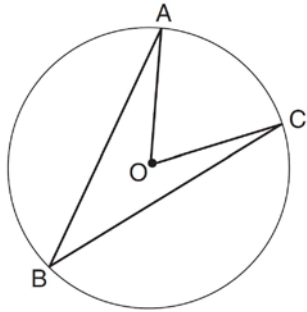


G.G.51: Arcs Determined by Angles 2: Investigate theorems about the arcs determined by angles intersecting a circle when the vertex is on the circle

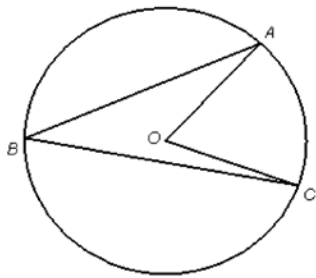
- 1 Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below.



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

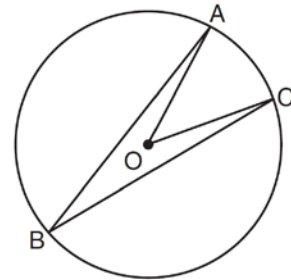
- 1) 1 : 1
- 2) 2 : 1
- 3) 3 : 1
- 4) 1 : 2

- 2 In the diagram below, circle O has $m\angle ABC = z$. What is $m\angle AOC$?



- 1) z
- 2) $2z$
- 3) $\frac{1}{2}z$
- 4) z^2

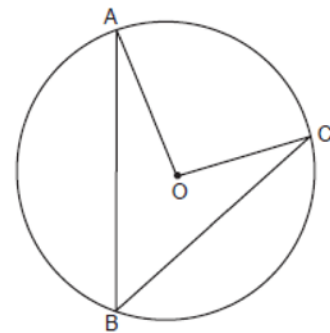
- 3 In the diagram below of circle O , $m\angle ABC = 24$.



What is the $m\angle AOC$?

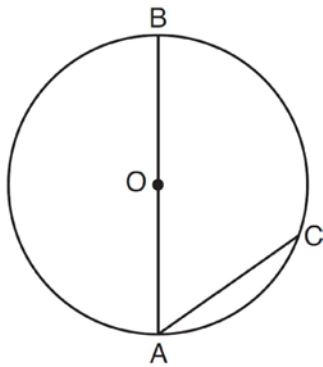
- 1) 12
- 2) 24
- 3) 48
- 4) 60

- 4 In the accompanying diagram of circle O , \overline{AB} and \overline{BC} are chords and $m\angle AOC = 96$. What is $m\angle ABC$?



- 1) 32
- 2) 48
- 3) 96
- 4) 192

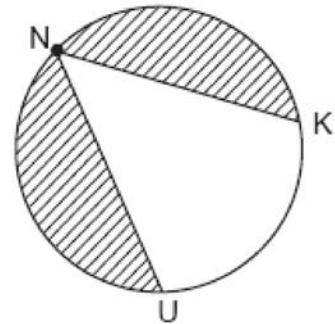
- 5 As shown in the diagram below, \overline{AB} is a diameter of circle O , and chord \overline{AC} is drawn.



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

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

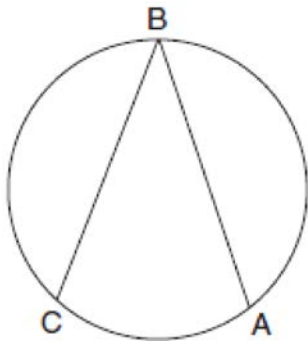
- 7 The NUK Energy Company is designing a new logo, as shown in the accompanying diagram, with $m\widehat{NK} = 130$ and $m\widehat{NK} = m\widehat{NU}$.



What is the measure of $\angle KNU$?

- 1) 50°
- 2) 65°
- 3) 80°
- 4) 100°

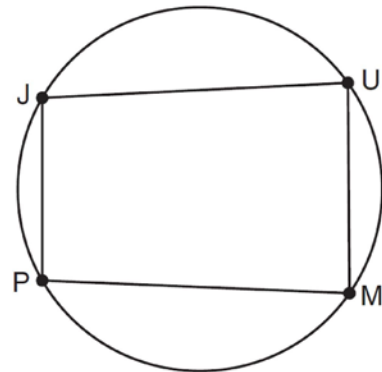
- 6 The new corporate logo created by the design engineers at Magic Motors is shown in the accompanying diagram.



If chords \overline{BA} and \overline{BC} are congruent and $m\widehat{BC} = 140$, what is $m\angle B$?

- 1) 40
- 2) 80
- 3) 140
- 4) 280

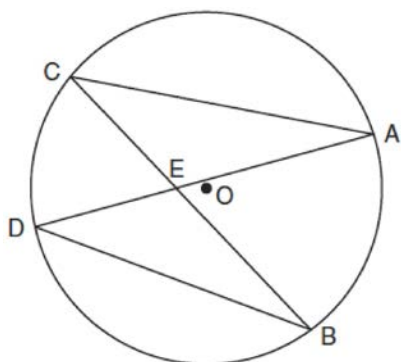
- 8 In the diagram below, quadrilateral $JUMP$ is inscribed in a circle..



Opposite angles J and M must be

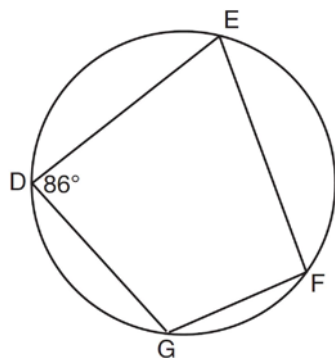
- 1) right
- 2) complementary
- 3) congruent
- 4) supplementary

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



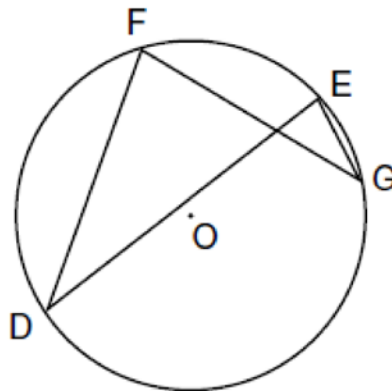
Which relationship must be true?

- 1) $\triangle CAE \cong \triangle DBE$
 - 2) $\triangle AEC \sim \triangle BED$
 - 3) $\angle ACB \cong \angle CBD$
 - 4) $\widehat{CA} \cong \widehat{DB}$
- 10 As shown in the diagram below, quadrilateral $DEFG$ is inscribed in a circle and $m\angle D = 86$.

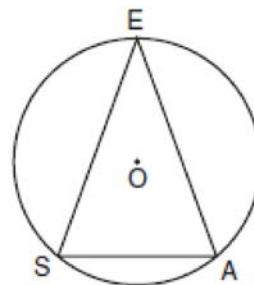


Determine and state $m\widehat{GFE}$. Determine and state $m\angle F$.

- 11 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.



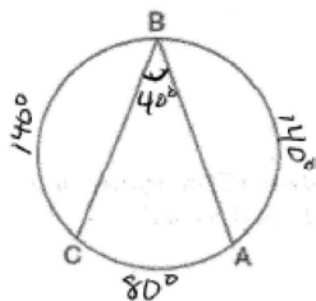
- 12 A machine part consists of a circular wheel with an inscribed triangular plate, as shown in the accompanying diagram. If $\overline{SE} \cong \overline{EA}$, $SE = 10$, and $m\widehat{SE} = 140$, find the length of \overline{SA} to the nearest tenth.



G.G.51: Arcs Determined by Angles 2: Investigate theorems about the arcs determined by angles intersecting a circle when the vertex is on the circle

Answer Section

- 1 ANS: 2 REF: 061322ge
 2 ANS: 2 REF: fall9914b
 3 ANS: 3 REF: 011523ge
 4 ANS: 2 REF: 060802b
 5 ANS: 1 REF: 081518ge
 6 ANS: 1

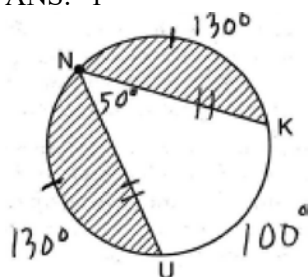


. Equal chords intercept equal arcs. If $m\widehat{BC} = 140$, then $m\widehat{AB} = 140$.

$m\widehat{AC} = 80$ ($360 - (140 + 140)$). The measure of an inscribed angle is half that of its intercepted arc. So $m\angle B = 40$.

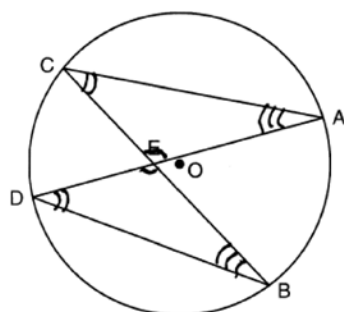
REF: 080107b

- 7 ANS: 1



REF: 080803b

- 8 ANS: 4 REF: 011124ge
 9 ANS: 2



REF: 061026GE

10 ANS:

$$86^\circ \cdot 2 = 172^\circ \quad 180^\circ - 86^\circ = 94^\circ$$

REF: 081432ge

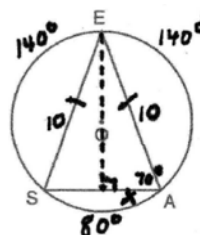
11 ANS:

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

REF: fall0836ge

12 ANS:

6.8. Equal chords intercept equal arcs. If $m\widehat{SE} = 140$, then $m\widehat{AE} = 140$. And $m\widehat{AS} = 80$ ($360 - (140 + 140)$). The measure of an inscribed angle is half that of its intercepted arc. So $m\angle A = 70$. Draw altitude \overline{EA} and use the cosine function to find the leg of the right triangle created,



which is half the length of \overline{SA} . $\cos 70 = \frac{x}{10}$.
 $x \approx 3.4 \times 2 \approx 6.8$

REF: 080629b