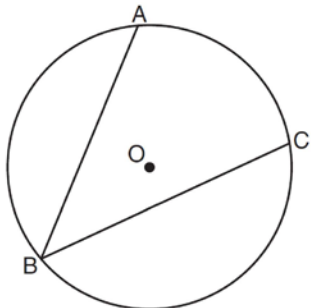


### G.C.A.2: Chords, Secants and Tangents 11

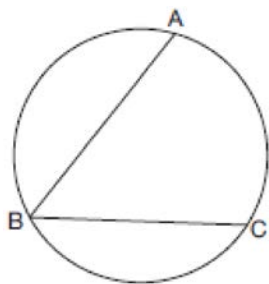
- 1 In the diagram below,  $\angle ABC$  is inscribed in circle  $O$ .



The ratio of the measure of  $\angle ABC$  to the measure of  $\widehat{AC}$  is

- 1) 1 : 1
- 2) 1 : 2
- 3) 1 : 3
- 4) 1 : 4

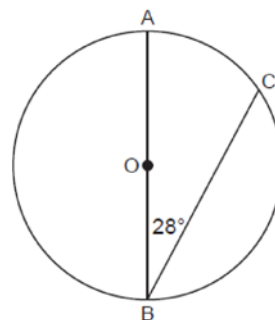
- 2 In the diagram below,  $m\widehat{ABC} = 268^\circ$ .



What is the number of degrees in the measure of  $\angle ABC$ ?

- 1)  $134^\circ$
- 2)  $92^\circ$
- 3)  $68^\circ$
- 4)  $46^\circ$

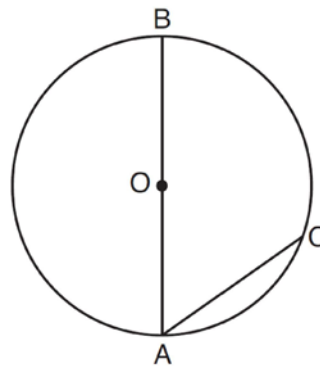
- 3 In the diagram below of Circle  $O$ , diameter  $\overline{AOB}$  and chord  $\overline{CB}$  are drawn, and  $m\angle B = 28^\circ$ .



What is  $m\widehat{BC}$ ?

- 1)  $56^\circ$
- 2)  $124^\circ$
- 3)  $152^\circ$
- 4)  $166^\circ$

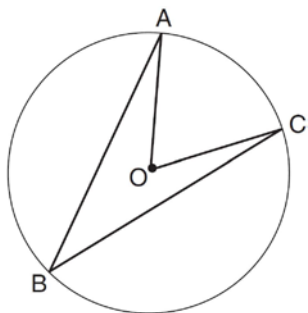
- 4 As shown in the diagram below,  $\overline{AB}$  is a diameter of circle  $O$ , and chord  $\overline{AC}$  is drawn.



If  $m\angle BAC = 70$ , then  $m\widehat{AC}$  is

- 1) 40
- 2) 70
- 3) 110
- 4) 140

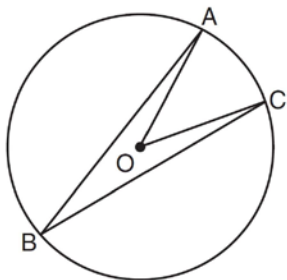
- 5 Circle  $O$  with  $\angle AOC$  and  $\angle ABC$  is shown in the diagram below.



What is the ratio of  $m\angle AOC$  to  $m\angle ABC$ ?

- 1) 1 : 1
- 2) 2 : 1
- 3) 3 : 1
- 4) 1 : 2

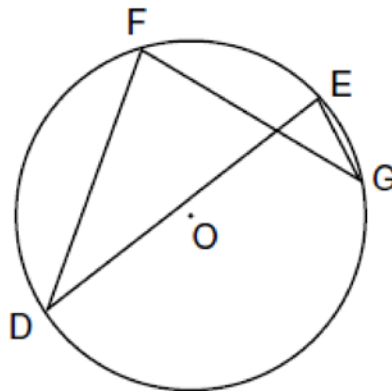
- 6 In the diagram below of circle  $O$ ,  $m\angle ABC = 24$ .



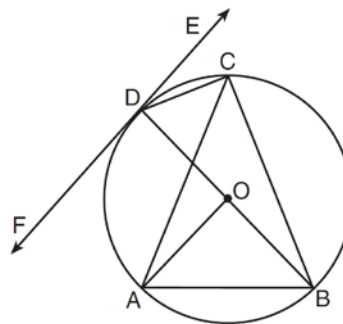
What is the  $m\angle AOC$ ?

- 1) 12
- 2) 24
- 3) 48
- 4) 60

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



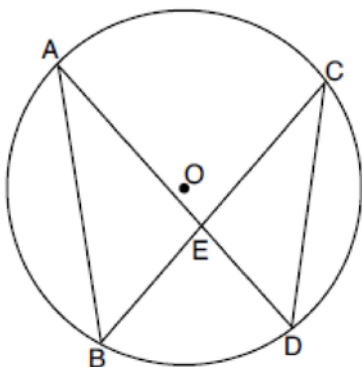
- 8 In the diagram below,  $\overline{DC}$ ,  $\overline{AC}$ ,  $\overline{DOB}$ ,  $\overline{CB}$ , and  $\overline{AB}$  are chords of circle  $O$ ,  $\overleftrightarrow{FDE}$  is tangent at point  $D$ , and radius  $\overline{AO}$  is drawn. Sam decides to apply this theorem to the diagram: "An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

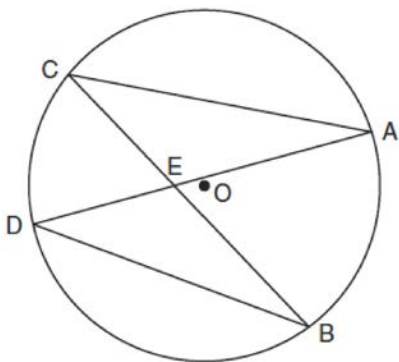
- 9 In the diagram below of circle  $O$ , chords  $\overline{AD}$  and  $\overline{BC}$  intersect at  $E$ , and chords  $\overline{AB}$  and  $\overline{CD}$  are drawn.



Which statement must always be true?

- 1)  $\overline{AB} \cong \overline{CD}$
- 2)  $\overline{AD} \cong \overline{BC}$
- 3)  $\angle B \cong \angle C$
- 4)  $\angle A \cong \angle C$

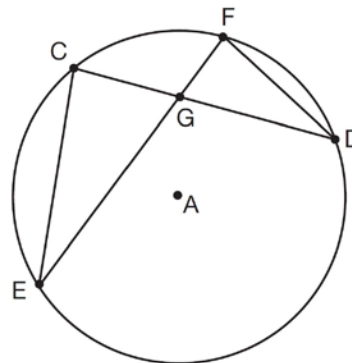
- 10 In the diagram below of circle  $O$ , chords  $\overline{AD}$  and  $\overline{BC}$  intersect at  $E$ .



Which relationship must be true?

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

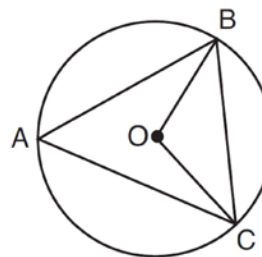
- 11 In the diagram of circle  $A$  shown below, chords  $\overline{CD}$  and  $\overline{EF}$  intersect at  $G$ , and chords  $\overline{CE}$  and  $\overline{FD}$  are drawn.



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)  $\triangle CEG \sim \triangle FDG$

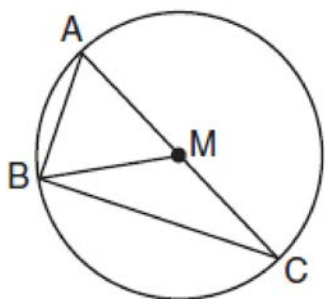
- 12 In the diagram below of circle  $O$ ,  $\overline{OB}$  and  $\overline{OC}$  are radii, and chords  $\overline{AB}$ ,  $\overline{BC}$ , and  $\overline{AC}$  are drawn.



Which statement must always be true?

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

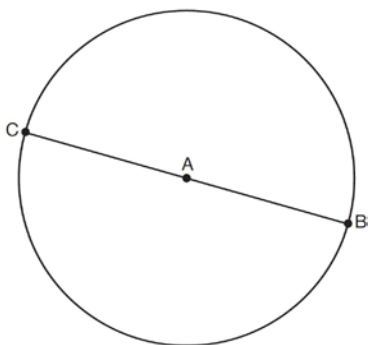
- 13 In circle  $M$  below, diameter  $\overline{AC}$ , chords  $\overline{AB}$  and  $\overline{BC}$ , and radius  $\overline{MB}$  are drawn.



Which statement is *not* true?

- 1)  $\triangle ABC$  is a right triangle.
- 2)  $\triangle ABM$  is isosceles.
- 3)  $m\widehat{BC} = m\angle BMC$
- 4)  $m\widehat{AB} = \frac{1}{2} m\angle ACB$

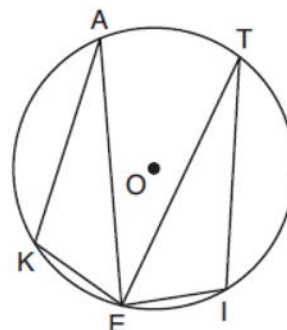
- 14 In the diagram below,  $\overline{BC}$  is the diameter of circle  $A$ .



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.

- 15 In the diagram below of circle  $O$ , points  $K, A, T, I$ , and  $E$  are on the circle,  $\triangle KAE$  and  $\triangle ITE$  are drawn,  $\widehat{KE} \cong \widehat{EI}$ , and  $\angle EKA \cong \angle EIT$ .



Which statement about  $\triangle KAE$  and  $\triangle ITE$  is always true?

- 1) They are neither congruent nor similar.
- 2) They are similar but not congruent.
- 3) They are right triangles.
- 4) They are congruent.

## G.C.A.2: Chords, Secants and Tangents 11

### Answer Section

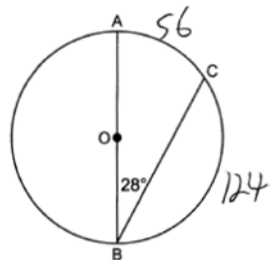
1 ANS: 2 REF: 011602ge

2 ANS: 4

$$\frac{1}{2}(360 - 268) = 46$$

REF: 061704geo

3 ANS: 2



REF: 062305geo

4 ANS: 1 REF: 081518ge

5 ANS: 2 REF: 061322ge

6 ANS: 3 REF: 011523ge

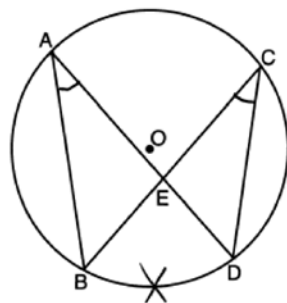
7 ANS:

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

REF: fall0836ge

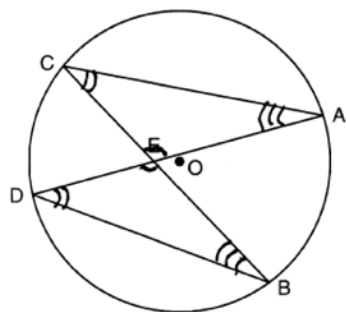
8 ANS: 3 REF: 011621geo

9 ANS: 4



REF: 082218geo

10 ANS: 2



REF: 061026ge

11 ANS: 1 REF: 061508geo

12 ANS: 2 REF: 061610geo

13 ANS: 4 REF: 011816geo

14 ANS: 1

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

REF: 081623geo

15 ANS: 4 REF: 011905geo