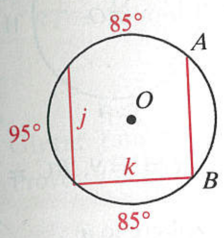
Written Exercises

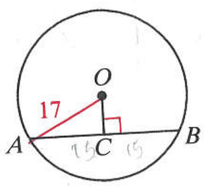
In the diagrams that follow, O is the center of each circle.

A 1.



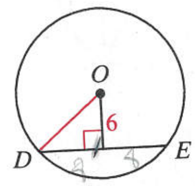
$AB = \underline{\ ?\ }$

2.



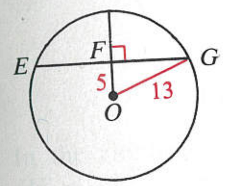
$AB = 30$; $OC = \underline{\ ?\ }$

3.



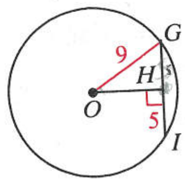
$DE = 16$; $OD = \underline{\ ?\ }$

4.



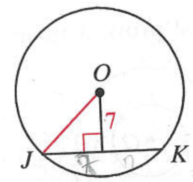
$EG = \underline{\ ?\ }$

5.



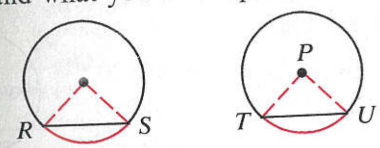
$OH = \underline{\ ?\ }$

6.

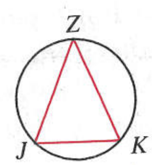


$JK = 14$; $OJ = \underline{\ ?\ }$

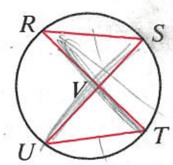
7. Prove part 2 of Theorem 7–4 for congruent circles. First list what is given and what you are to prove.



8. **a.** Given: $\overparen{JZ} \cong \overparen{KZ}$
Prove: $\angle J \cong \angle K$
b. Is the converse of part (a) true?

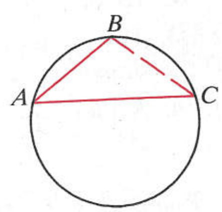


B 9. Given: $\overline{RS} \cong \overline{UT}$
Prove: $\overline{RT} \cong \overline{US}$
(*Hint:* Apply Theorem 7–4 and the Arc Addition Postulate.)

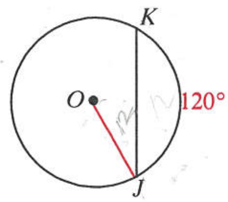


10. Given: $\overparen{RS} \cong \overparen{UT}$; $\angle R \cong \angle U$
Prove: $\overline{VS} \cong \overline{VT}$ and $\overline{RV} \cong \overline{UV}$

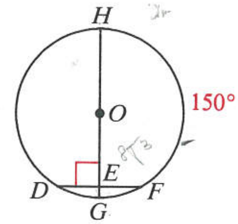
11. The informal statement "When you double the length of an arc you double the length of the chord" may seem at first glance to be true. But use the figure, in which $m\overparen{AC} = 2 \cdot m\overparen{AB}$, to show that $AC \neq 2 \cdot AB$.



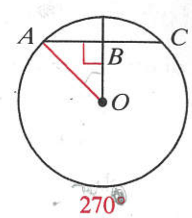
12. **a.** Draw three generous-sized circles and inscribe a different-shaped quadrilateral $ABCD$ in each.
b. Use a protractor to measure all the angles.
c. Compare $\angle A$ and $\angle C$, $\angle B$ and $\angle D$.
d. Although you haven't proved anything in this exercise, you should wonder about a possible theorem. State the theorem.

13. 

If $OJ = 12$, $JK = \underline{\ ?\ }$.

14. 

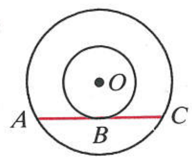
If $OE = 8\sqrt{3}$, $HG = \underline{\ ?\ }$.

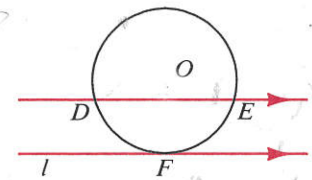
15. 

If $OA = 9$, $BC = \underline{\ ?\ }$.

16. The radius of a sphere is j. The distance from the center of the sphere to a certain chord is k. How long is the chord? Answer in terms of j and k.

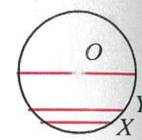
State and prove a theorem suggested by the figure.

C 17. 

18. 

19. Investigate the possibility, given a circle, of drawing two chords whose lengths are in the ratio 1:2 and whose distances from the center are in the ratio 2:1. If the chords can be drawn, find the length of each in terms of the radius. If not, prove that the figure is impossible.

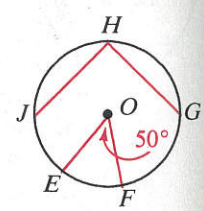
20. Three parallel chords of $\odot O$ are drawn as shown. Their lengths are 20, 16, and 12 cm. Find, to the nearest tenth of a centimeter, the length of chord $\overline{XY}$ (not shown).



Self-Test 1

1. Sketch a triangle inscribed in one circle and sketch a quadrilateral circumscribed about another circle.
2. Circles O and Q are congruent circles. The radius of $\odot O$ is 8. The diameter of $\odot Q$ is $\underline{\ ?\ }$.
3. Two circles intersect in two points. How many common tangents can be drawn to the circles?
4. A plane passes through the common center of two concentric spheres. Describe the intersection of the plane and the two spheres.

Points *E, F, G, H,* and *J* lie on $\odot O$.



5. $m\widehat{EF} = \underline{\ ?\ }$

6. $m\widehat{EHF} = \underline{\ ?\ }$

7. Suppose $\overline{JH} \cong \overline{HG}$. State the theorem that supports the conclusion that $\widehat{JH} \cong \widehat{HG}$.