 65, 75, 55, 35, 100. \widehat{BA} , \widehat{AG} and \widehat{GF} form a semi-circle and measure 90° ($\frac{3}{6} \times 180$), 60° ($\frac{2}{6} \times 180$) and 30° ($\frac{1}{6} \times 180$), respectively. The measure of an inscribed angle is half that of its intercepted arc. So $m\angle BDG = 75$ ($\frac{90+60}{2}$) and $m\angle HBD = 40$ ($\frac{80}{2}$). Therefore $m\angle BHD = 65$ ($180 - (75 + 40)$). The angle formed by a tangent and a chord is half the intercepted arc. Since the intercepted arc is 110° ($80 + 30$), $m\angle GDE = 55$. Given diameter \overline{BOHF} and $m\widehat{DF} = 80$, $m\widehat{BD} = 100$. The angle formed by a tangent and a secant is equal to half the difference between the intercepted arcs, so $m\angle C = \frac{(60 + 30 + 80) - 100}{2} = 35$. The measure of a central angle is equal to the measure of the arc it intercepts, so $m\angle BOD = 100$.



REF: 080633b

6 ANS:

25, 115, 115

REF: 011033b