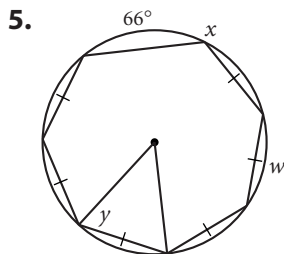
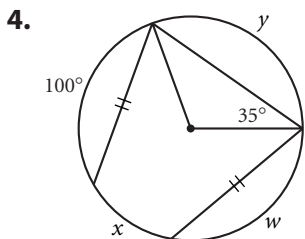
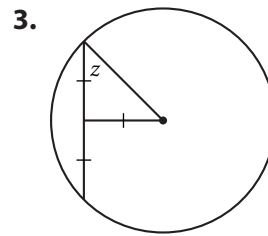
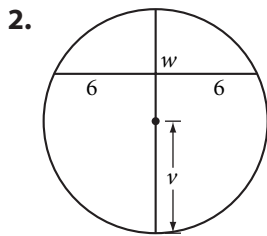
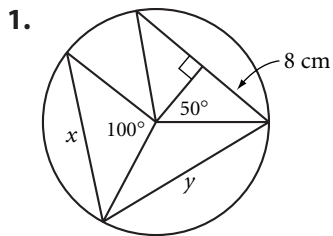


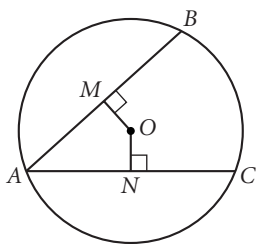
# Lesson 6.1 • Chord Properties

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

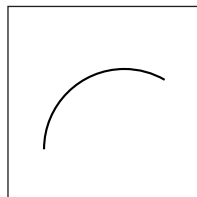
In Exercises 1–5, find each unknown or write “cannot be determined.”



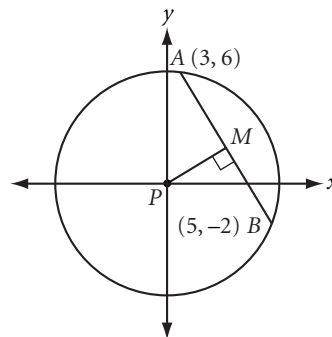
6.  $\overline{AB} \cong \overline{AC}$ .  $\overline{AMON}$  is a \_\_\_\_\_.  
Justify your answer.



7. Trace part of a circle onto patty paper. Fold to find the center. Explain your method.

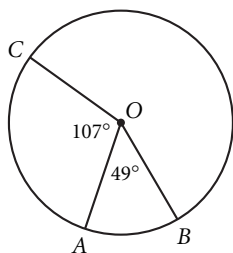


8. Find the coordinates of P and M.



9. Two circles share a common chord. The chord cuts off a  $70^\circ$  arc of circle A and a  $50^\circ$  arc of circle B. Which circle has the larger radius?

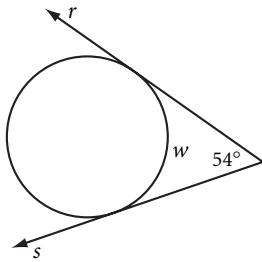
10.  $m\widehat{AB} =$  \_\_\_\_\_  
 $m\widehat{ABC} =$  \_\_\_\_\_  
 $m\widehat{BAC} =$  \_\_\_\_\_  
 $m\widehat{ACB} =$  \_\_\_\_\_



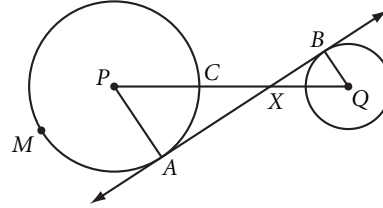
# Lesson 6.2 • Tangent Properties

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

1. Rays  $r$  and  $s$  are tangents.  $w =$  \_\_\_\_\_

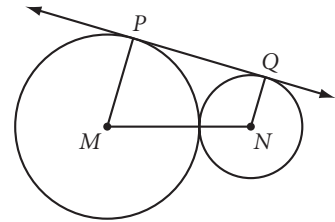


2.  $\overleftrightarrow{AB}$  is tangent to both circles and  $m\widehat{AMC} = 295^\circ$ .  $m\angle BQX =$  \_\_\_\_\_



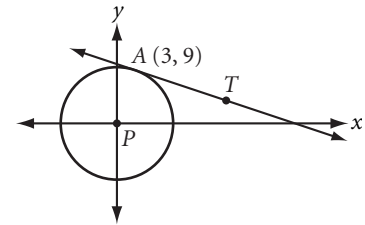
3.  $\overleftrightarrow{PQ}$  is tangent to two externally tangent noncongruent circles,  $M$  and  $N$ .

- What kind of quadrilateral is  $MNQP$ ? Explain your reasoning.
- If circles  $M$  and  $N$  are congruent, what is  $MNQP$ ? Explain why.



4.  $\overleftrightarrow{AT}$  is tangent to circle  $P$ . Find the equation of  $\overleftrightarrow{AT}$ .

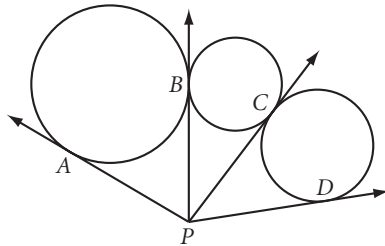
5. Construct a circle,  $P$ . Pick a point,  $A$ , on the circle. Construct a tangent through  $A$ . Pick a point,  $T$ , on the tangent. Construct a second tangent to the circle through  $T$ .



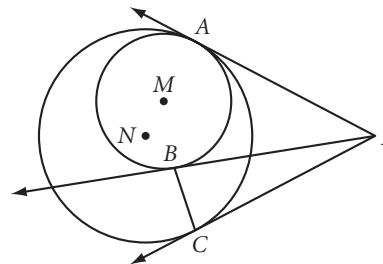
6. Circle  $A$  has diameter 16.4 cm. Circle  $B$  has diameter 6.7 cm.

- If  $A$  and  $B$  are internally tangent, what is the distance between their centers?
- If  $A$  and  $B$  are externally tangent, what is the distance between their centers?

7.  $\overleftrightarrow{PA}$ ,  $\overleftrightarrow{PB}$ ,  $\overleftrightarrow{PC}$ , and  $\overleftrightarrow{PD}$  are tangents. Explain why  $\overleftrightarrow{PA} \cong \overleftrightarrow{PD}$ .



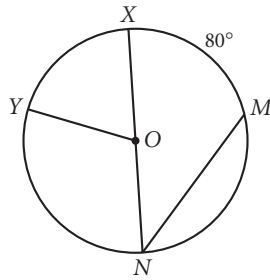
8. Circles  $M$  and  $N$  are tangent at  $A$ .  $\overleftrightarrow{PA}$ ,  $\overleftrightarrow{PB}$ , and  $\overleftrightarrow{PC}$  are tangents. Explain why  $\angle PCB \cong \angle PBC$ .



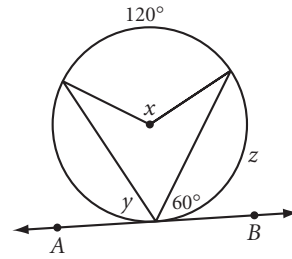
# Lesson 6.3 • Arcs and Angles

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

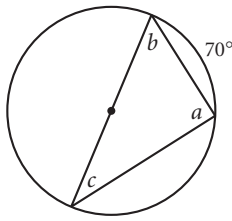
1.  $m\widehat{XM} = 80^\circ$   
 $m\angle XNM = \underline{\hspace{2cm}}$   
 $m\widehat{XN} = \underline{\hspace{2cm}}$   
 $m\widehat{MN} = \underline{\hspace{2cm}}$



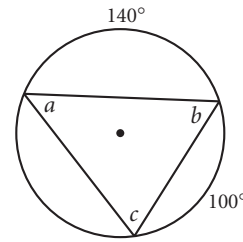
2.  $\overleftrightarrow{AB}$  is a tangent.  
 $x = \underline{\hspace{2cm}}$   
 $y = \underline{\hspace{2cm}}$   
 $z = \underline{\hspace{2cm}}$



3.  $a = \underline{\hspace{2cm}}$   
 $b = \underline{\hspace{2cm}}$   
 $c = \underline{\hspace{2cm}}$

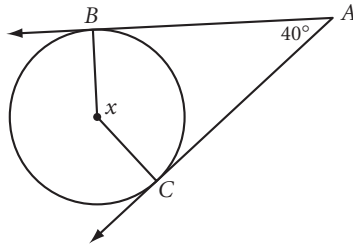


4.  $a = \underline{\hspace{2cm}}$   
 $b = \underline{\hspace{2cm}}$   
 $c = \underline{\hspace{2cm}}$



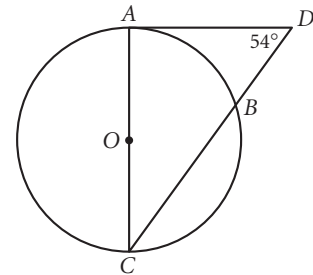
5.  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{AC}$  are tangents.

$x = \underline{\hspace{2cm}}$

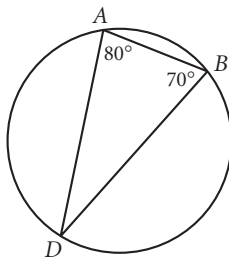


6.  $\overleftrightarrow{AD}$  is a tangent.  $\overleftrightarrow{AC}$  is a diameter.

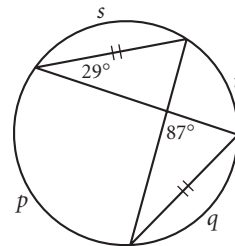
- $m\angle A = \underline{\hspace{2cm}}$   
 $m\widehat{AB} = \underline{\hspace{2cm}}$   
 $m\angle C = \underline{\hspace{2cm}}$   
 $m\widehat{CB} = \underline{\hspace{2cm}}$



7.  $m\widehat{AD} = \underline{\hspace{2cm}}$   
 $m\angle D = \underline{\hspace{2cm}}$   
 $m\widehat{AB} = \underline{\hspace{2cm}}$   
 $m\widehat{DAB} = \underline{\hspace{2cm}}$



8.  $p = \underline{\hspace{2cm}}$   
 $q = \underline{\hspace{2cm}}$   
 $r = \underline{\hspace{2cm}}$   
 $s = \underline{\hspace{2cm}}$

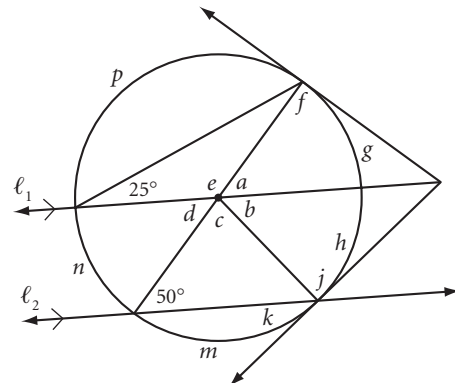


9. Find the lettered angle and arc measures.

- $a = \underline{\hspace{2cm}}$   
 $d = \underline{\hspace{2cm}}$   
 $g = \underline{\hspace{2cm}}$   
 $k = \underline{\hspace{2cm}}$   
 $p = \underline{\hspace{2cm}}$

- $b = \underline{\hspace{2cm}}$   
 $e = \underline{\hspace{2cm}}$   
 $h = \underline{\hspace{2cm}}$   
 $m = \underline{\hspace{2cm}}$

- $c = \underline{\hspace{2cm}}$   
 $f = \underline{\hspace{2cm}}$   
 $j = \underline{\hspace{2cm}}$   
 $n = \underline{\hspace{2cm}}$



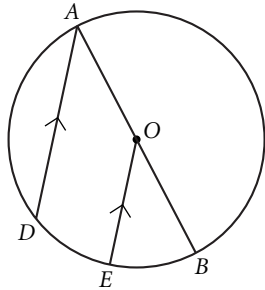
## Lesson 6.4 • Proving Circle Conjectures

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

In Exercises 1–3, complete each proof with a paragraph or a flowchart.

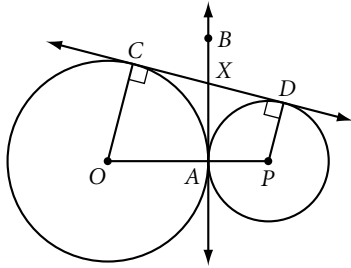
1. **Given:** Circle  $O$  with diameter  $\overline{AB}$  and chord  $\overline{AD}$ .  $\overline{OE} \parallel \overline{AD}$ .

**Show:**  $\widehat{DE} \cong \widehat{BE}$

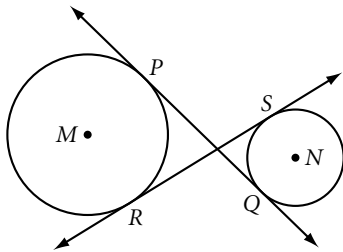


2. **Given:** Circles  $O$  and  $P$  are externally tangent, with common tangents  $\overline{CD}$  and  $\overline{AB}$

**Show:**  $\overline{AB}$  bisects  $\overline{CD}$  at  $X$



3.  $\overline{PQ}$  and  $\overline{RS}$  are tangent to both circles. Show that  $\overline{PQ} \cong \overline{RS}$ .



In Exercises 4–6, give a paragraph or flowchart proof for each statement.

4. If a quadrilateral is circumscribed about a circle, then the sums of the lengths of opposite sides are equal.
5. Prove the converse of the Chord Arcs Conjecture: If two arcs in a circle are congruent, then their chords are congruent.
6. If congruent chords in a circle intersect, then the point of intersection divides both chords in the same ratio.

## Lesson 6.5 • The Circumference/Diameter Ratio

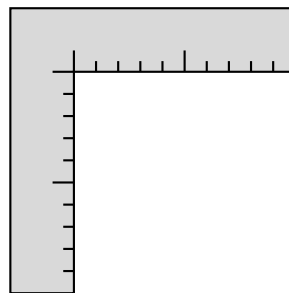
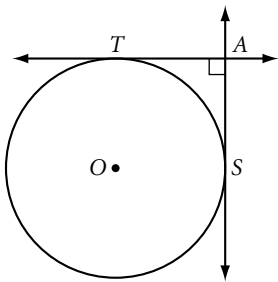
Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

In Exercises 1–7, leave your answers in terms of  $\pi$ .

1. If  $r = 10.5$  cm, find  $C$ .
2. If  $C = 25\pi$  cm, find  $r$ .
3. If  $C = 9.6\pi$  cm, find  $d$ .
4. If  $d = 12$  cm, find  $C$ .
5. What is the circumference of a circle whose radius is 30 cm?
6. What is the diameter of a circle whose circumference is  $24\pi$  cm?
7. A square with sides that measure 2 cm is inscribed in a circle. Find the circumference of the circle.

In Exercises 8–13, round your answer to the nearest 0.1 unit. Use the symbol  $\approx$  to show that your answer is an approximation.

8. If  $d = 9.6$  cm, find  $C$ .
9. If  $r = 8.1$  cm, find  $C$ .
10. If  $C = 132$  cm, find  $d$  and  $r$ .
11. A dinner plate fits snugly in a square box with perimeter 48 inches. What is the circumference of the plate?
12. Four saucers are part of the same set as the dinner plate in Exercise 11. Each has a circumference of 15.7 inches. Will they fit, side by side, in the same square box? If so, how many inches will there be between the saucers for padding?
13.  $\overrightarrow{AT}$  and  $\overrightarrow{AS}$  are tangents.  $AT = 12$  cm. What is the circumference of circle  $O$ ?
14. How can you use a large carpenter's square to find the circumference of a tree?

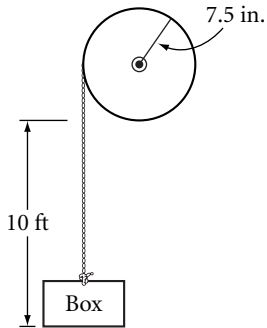


15. In order to increase the circumference of a circle from  $16\pi$  cm to  $20\pi$  cm, by how much must the diameter increase?
16. When a rock is dropped into a pond, a circular wave front spreads out from the point where the rock hit the water. If the wave moves out from the center at 0.7 m/sec, find the length of the wave front after 3 seconds. Round your answer to the nearest 0.1 m.

## Lesson 6.6 • Around the World

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

1. Alfonso's Pizzeria bakes olive pieces in the outer crust of its 20-inch (diameter) pizza. There is at least one olive piece per inch of crust. How many olive pieces will you get in one slice of pizza? Assume the pizza is cut into eight slices.
2. To use the machine below you turn the crank, which turns the pulley wheel, which winds the rope and lifts the box. Through how many rotations must you turn the crank to lift the box 10 feet?



3. A satellite in *geostationary* orbit stays over the same spot on Earth. The satellite completes one orbit in the same time that Earth rotates once about its axis (23.93 hours). If the satellite's orbit has radius  $4.23 \times 10^7$  m, calculate the satellite's orbital speed (tangential velocity) in m/sec.
4. You can make an electromagnet by wrapping a wire around a nail and then sending a current through the wire. The strength of the magnet is directly proportional to the number of wrappings. The nail, pictured below, has a diameter of 0.4 cm. The wire is 0.05 cm in diameter, and you can get 100 wrappings side-by-side on the nail before having to start another layer. Consider each wrapping a perfect circle. How many meters of wire do you need, to the nearest 0.1 m, to make a magnet with 700 wrappings?



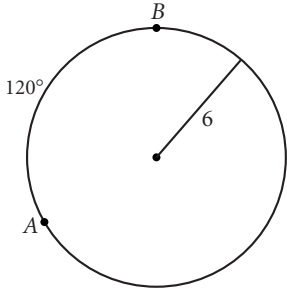
5. You want to decorate the side of a cylindrical can by coloring a rectangular piece of paper and wrapping it around the can. The paper is 19 cm by 29 cm. Find the two possible diameters of the can to the nearest 0.01 cm. Assume the paper fits exactly.
6. As you sit in your chair, you are whirling through space with Earth as it moves around the sun. If the average distance from Earth to the sun is  $1.4957 \times 10^{11}$  m and Earth completes one revolution every 364.25 days, what is your "sitting" speed in space relative to the sun? Give your answer in km/hr, rounded to the nearest 100 km/hr.

# Lesson 6.7 • Arc Length

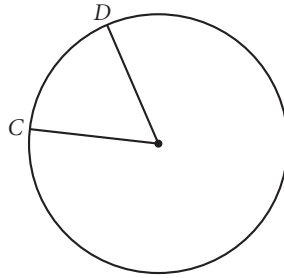
Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

Use your conjectures to solve each problem. Leave your answers in terms of  $\pi$ .

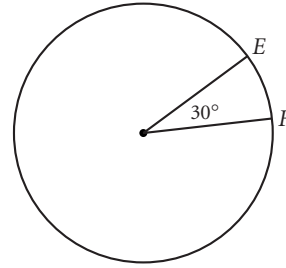
1. Length of  $\widehat{AB}$  = \_\_\_\_\_



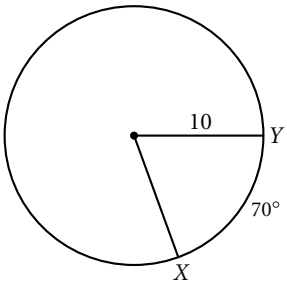
2. The circumference is  $24\pi$  and  $m\widehat{CD} = 60^\circ$ . Length of  $\widehat{CD}$  = \_\_\_\_\_



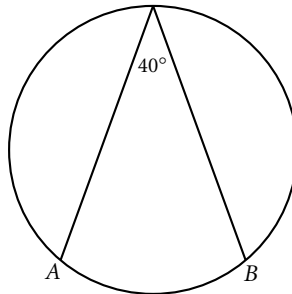
3. The length of  $\widehat{EF}$  is  $5\pi$ . Radius = \_\_\_\_\_



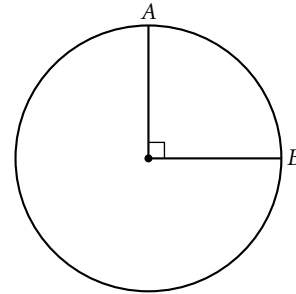
4. Length of  $\widehat{XY}$  = \_\_\_\_\_



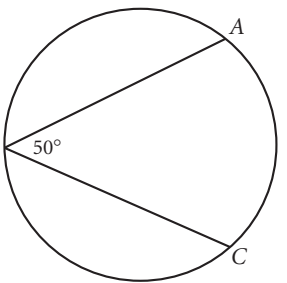
5. The radius is 20. Length of  $\widehat{AB}$  = \_\_\_\_\_



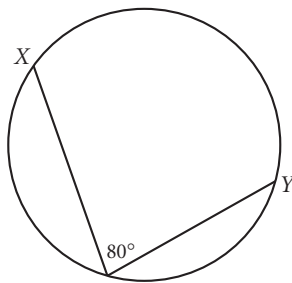
6. The circumference is  $25\pi$ . Length of  $\widehat{AB}$  = \_\_\_\_\_



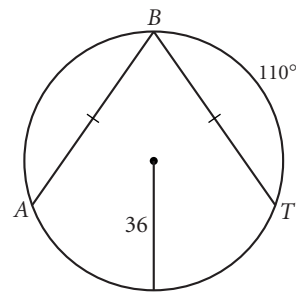
7. The diameter is 40. Length of  $\widehat{AC}$  = \_\_\_\_\_



8. The length of  $\widehat{XY}$  is  $14\pi$ . Diameter = \_\_\_\_\_



9. Length of  $\widehat{AB}$  = \_\_\_\_\_



10. A circle has an arc with measure  $80^\circ$  and length  $88\pi$ . What is the diameter of the circle?