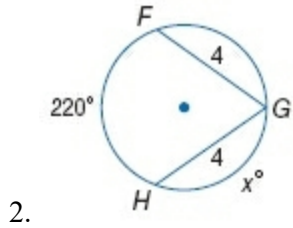


**10-3 Arcs and Chords**

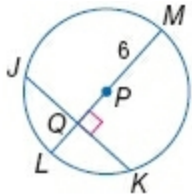
**ALGEBRA** Find the value of  $x$ .



**ANSWER:**

70

In  $\odot P$ ,  $JK = 10$  and  $m\widehat{JLK} = 134$ . Find each measure. Round to the nearest hundredth.

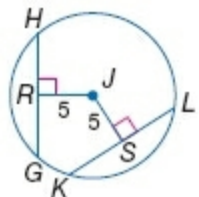


4.  $m\widehat{JL}$

**ANSWER:**

67

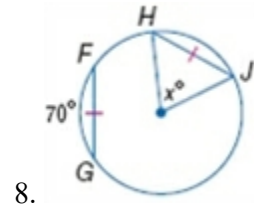
6. In  $\odot J$ ,  $GH = 9$ ,  $KL = 4x + 1$ . Find  $x$ .



**ANSWER:**

2

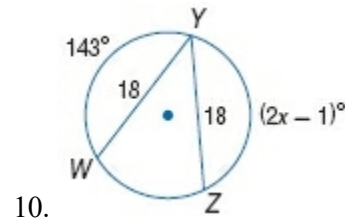
**ALGEBRA** Find the value of  $x$ .



8.

**ANSWER:**

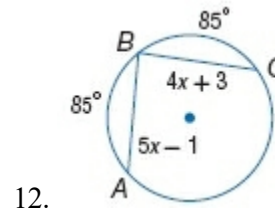
70



10.

**ANSWER:**

72



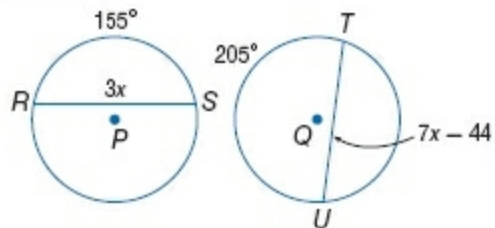
12.

**ANSWER:**

4

**10-3 Arcs and Chords**

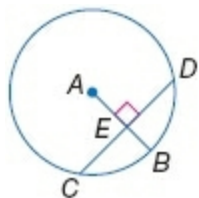
14.  $\odot P \cong \odot Q$



ANSWER:

11

In  $\odot A$ , the radius is 14 and  $CD = 22$ . Find each measure. Round to the nearest hundredth, if necessary.

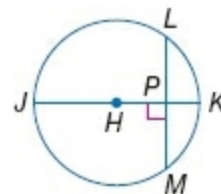


16.  $CE$

ANSWER:

11

In  $\odot H$ , the diameter is 18,  $LM = 12$ , and  $m\widehat{LM} = 84$ . Find each measure. Round to the nearest hundredth, if necessary.

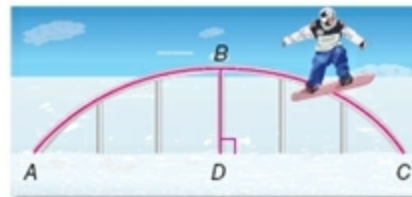


18.  $m\widehat{LK}$

ANSWER:

42

20. **SNOWBOARDING** The snowboarding rail shown is an arc of a circle in which  $\overline{BD}$  is part of the diameter. If  $\widehat{ABC}$  is about 32% of a complete circle, what is  $m\widehat{AB}$  ?

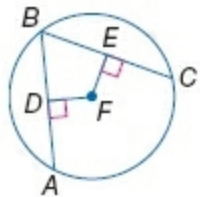


ANSWER:

57.6

### 10-3 Arcs and Chords

22. ALGEBRA In  $\odot F$ ,  $\overline{AB} \cong \overline{BC}$ ,  $DF = 3x - 7$ , and  $FE = x + 9$ . What is  $x$ ?



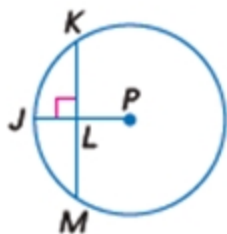
ANSWER:

8

**PROOF** Write a two-column proof.

24. Given:  $\odot P$ ,  $\overline{KM} \perp \overline{JP}$

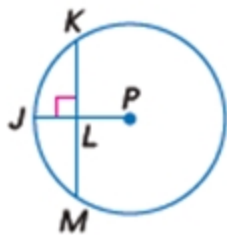
Prove:  $\overline{JP}$  bisects  $\overline{KM}$  and  $\widehat{KM}$



ANSWER:

Given:  $\odot P$ ,  $\overline{KM} \perp \overline{JP}$

Prove:  $\overline{JP}$  bisects  $\overline{KM}$  and  $\widehat{KM}$



Proof:

Statements (Reasons)

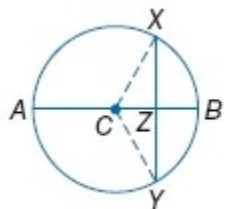
1.  $\overline{KM} \perp \overline{JP}$  (Given)
2. Draw radii  $\overline{PK}$  and  $\overline{PM}$ . (2 points determine a line.)
3.  $\overline{PK} \cong \overline{PM}$  (All radii of a  $\odot$  are  $\cong$ .)
4.  $\overline{PL} \cong \overline{PL}$  (Reflex. Prop. of  $\cong$ )
5.  $\angle PLM$  and  $\angle PLK$  are right  $\angle$ s. (Def. of  $\perp$ )
6.  $\angle PLM \cong \angle PLK$  (All right  $\angle$ s are  $\cong$ .)
7.  $\triangle PLM \cong \triangle PLK$  (SAS)
8.  $\overline{ML} \cong \overline{KL}$  (CPCTC)
9.  $\overline{PJ}$  bisects  $\overline{KM}$ . (Def. of bisect)
10.  $\angle MPJ \cong \angle KPJ$  (CPCTC)
11.  $\widehat{MJ} \cong \widehat{KJ}$  (In the same circle, two arcs are congruent if their corresponding central angles are congruent.)
12.  $\overline{JP}$  bisects  $\widehat{KM}$ . (Def. of bisect)

### 10-3 Arcs and Chords

26. two-column proof of Theorem 10.3

**Given:**  $\odot C, \overline{AB} \perp \overline{XY}$

**Prove:**  $\overline{XZ} \cong \overline{YZ}, \widehat{XB} \cong \widehat{YB}$



**ANSWER:**

Proof:

Statements (Reasons)

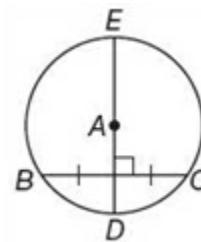
1.  $\odot C, \overline{AB} \perp \overline{XY}$  (Given)
2.  $\overline{CX} \cong \overline{CY}$  (All radii of a  $\odot$  are  $\cong$ .)
3.  $\overline{CZ} \cong \overline{CZ}$  (Reflexive Prop.)
4.  $\angle XZC$  and  $\angle YZC$  are rt.  $\angle$ s (Definition of  $\perp$  lines)
5.  $\triangle XZC \cong \triangle YZC$  (HL)
6.  $\overline{XZ} \cong \overline{YZ}$ ,  $\angle X CZ \cong \angle Y CZ$  (CPCTC)
7.  $\widehat{XB} \cong \widehat{YB}$  (If central  $\angle$ s are  $\cong$ , intercepted arcs are  $\cong$ .)

28. **PROOF** Write a two-column proof of Theorem 10.4.

**ANSWER:**

Given:  $\odot A, \overline{ED}$  is the  $\perp$  bisector of  $\overline{BC}$ .

Prove:  $\overline{ED}$  is a diameter of  $\odot A$ .



Proof:

Statements (Reasons)

1.  $\overline{ED}$  is the  $\perp$  bisector of  $\overline{BC}$  (Given)
2.  $A$  is equidistant from  $B$  and  $C$ . (All radii of a  $\odot$  are  $\cong$ .)
3.  $A$  lies on the  $\perp$  bisector of  $\overline{BC}$ . (Conv. of the  $\perp$  Bisector Thm.)
4.  $\overline{ED}$  is a diameter of  $\odot A$ . (Def. of diameter)

**CCSS ARGUMENTS** Write a two-column proof of the indicated part of Theorem 10.5.

30. In a circle, if two chords are congruent, then they are equidistant from the center.

**ANSWER:**

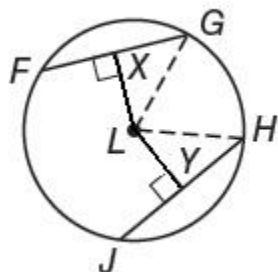
Given:  $\odot L, \overline{FG} \cong \overline{JH}$ ,  $\overline{LG}$  and  $\overline{LH}$  are radii.

$\overline{LX} \perp \overline{FG}, \overline{LY} \perp \overline{JH}$

Prove:  $\overline{LX} \cong \overline{LY}$

Proof:

### 10-3 Arcs and Chords

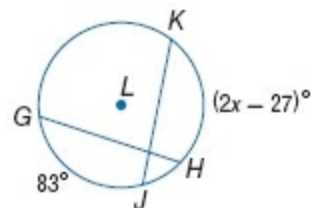


#### Statements (Reasons)

1.  $\odot L, \overline{FG} \cong \overline{JH}$  and  $\overline{LG}$  and  $\overline{LH}$  are radii.  
 $\overline{LX} \perp \overline{FG}, \overline{LY} \perp \overline{JH}$  (Given)
2.  $\overline{LX}$  bisects  $\overline{FG}$ ;  $\overline{LY}$  bisects  $\overline{JH}$ . ( $\overline{LX}$  and  $\overline{LY}$  are contained in radii. A radius  $\perp$  to a chord bisects the chord.)
3.  $XG = \frac{1}{2}FG, YH = \frac{1}{2}JH$  (Definition of bisector)
4.  $FG = JH$  (Definition of  $\cong$  segments)
5.  $\frac{1}{2}FG = \frac{1}{2}JH$  (Multiplication Property of Equality)
6.  $XG = YH$  (Substitution)
7.  $\overline{XG} \cong \overline{YH}$  (Definition of  $\cong$  segments)
8.  $\overline{LG} \cong \overline{LH}$  (All radii of a circle are  $\cong$ .)
9.  $\angle GXL$  and  $\angle HYL$  are right  $\angle$ s (Def. of  $\perp$  lines)
10.  $\triangle XLG \cong \triangle YLH$  (HL)
11.  $\overline{LX} \cong \overline{LY}$  (CPCTC)

Find the value of  $x$ .

32.  $\overline{GH} \cong \overline{KJ}$



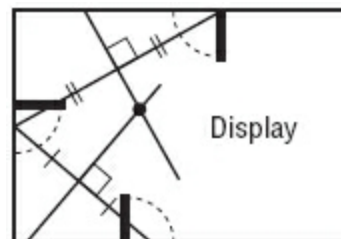
ANSWER:

55

34. **ADVERTISING** A bookstore clerk wants to set up a display of new books. If there are three entrances into the store as shown in the figure at the right, where should the display be to get maximum exposure?



ANSWER:



### 10-3 Arcs and Chords

36. **REASONING** In a circle,  $\overline{AB}$  is a diameter and  $\overline{HG}$  is a chord that intersects  $\overline{AB}$  at point  $X$ . Is it *sometimes, always, or never* true that  $HX = GX$ ? Explain.

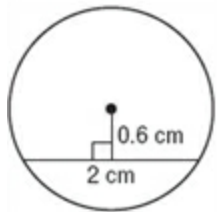
**ANSWER:**

Sometimes; if the diameter is perpendicular to the chord, then it bisects the chord.

38. **OPEN ENDED** Construct a circle and draw a chord. Measure the chord and the distance that the chord is from the center. Find the length of the radius.

**ANSWER:**

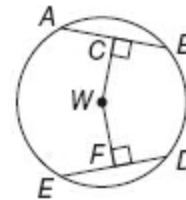
Sample answer:



radius  $\approx 1.2$  cm

40. If  $CW = WF$  and  $ED = 30$ , what is  $DF$ ?

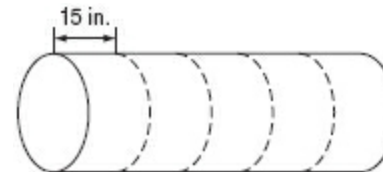
- A 60
- B 45
- C 30
- D 15



**ANSWER:**

D

42. **SHORT RESPONSE** The pipe shown is divided into five equal sections. How long is the pipe in feet (ft) and inches (in.)?



**ANSWER:**

6 ft 3 in.

**Find  $x$ .**

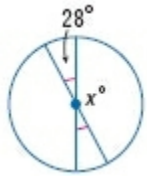


- 44.

**ANSWER:**

114

### 10-3 Arcs and Chords



46.

ANSWER:

152

Determine whether each set of numbers can be the measures of the sides of a triangle. If so, classify the triangle as *acute*, *obtuse*, or *right*. Justify your answer.

48. 8, 15, 17

ANSWER:

yes; right

$$17^2 = 8^2 + 15^2$$

$$289 = 64 + 225$$

50. 10, 16, 18

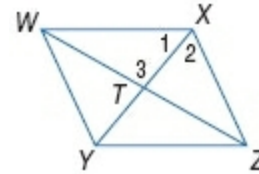
ANSWER:

yes; acute

$$18^2 = 10^2 + 16^2$$

$$324 < 100 + 256$$

ALGEBRA Quadrilateral  $WXZY$  is a rhombus. Find each value or measure.



52. If  $m\angle XZY = 56$ , find  $m\angle YWZ$ .

ANSWER:

28