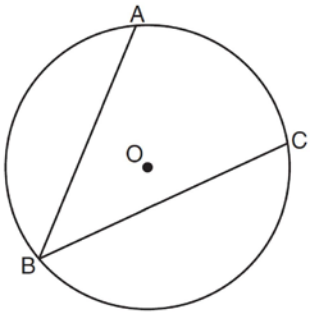
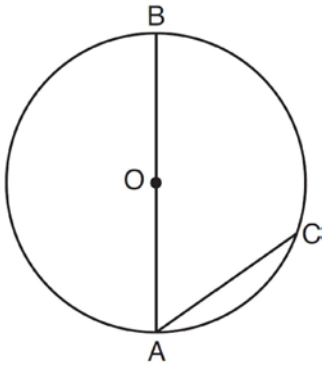
G.C.A.2: Chords, Secants and Tangents

1 In the diagram below, $\angle ABC$ is inscribed in circle O.



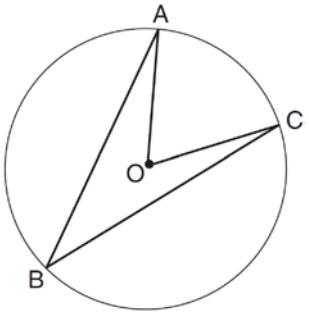
The ratio of the measure of $\angle ABC$ to the measure of $\overset{\frown}{AC}$ is
1) 1 : 1
2) 1 : 2
3) 1 : 3
4) 1 : 4

2 As shown in the diagram below, $\overline{AB}$ is a diameter of circle O, and chord $\overline{AC}$ is drawn.



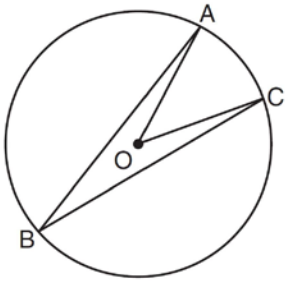
If $m\angle BAC = 70$, then $m\overset{\frown}{AC}$ is
1) 40
2) 70
3) 110
4) 140

3 Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below.



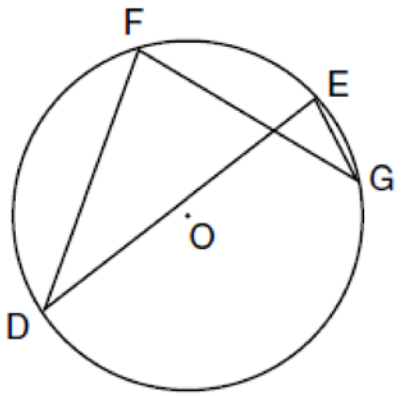
What is the ratio of $m\angle AOC$ to $m\angle ABC$?
1) 1 : 1
2) 2 : 1
3) 3 : 1
4) 1 : 2

4 In the diagram below of circle O, $m\angle ABC = 24$.

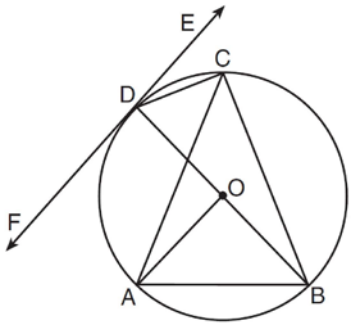


What is the $m\angle AOC$?
1) 12
2) 24
3) 48
4) 60

5 In the diagram below of circle O, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5:2:1:7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.



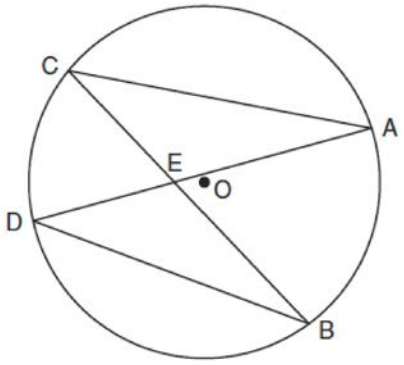
6 In the diagram below, $\overline{DC}$, $\overline{AC}$, $\overline{DOB}$, $\overline{CB}$, and $\overline{AB}$ are chords of circle O, $\overleftrightarrow{FDE}$ is tangent at point D, and radius $\overline{AO}$ is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a semi-circle is a right angle."



Which angle is Sam referring to?

1) $\angle AOB$
2) $\angle BAC$
3) $\angle DCB$
4) $\angle FDB$

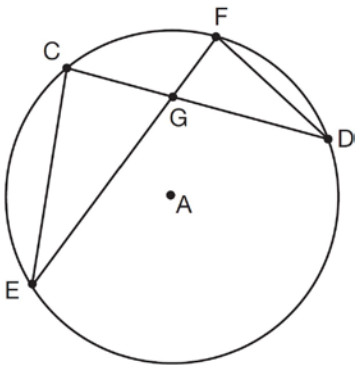
7 In the diagram below of circle O, chords $\overline{AD}$ and $\overline{BC}$ intersect at E.



Which relationship must be true?

1) $\triangle CAE \cong \triangle DBE$
2) $\triangle AEC \sim \triangle BED$
3) $\angle ACB \cong \angle CBD$
4) $\overset{\frown}{CA} \cong \overset{\frown}{DB}$

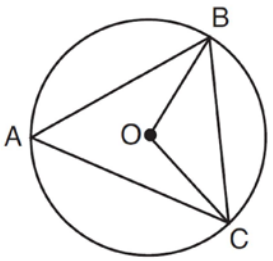
8 In the diagram of circle A shown below, chords $\overline{CD}$ and $\overline{EF}$ intersect at G, and chords $\overline{CE}$ and $\overline{FD}$ are drawn.



Which statement is *not* always true?

1) $\overline{CG} \cong \overline{FG}$
2) $\angle CEG \cong \angle FDG$
3) $\frac{CE}{EG} = \frac{FD}{DG}$
4) $\triangle CEG \sim \triangle FDG$

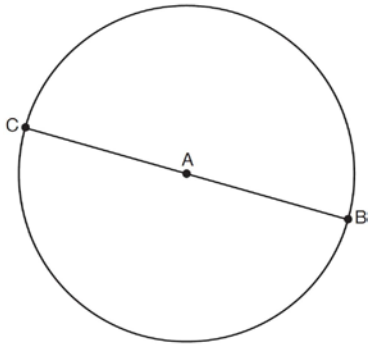
9 In the diagram below of circle O, $\overline{OB}$ and $\overline{OC}$ are radii, and chords $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are drawn.



Which statement must always be true?

1) $\angle BAC \cong \angle BOC$
2) $\text{m}\angle BAC = \frac{1}{2}\,\text{m}\angle BOC$
3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.

10 In the diagram below, $\overline{BC}$ is the diameter of circle A.



Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?

1) $\triangle BCD$ is a right triangle.
2) $\triangle BCD$ is an isosceles triangle.
3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.
4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

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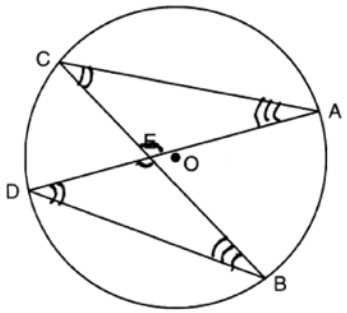
Answer Section

1 ANS: 2 REF: 011602ge
2 ANS: 1 REF: 081518ge
3 ANS: 2 REF: 061322ge
4 ANS: 3 REF: 011523ge
5 ANS:

$\angle D$, $\angle G$ and 24° or $\angle E$, $\angle F$ and 84°. $m\overset{\frown}{FE} = \frac{2}{15} \times 360 = 48$. Since the chords forming $\angle D$ and $\angle G$ are intercepted by $\overset{\frown}{FE}$, their measure is 24°. $m\overset{\frown}{GD} = \frac{7}{15} \times 360 = 168$. Since the chords forming $\angle E$ and $\angle F$ are intercepted by $\overset{\frown}{GD}$, their measure is 84°.

REF: fall0836ge
6 ANS: 3 REF: 011621geo
7 ANS: 2



REF: 061026ge
8 ANS: 1 REF: 061508geo
9 ANS: 2 REF: 061610geo
10 ANS: 1

The other statements are true only if $\overline{AD} \perp \overline{BC}$.

REF: 081623geo