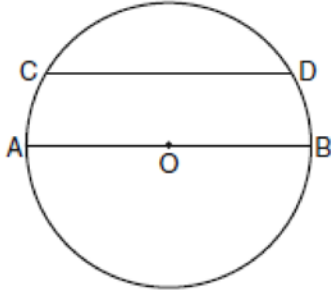


**G.C.A.2: Chords, Secants and Tangents 9**

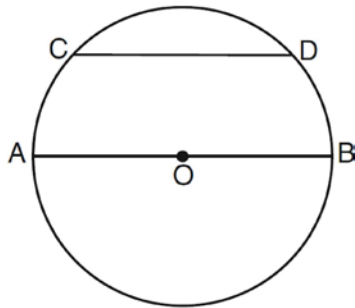
- 1 In the diagram of circle  $O$  below, chord  $\overline{CD}$  is parallel to diameter  $\overline{AOB}$  and  $m\widehat{AC} = 30$ .



What is  $m\widehat{CD}$ ?

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

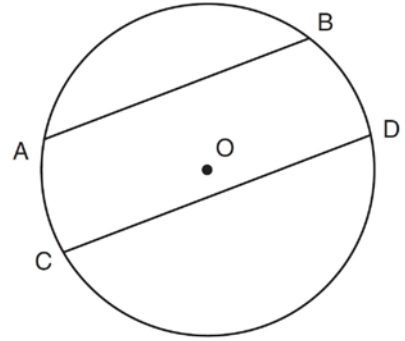
- 2 In the diagram below of circle  $O$ , diameter  $\overline{AB}$  is parallel to chord  $\overline{CD}$ .



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

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

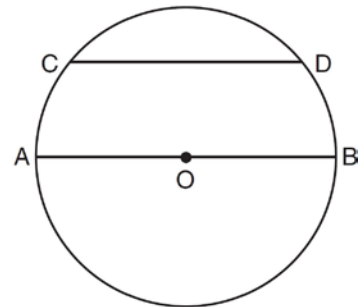
- 3 In circle  $O$  shown in the diagram below, chords  $\overline{AB}$  and  $\overline{CD}$  are parallel.



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

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

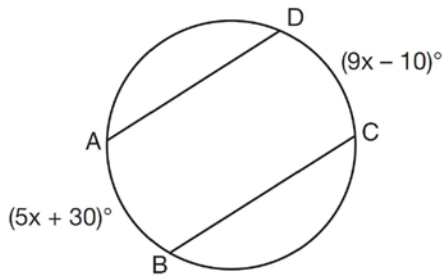
- 4 In the diagram of circle  $O$  below, chord  $\overline{CD}$  is parallel to diameter  $\overline{AOB}$  and  $m\widehat{CD} = 110$ .



What is  $m\widehat{DB}$ ?

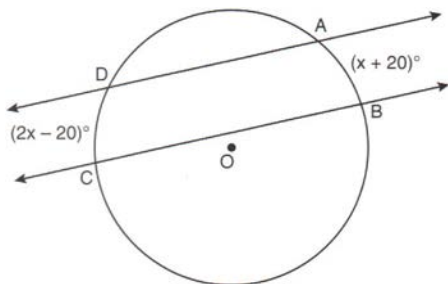
- 1) 35
- 2) 55
- 3) 70
- 4) 110

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

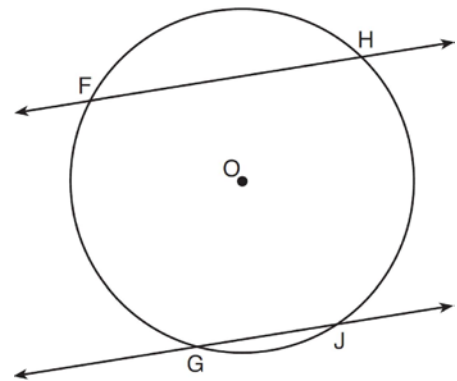


What is  $m\widehat{AB}$ ?

- 1) 5
  - 2) 10
  - 3) 55
  - 4) 80
- 6 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  $m\widehat{AB}$ .

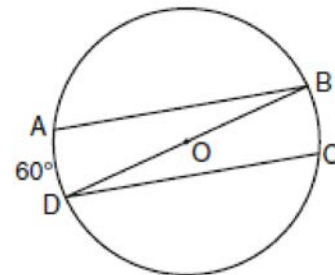


- 7 Parallel secants  $\overleftrightarrow{FH}$  and  $\overleftrightarrow{GJ}$  intersect circle  $O$ , as shown in the diagram below.



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

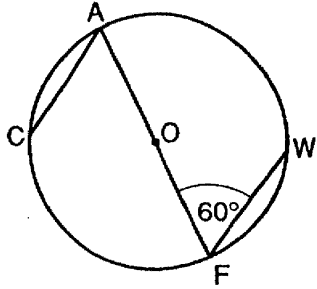
- 1) 106
  - 2) 115
  - 3) 130
  - 4) 156
- 8 In the diagram of circle  $O$  below, chords  $\overline{AB}$  and  $\overline{CD}$  are parallel, and  $\overline{BD}$  is a diameter of the circle.



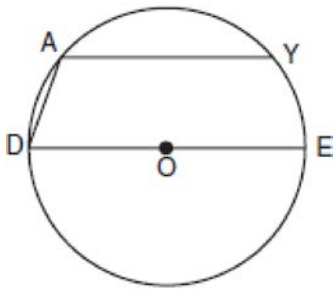
If  $m\widehat{AD} = 60$ , what is  $m\angle CDB$ ?

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

- 9 In the accompanying diagram of circle  $O$ , chords  $\overline{AC}$  and  $\overline{WF}$  are drawn,  $\overline{AOF}$  is a diameter,  $\overline{AC} \parallel \overline{WF}$ , and  $m\angle AFW = 60$ . Find  $m\widehat{AC}$ .



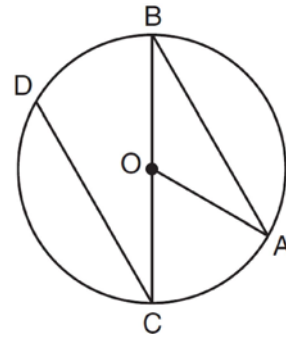
- 10 In the accompanying diagram of circle  $O$ , chord  $\overline{AY}$  is parallel to diameter  $\overline{DOE}$ ,  $\overline{AD}$  is drawn, and  $m\widehat{AD} = 40$ .



What is  $m\angle DAY$ ?

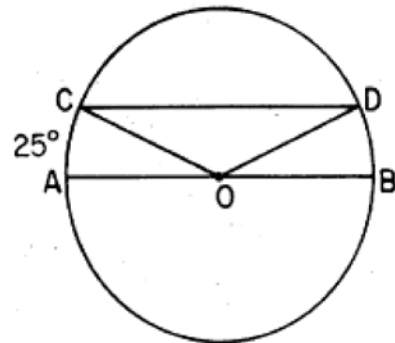
- 1) 90
- 2) 110
- 3) 130
- 4) 150

- 11 In the diagram below of circle  $O$  with diameter  $\overline{BC}$  and radius  $\overline{OA}$ , chord  $\overline{DC}$  is parallel to chord  $\overline{BA}$ .



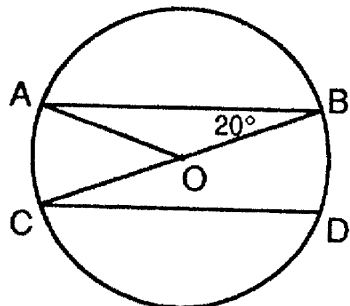
If  $m\angle BCD = 30^\circ$ , determine and state  $m\angle AOB$ .

- 12 In the accompanying diagram, chord  $\overline{CD}$  is parallel to diameter  $\overline{AB}$ . If  $m\widehat{AC} = 25$ , what is  $m\angle COD$ ?

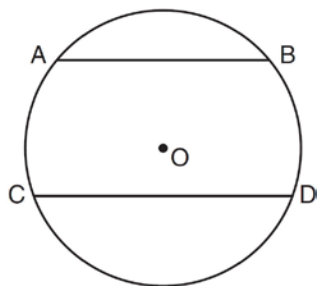


- 1) 25
- 2) 65
- 3) 130
- 4) 155

- 13 In the accompanying diagram of circle  $O$ ,  $\overline{AB} \parallel \overline{CD}$ ,  $\overline{BC}$  is a diameter, and radius  $\overline{AO}$  is drawn. If  $m\angle ABC = 20$ , find  $m\widehat{BD}$ .



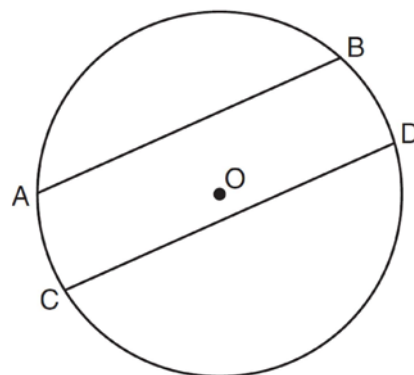
- 14 In the diagram below of circle  $O$ , chord  $\overline{AB}$  is parallel to chord  $\overline{CD}$ .



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

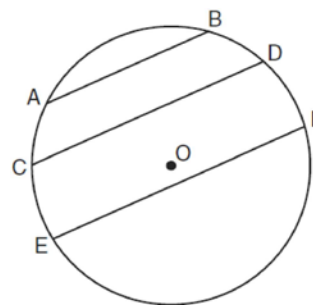
- 15 In the diagram below of circle  $O$ , chord  $\overline{AB}$  is parallel to chord  $\overline{CD}$ .



Which statement must be true?

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

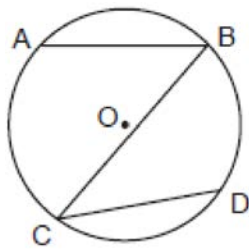
- 16 In the diagram below of circle  $O$ , chord  $\overline{AB} \parallel$  chord  $\overline{CD}$ , and chord  $\overline{CD} \parallel$  chord  $\overline{EF}$ .



Which statement must be true?

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

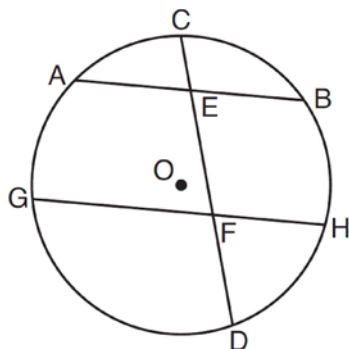
- 17 In the accompanying diagram of circle  $O$ ,  
 $\overline{AB} \cong \overline{CD}$ .



Which statement is true?

- 1)  $\overline{AB} \cong \overline{CD}$
- 2)  $\overline{AC} \cong \overline{BD}$
- 3)  $\overline{AB} \parallel \overline{CD}$
- 4)  $\angle ABC \cong \angle BCD$

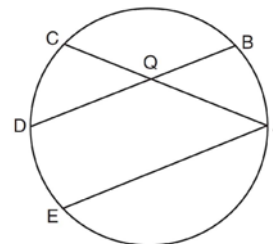
- 18 In the diagram below of circle  $O$ , chord  $\overline{AB}$  is parallel to chord  $\overline{GH}$ . Chord  $\overline{CD}$  intersects  $\overline{AB}$  at  $E$  and  $\overline{GH}$  at  $F$ .



Which statement must always be true?

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

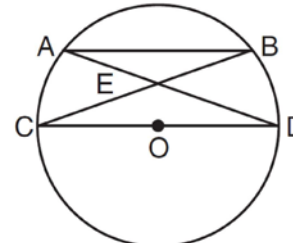
- 19 In the diagram of the circle shown below, chords  $\overline{AC}$  and  $\overline{BD}$  intersect at  $Q$ , and chords  $\overline{AE}$  and  $\overline{BD}$  are parallel.



Which statement must always be true?

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

- 20 In circle  $O$  shown below, chord  $\overline{AB}$  and diameter  $\overline{CD}$  are parallel, and chords  $\overline{AD}$  and  $\overline{BC}$  intersect at point  $E$ .



Which statement is false?

- 1)  $\overline{AC} \cong \overline{BD}$
- 2)  $BE = CE$
- 3)  $\triangle ABE \sim \triangle CDE$
- 4)  $\angle B \cong \angle C$

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

## G.C.A.2: Chords, Secants and Tangents 9

## Answer Section

1 ANS: 2

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

REF: 080904ge

2 ANS: 3

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

REF: 061205ge

3 ANS: 2

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

REF: 011302ge

4 ANS: 1

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

REF: 081302ge

5 ANS: 4

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

$$4x = 40$$

$$x = 10$$

REF: 011525ge

6 ANS:

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

$$x = 40$$

REF: 011229ge

7 ANS: 2

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

REF: 081503ge

8 ANS: 2

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

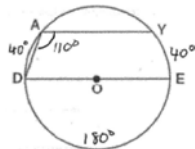
REF: 060906ge

9 ANS:  
60

REF: 019501siii

10 ANS: 2

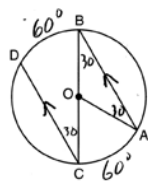
Parallel chords intercept equal arcs. If  $m\widehat{AD} = 40$ , then  $m\widehat{EY} = 40$  as well. The diameter of a circle divides the circle into two  $180^\circ$  arcs. So  $m\widehat{DEY} = 220$ . The measure of an inscribed angle is half that of



its intercepted arc. So  $m\angle DAY = 110$ .

REF: 060603b

11 ANS:



$$180 - 2(30) = 120$$

REF: 011626geo

12 ANS: 3

REF: 088519siii

13 ANS:  
40

REF: 069403siii

14 ANS: 1

Parallel lines intercept congruent arcs.

REF: 081413ge

15 ANS: 1

Parallel lines intercept congruent arcs.

REF: 061105ge

16 ANS: 1

Parallel lines intercept congruent arcs.

REF: 061001ge

17 ANS: 1

REF: 060811b

18 ANS: 4

Parallel lines intercept congruent arcs.

REF: 081201ge

19 ANS: 3  
Parallel lines intercept congruent arcs.

REF: 061409ge

20 ANS: 2 REF: 011616ge

21 ANS: 2 REF: 061516ge