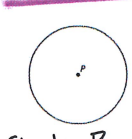
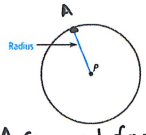
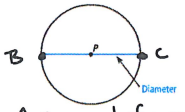
Center, Radius, & Diameter



Circle P



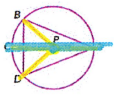
A segment from the center to the edge of the circle. Radius $\overline{AP}$



A segment from one edge of the circle all the way to the opposite edge of the circle. It must pass through the center.

Diameter $\overline{BC}$

EX: ① An art class developed this logo to represent the school in an art show. Determine which segments are *radii* and which are *diameters*.



Radii

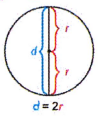
① $\overline{AP}$
② $\overline{BP}$
③ $\overline{CP}$
④ $\overline{DP}$

Diameters

① $\overline{AC}$

★ $\overline{BD}$ does not go through the center ★

The same goes for $\overline{AB}$ and $\overline{AD}$



The diameter is equal to two radii. If I know the diameter, then I divide by 2 to get the radius. If I know the radius, then I multiply it by 2 to get the diameter.

EX: ② In the diagram, $ST = 4\frac{1}{3}$ ft. What is SO?

- I know $\overline{ST}$ is a diameter
- I know $\overline{SO}$ is a radius

$4\frac{1}{3} \div 2$

$4\frac{1}{3} \div \frac{2}{1}$

$\frac{13}{3} \cdot \frac{1}{2} = \frac{13}{6} = 2\frac{1}{6}$ ft

Radius $\overline{OS}$ is $2\frac{1}{6}$ feet.

EX: ① If $KM = 2x - 4$ and $LM = 12$, what is the value of x?

- I know $\overline{KM}$ is a diameter
- I know $\overline{LM}$ is a radius
- I know $d = 2 \cdot r$

$2x - 4 = 2 \cdot 12$

$2x - 4 = 24$

$+4 \quad +4$

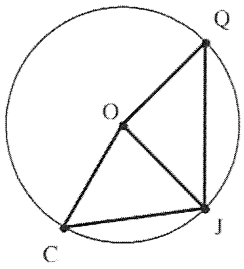
$2x = 28$

$\div 2 \quad \div 2$

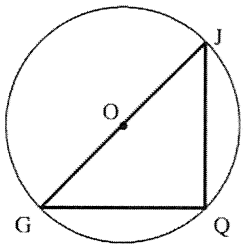
$x = 14$

Lesson 20-1 Homework

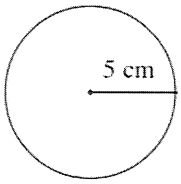
1. What are the radii of the circle shown with O as the center?
   - ❍ A. $\overline{JC}$, $\overline{QO}$, and $\overline{QJ}$
   - ❍ B. $\overline{JO}$, $\overline{QO}$, and $\overline{CO}$
   - ❍ C. $\overline{JO}$, $\overline{QC}$, and $\overline{CJ}$
   - ❍ D. $\overline{JQ}$, $\overline{QC}$, and $\overline{CJ}$



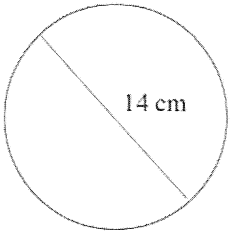
2. Which is the diameter of the circle shown?
   - ❍ A. $\overline{GO}$
   - ❍ B. $\overline{QG}$
   - ❍ C. $\overline{JO}$
   - ❍ D. $\overline{JG}$



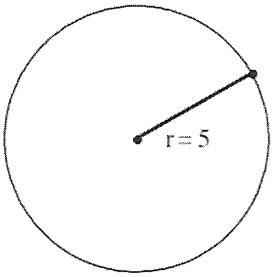
3. Find the length of the diameter of the circle.



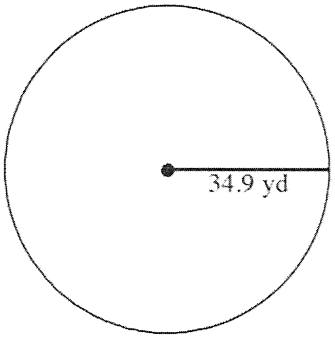
4. The length of the diameter, d, of the circle is 14 cm. Find the length of the radius, r, of the circle.



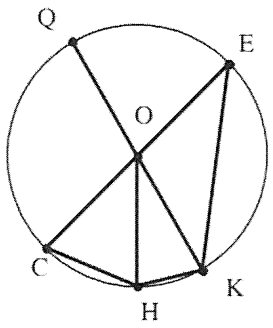
5. The radius of a circle is 5 cm. 3x + 7 represents the length of the diameter.
   a) Write an equation for x.
   b) Find the value of x.



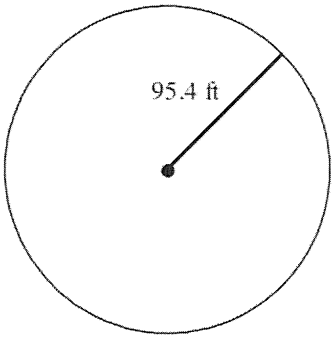
6. Writing Find the diameter of the circle.



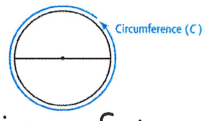
7. Which segment(s) of the circle are diameters? Check all that apply.
   - ❑ A. $\overline{EC}$
   - ❑ B. $\overline{KC}$
   - ❑ C. $\overline{EO}$
   - ❑ D. $\overline{CO}$
   - ❑ E. $\overline{EQ}$
   - ❑ F. $\overline{KQ}$



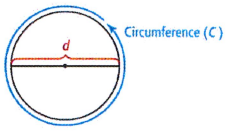
8. Find the diameter of the circle.



Circumference of a Circle



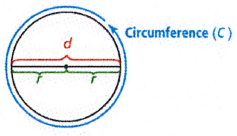
Circumference is the distance around the edge of the circle. It's the perimeter of the circle.



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

$\pi = 3.14$

$\pi = \frac{22}{7}$



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

$C = \pi d$, or $C = 2\pi r$

Use this if you know the diameter.

Use this if you know the radius.

EX: ① What is the circumference of a circle with a diameter of 4 in.?

I know the diameter, so I will use $C = \pi \cdot d$

Exact answer in terms of π

$C = \pi \cdot 4$

$\boxed{C = 4\pi}$

Use 3.14 for π

$C = 3.14 \cdot 4$

$\boxed{C = 12.56}$

Use $22/7$ for π

$C = \frac{22}{7} \cdot 4$

$C = \frac{22}{7} \cdot \frac{4}{1}$

$C = \frac{88}{7}$

$\boxed{C = 12\frac{4}{7}}$

EX: ② What is the diameter of a circle with a circumference of 88 ft?
Use $\frac{22}{7}$ for π.

I'm being asked to find the diameter, so I will use $C = \pi \cdot d$

$88 = \frac{22}{7} \cdot d$

$\frac{7}{22_1} \cdot \frac{88^4}{1} = \frac{7^1}{22_1} \cdot \frac{22^1}{7_1} \cdot d$

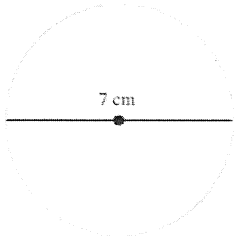
$\frac{28}{1} = \frac{1}{1} \cdot d$

$28 = 1 \cdot d$

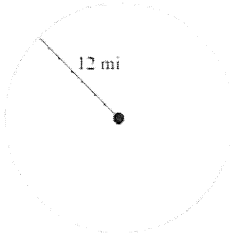
$\boxed{28 = d}$

Lesson 20-2 Homework

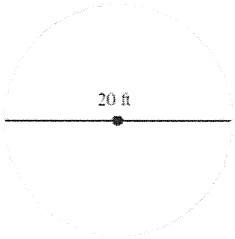
1. Find the circumference of the circle. Write an exact answer in terms of π.



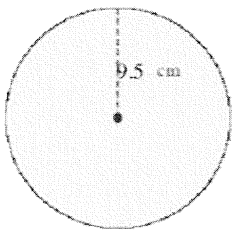
2. Find the circumference of the circle. Write an exact answer in terms of π.



3. Find the circumference of the circle. Use 3.14 for π. Write an integer or decimal rounded to the nearest hundredth as needed.



4. Find the circumference of the circle. Use 3.14 for π. Round to the nearest hundredth as needed.



5. Find the diameter of the circle with the circumference C = 27 cm. Use 3.14 for π. Round to the nearest tenth as needed.

6. The distance around a meteor crater is 9,687 ft. Find the diameter of the crater. Use $\frac{22}{7}$ for π. Write an integer or decimal rounded to the nearest tenth as needed.

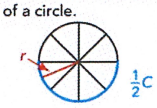
7. What is the diameter of a circle with a circumference of 29.6 ft? Use 3.14 for π. Round to the nearest tenth as needed.

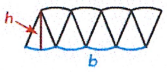
8. How much fencing is required to enclose a circular garden whose radius is 22 m? Use 3.14 for π.

9. What is the diameter of a circle with a circumference of 132 ft? Use $\frac{22}{7}$ for π.

Area of a Circle

You can use what you know about the area of a parallelogram to find the area of a circle.





$A = \frac{1}{2}C \cdot r$

$= \frac{1}{2} \cdot 2 \cdot \pi \cdot r \cdot r$

$= \pi r^2$

$A = b \cdot h$

EX: 1 What is the area of a circle with a radius of 3.2 m? Leave your answer in terms of π.

$A = \pi \cdot r^2$

$A = \pi \cdot 3.2^2$

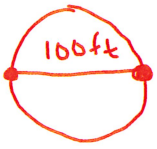
$A = \pi \cdot 3.2 \cdot 3.2$

$A = \pi \cdot 10.24$

$A = 10.24\pi \text{ m}^2$

EX: 2 Bubble netting is a hunting technique used by humpback whales. They blow bubbles in a circular ring that drives fish toward the center of the circle. What is the area of a ring of bubbles 100 feet wide? Use 3.14 for π.

$A = \pi \cdot r^2$



Because I was given the diameter, I need to divide it by 2 to find the radius.

$100 \div 2 = 50$

$A = 3.14 \cdot 50^2$

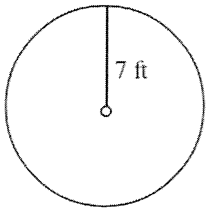
$A = 3.14 \cdot 50 \cdot 50$

$A = 3.14 \cdot 2500$

$A = 7,850 \text{ ft}^2$

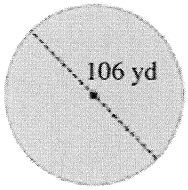
Lesson 20-3 Homework

1. Find the area of the circle. Use 3.14 for π. Round to the nearest hundredth as needed.



2. A water sprinkler sends water out in a circular pattern. How large is the watered area if the radius of the watering pattern is 18 ft? Write an exact answer in terms of π.

3. Find the area of the circle. Use 3.14 for π. Round to the nearest hundredth as needed.



4. A certain coin is a circle with diameter 18 mm. What is the exact area of each side of the coin? Simplify your answer. Write an exact answer in terms of π.

5. Find the exact area of the circle in terms of π.