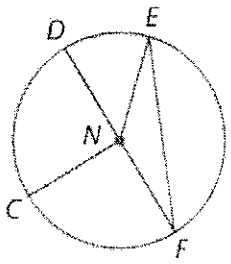
10.1 Warm-Up Day 2

For Exercises 1–4, refer to ⊙N.



1. Name the circle.
   Circle N

2. Identify each.
   a. a chord
   EF
   b. a diameter
   DF
   c. a radius
   DN, NF, CN, EN

3. If $CN = 8$ centimeters, find DN.
   8

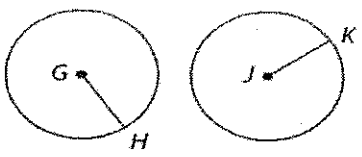
4. If $EN = 13$ feet, what is the diameter of the circle?
   $13 \cdot 2 = 26$

10.1 Circles and Circumference

Target: Use properties of circles to name and identify particular parts.

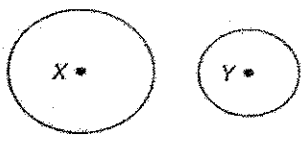
KeyConcept Circle Pairs

Two circles are congruent if and only if they have congruent radii.



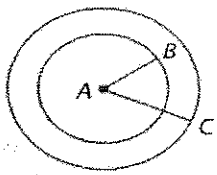
Example $\overline{GH} \cong \overline{JK}$, so $\odot G \cong \odot J$.

All circles are similar.

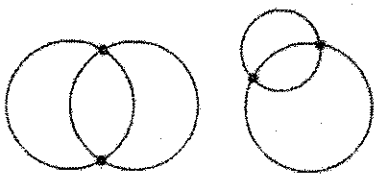
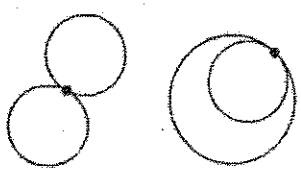
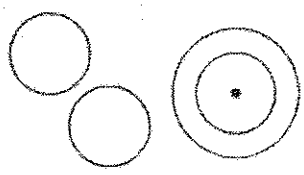


Example $\odot X \sim \odot Y$

Concentric circles are coplanar circles that have the same center.



Example $\odot A$ with radius $\overline{AB}$ and $\odot A$ with radius $\overline{AC}$ are concentric.

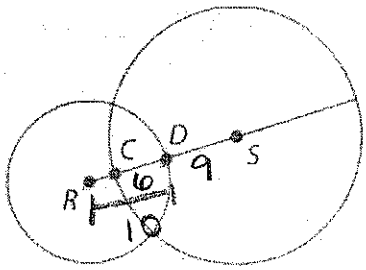
2 Points of Intersection	1 Point of Intersection	No Points of Intersection
		

Example 3 Find Measures in Intersecting Circles

The diameter of ⊙S is 30 units, the diameter of ⊙R is 20 units, and $DS = 9$ units. Find CD.

$CD + 9 = 15$
$-9 \quad -9$
6

$CD = 6$



GuidedPractice

3. Use the diagram above to find RC.

$RC + 6 = 10$
$-6 \quad -6$

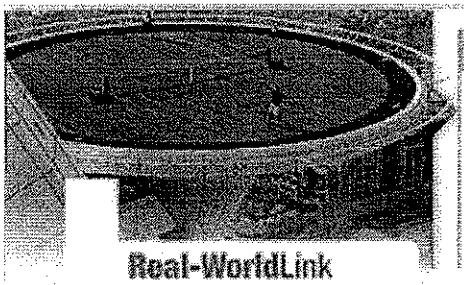
$RC = 4$

→ perimeter

Circumference The **circumference** of a circle is the distance around the circle.

KeyConcept Circumference

Words	If a circle has diameter d or radius r, the circumference C equals the diameter times pi or twice the radius times pi.
Symbols	$C = \pi d$ or $C = 2\pi r$ $\quad \pi = 3.14$



Real-WorldLink

In 2005, Roger Federer and Andre Agassi played tennis on the helipad of the Burj Al Arab hotel in the United Arab Emirates. The helipad has a diameter of 79 feet and is nearly 700 feet high.

Real-World Example 4 Find Circumference

TENNIS Find the circumference of the helipad described at the left.

$C = 3.14(79)$
$C = 248.06$ ft

GuidedPractice

Find the circumference of each circle described. Round to the nearest hundredth.

4A. radius = 2.5 centimeters

$C = 2\pi(2.5)$
$C = 15.7$

4B. diameter = 16 feet

$C = \pi 16$
$C = 50.24$

$d = \frac{C}{\pi}$

Example 5 Find Diameter and Radius

Find the diameter and radius of a circle to the nearest hundredth if the circumference of the circle is 106.4 millimeters.

$C = 106.4$ mm $\quad d = \frac{106.4}{\pi}$ $\quad d = 33.86$

$r = 16.93$

GuidedPractice

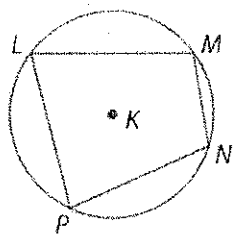
5. Find the diameter and radius of a circle to the nearest hundredth if the circumference of the circle is 77.8 centimeters.

$C = 77.8$ $\quad d = \frac{77.8}{\pi}$ $\quad d = 24.76$ cm $\quad r = \frac{24.76}{2}$

$r = 12.38$ cm

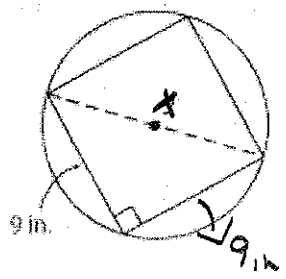
A polygon is **inscribed** in a circle if all of its vertices lie on the circle. A circle is **circumscribed** about a polygon if it contains all the vertices of the polygon.

- Quadrilateral *LMNP* is *inscribed in* ⊙*K*.
- Circle *K* is *circumscribed about* quadrilateral *LMNP*.



Standardized Test Example 6 Circumference of Circumscribed Polygon

SHORT RESPONSE A square with side length of 9 inches is inscribed in ⊙*J*. Find the exact circumference of ⊙*J*.



$9^2 + 9^2 = x^2$

$81 + 81 = x^2$

$162 = x^2$

$x = 12.7$ in

$C = 12.7(\pi)$

$C = 39.89$

Guided Practice

Find the exact circumference of each circle by using the given polygon.

6A. inscribed right triangle with legs 7 meters and 3 meters long

$7^2 + 3^2 = x^2$

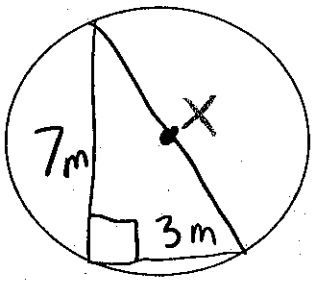
$49 + 9 = x^2$

$58 = x^2$

$7.6 = x$

$C = 7.6(\pi)$

$C = 23.87$



6B. circumscribed square with side 10 feet long

$10^2 + 10^2 = x^2$

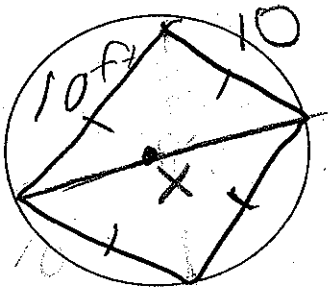
$100 + 100 = x^2$

$200 = x^2$

$x = 14.14$

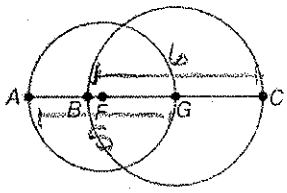
$C = 14.14(\pi)$

$C = 44.41$



The diameters of ⊙F and ⊙G are 5 and 6 units, respectively. Find each measure.

1. FF $3-2.5=0.5$ 2. AB 2.5



Find the diameter and radius of a circle with the given circumference. Round to the nearest hundredth.

3. $C = 36$ m

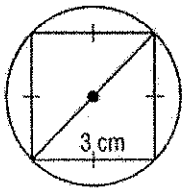
4. $C = 17.2$ ft

5. $C = 81.3$ cm

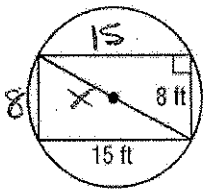
6. $C = 5$ yd

Find the exact circumference of each circle.

7.



8.



$8^2+15^2=x^2$

$64+225=x^2$

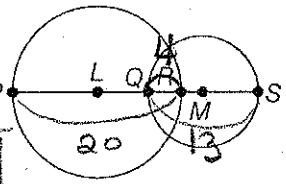
$x=17$

$C=\pi(17)$ $C=53.38$ ft

The diameters of ⊙L and ⊙M are 20 and 13 units, respectively, and $QR = 4$. Find each measure.

9. LQ $\frac{20}{2}=10-4=6$

10. RM $\frac{13}{2}=6.5-4=2.5$



Find the diameter and radius of a circle with the given circumference. Round to the nearest hundredth.

11. $C = 21.2$ ft

12. $C = 5.9$ m

13. SUNDIALS Herman purchased a sundial to use as the centerpiece for a garden. The diameter of the sundial is 9.5 inches.

a. Find the radius of the sundial.

b. Find the circumference of the sundial to the nearest hundredth.