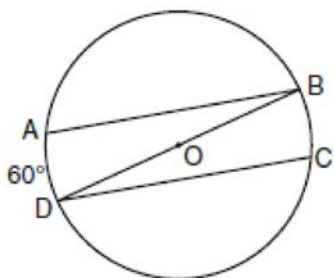


G.G.52: Chords and Secants 1: Investigate, justify, and apply theorems about arcs of a circle cut by two parallel lines

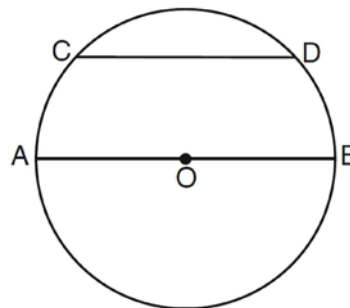
- 1 In the diagram of circle O below, chords \overline{AB} and \overline{CD} are parallel, and \overline{BD} is a diameter of the circle.



If $m\widehat{AD} = 60$, what is $m\angle CDB$?

- 1) 20
- 2) 30
- 3) 60
- 4) 120

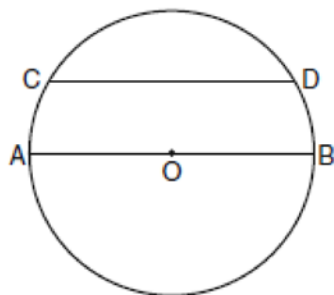
- 3 In the diagram below of circle O , diameter \overline{AB} is parallel to chord \overline{CD} .



If $m\widehat{CD} = 70$, what is $m\widehat{AC}$?

- 1) 110
- 2) 70
- 3) 55
- 4) 35

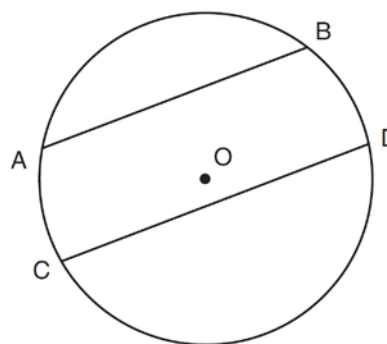
- 2 In the diagram of circle O below, chord \overline{CD} is parallel to diameter \overline{AOB} and $m\widehat{AC} = 30$.



What is $m\widehat{CD}$?

- 1) 150
- 2) 120
- 3) 100
- 4) 60

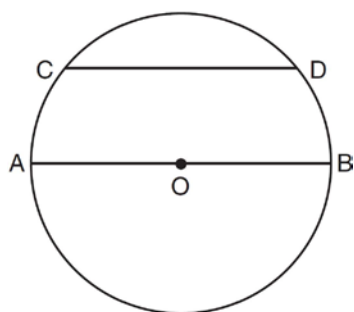
- 4 In circle O shown in the diagram below, chords \overline{AB} and \overline{CD} are parallel.



If $m\widehat{AB} = 104$ and $m\widehat{CD} = 168$, what is $m\widehat{BD}$?

- 1) 38
- 2) 44
- 3) 88
- 4) 96

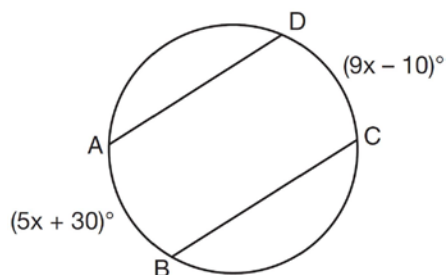
- 5 In the diagram of circle O below, chord \overline{CD} is parallel to diameter \overline{AOB} and $m\widehat{CD} = 110$.



What is $m\widehat{DB}$?

- 1) 35
- 2) 55
- 3) 70
- 4) 110

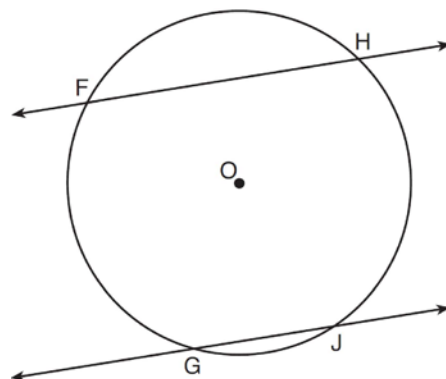
- 6 In the diagram of the circle below, $\overline{AD} \parallel \overline{BC}$, $m\widehat{AB} = (5x + 30)^\circ$, and $m\widehat{CD} = (9x - 10)^\circ$.



What is $m\widehat{AB}$?

- 1) 5
- 2) 10
- 3) 55
- 4) 80

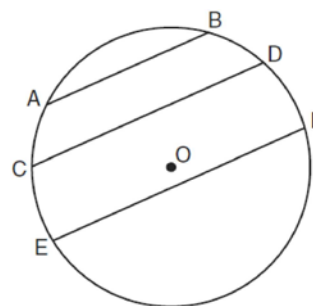
- 7 Parallel secants \overleftrightarrow{FH} and \overleftrightarrow{GJ} intersect circle O , as shown in the diagram below.



If $m\widehat{FH} = 106$ and $m\widehat{GJ} = 24$, then $m\widehat{FG}$ equals

- 1) 106
- 2) 115
- 3) 130
- 4) 156

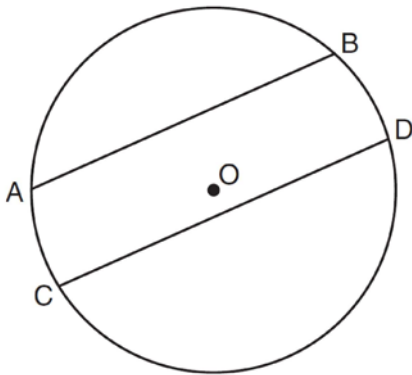
- 8 In the diagram below of circle O , chord $\overline{AB} \parallel$ chord \overline{CD} , and chord $\overline{CD} \parallel$ chord \overline{EF} .



Which statement must be true?

- 1) $\widehat{CE} \cong \widehat{DF}$
- 2) $\widehat{AC} \cong \widehat{DF}$
- 3) $\widehat{AC} \cong \widehat{CE}$
- 4) $\widehat{EF} \cong \widehat{CD}$

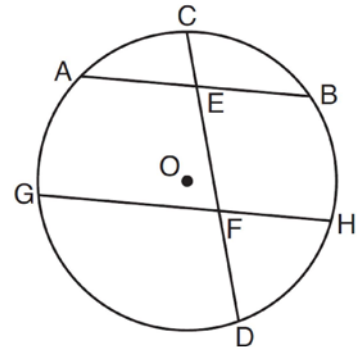
- 9 In the diagram below of circle O , chord \overline{AB} is parallel to chord \overline{CD} .



Which statement must be true?

- 1) $\widehat{AC} \cong \widehat{BD}$
- 2) $\widehat{AB} \cong \widehat{CD}$
- 3) $\overline{AB} \cong \overline{CD}$
- 4) $\widehat{ABD} \cong \widehat{CDB}$

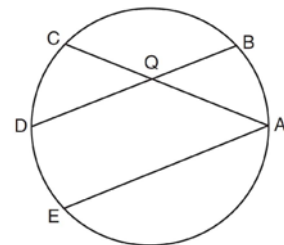
- 10 In the diagram below of circle O , chord \overline{AB} is parallel to chord \overline{GH} . Chord \overline{CD} intersects \overline{AB} at E and \overline{GH} at F .



Which statement must always be true?

- 1) $\widehat{AC} \cong \widehat{CB}$
- 2) $\widehat{DH} \cong \widehat{BH}$
- 3) $\widehat{AB} \cong \widehat{GH}$
- 4) $\widehat{AG} \cong \widehat{BH}$

- 11 In the diagram of the circle shown below, chords \overline{AC} and \overline{BD} intersect at Q , and chords \overline{AE} and \overline{BD} are parallel.



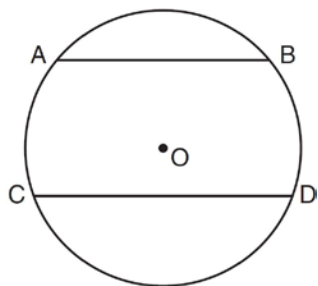
Which statement must always be true?

- 1) $\widehat{AB} \cong \widehat{CD}$
- 2) $\widehat{DE} \cong \widehat{CD}$
- 3) $\widehat{AB} \cong \widehat{DE}$
- 4) $\widehat{BD} \cong \widehat{AE}$

- 12 Points A , B , C , and D are located on circle O , forming trapezoid $ABCD$ with $\overline{AB} \parallel \overline{DC}$. Which statement must be true?

- 1) $\overline{AB} \cong \overline{DC}$
- 2) $\widehat{AD} \cong \widehat{BC}$
- 3) $\angle A \cong \angle D$
- 4) $\widehat{AB} \cong \widehat{DC}$

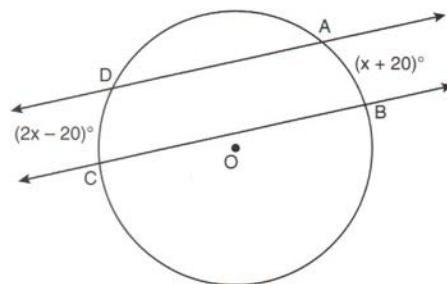
- 13 In the diagram below of circle O , chord \overline{AB} is parallel to chord \overline{CD} .



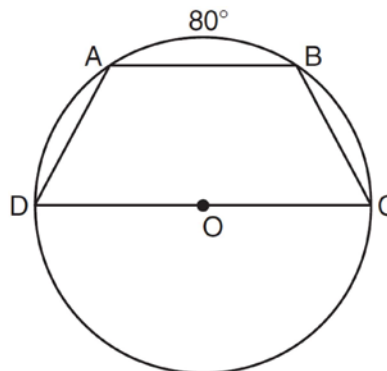
A correct justification for $m\widehat{AC} = m\widehat{BD}$ in circle O is

- 1) parallel chords intercept congruent arcs
- 2) congruent chords intercept congruent arcs
- 3) if two chords are parallel, then they are congruent
- 4) if two chords are equidistant from the center, then the arcs they intercept are congruent

- 14 In the diagram below, two parallel lines intersect circle O at points A , B , C , and D , with $m\widehat{AB} = x + 20$ and $m\widehat{DC} = 2x - 20$. Find $m\widehat{AB}$.



- 15 In the diagram below, trapezoid $ABCD$, with bases \overline{AB} and \overline{DC} , is inscribed in circle O , with diameter \overline{DC} . If $m\widehat{AB} = 80$, find $m\widehat{BC}$.



G.G.52: Chords and Secants 1: Investigate, justify, and apply theorems about arcs of a circle cut by two parallel lines
Answer Section

1 ANS: 2

Parallel chords intercept congruent arcs. $m\widehat{AD} = m\widehat{BC} = 60$. $m\angle CDB = \frac{1}{2} m\widehat{BC} = 30$.

REF: 060906ge

2 ANS: 2

Parallel chords intercept congruent arcs. $m\widehat{AC} = m\widehat{BD} = 30$. $180 - 30 - 30 = 120$.

REF: 080904ge

3 ANS: 3

$$\frac{180 - 70}{2} = 55$$

REF: 061205ge

4 ANS: 2

Parallel chords intercept congruent arcs. $\frac{360 - (104 + 168)}{2} = 44$

REF: 011302ge

5 ANS: 1

Parallel chords intercept congruent arcs. $m\widehat{AC} = m\widehat{BD}$. $\frac{180 - 110}{2} = 35$.

REF: 081302ge

6 ANS: 4

$$9x - 10 = 5x + 30 \quad 5(10) + 30 = 80$$

$$4x = 40$$

$$x = 10$$

REF: 011525ge

7 ANS: 2

Parallel secants intercept congruent arcs. $\frac{360 - (106 + 24)}{2} = \frac{230}{2} = 115$

REF: 081503ge

8 ANS: 1

Parallel lines intercept congruent arcs.

REF: 061001ge

- 9 ANS: 1
Parallel lines intercept congruent arcs.

REF: 061105ge
- 10 ANS: 4
Parallel lines intercept congruent arcs.

REF: 081201ge
- 11 ANS: 3
Parallel lines intercept congruent arcs.

REF: 061409ge
- 12 ANS: 2 REF: 061516ge
- 13 ANS: 1
Parallel lines intercept congruent arcs.

REF: 081413ge
- 14 ANS:

$$2x - 20 = x + 20. \quad \widehat{mAB} = x + 20 = 40 + 20 = 60$$

$$x = 40$$

REF: 011229ge
- 15 ANS:

$$\frac{180 - 80}{2} = 50$$

REF: 081129ge