

Relationships between Circumference & Diameter of a Circle

What is relationship between the circumference of a circle and its diameter?

The _____ of a circle's circumference to its diameter is a _____, also known as _____. It can be estimated as _____ or _____. The ratio is _____.

IF a diagram shows the length of either the radius or diameter, can you determine the other?

IF you know the _____, _____ by 2

IF you know the _____, _____ by 2.

Relationships between Circumference & Diameter of a Circle

What is relationship between the circumference of a circle and its diameter?

The ratio of a circle's circumference to its diameter is a constant, also known as π or $\frac{22}{7}$. It can be estimated as 3.14. The ratio is $\frac{C}{d}$.

IF a diagram shows the length of either the radius or diameter, can you determine the other?

yes

IF you know the radius, multiply by 2

IF you know the diameter, divide by 2.

LESSON
4-4 **Ratios and Pi**

Reading Strategies: Identify Relationships

You can find unknown measurements of circles when you understand the relationships among a circle's different parts.

First, you need to understand the terms *radius*, *diameter*, and *circumference*.

- The **radius** has one endpoint at the center and one endpoint at any point on the circle.
- The **diameter** passes through the center, and its two endpoints both lie on the circle.
- The **circumference** is the distance around the circle.

The table shows the dimensions of six circles. Use it to determine the relationship between the radius, diameter, and circumference of a circle.

Circle	Radius (in.)	Diameter (in.)	Circumference (in.)	$\frac{\text{Diameter}}{\text{Radius}}$	$\frac{\text{Circumference}}{\text{Diameter}}$
A	2	4	12.56	2	3.14
B	3	6	18.84	2	3.14
C	5	10	31.4	2	3.14
D	8	16	50.24	2	3.14
E	14	28	87.92	2	3.14
F	20	40	125.6	2	3.14

You try it. Show your work.

Write the ratio for any circle.

1. $\frac{\text{Diameter}}{\text{Radius}}$ _____
2. $\frac{\text{Circumference}}{\text{Diameter}}$ _____

Solve.

3. The length of the radius of a circle is 12 feet. What is the length of the diameter of the circle?

4. The length of the diameter of a circle is 15 inches. What is the circumference of the circle?

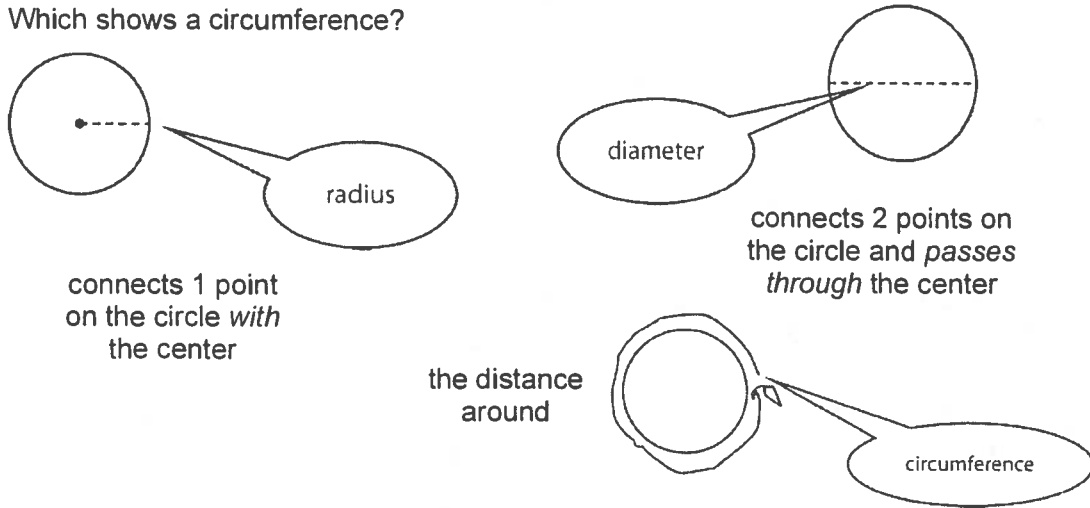
LESSON
4-4

Ratios and Pi

Success for English Learners

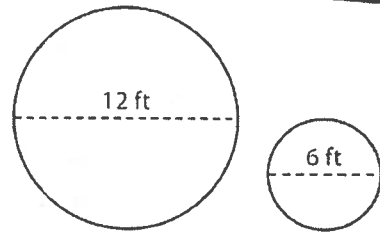
Problem 1

Which shows a diameter? Which shows a radius?
Which shows a circumference?



Problem 2

The circumference of the large circle is about 38 feet. What is the circumference of the small circle?
Set up a proportion.



$$\frac{\text{circumference of large circle}}{\text{diameter of large circle}} = \frac{\text{circumference of small circle}}{\text{diameter of small circle}}$$

$$\frac{38}{12} = \frac{y}{6} \quad \leftarrow \text{Substitute.}$$

$$12 \times y = 38 \times 6 \quad \leftarrow \text{Set up cross-products.}$$

$$12y = 228 \quad \leftarrow \text{Multiply.}$$

$$y = 19 \text{ feet} \quad \leftarrow \text{Solve for } y.$$

1. Explain the relationship between the circles in Problem 2. Do all circles have the same relationship?

2. The circumference of a large circle is 21 centimeters, and its diameter is 7 centimeters. The circumference of a smaller circle is 15 centimeters. Find the diameter of the smaller circle. Explain.

LESSON
4-4

Ratios and Pi

Practice and Problem Solving: D

Use the figures to answer the questions. The first one is done for you.

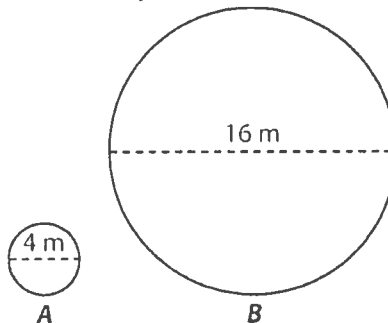
1. What is the diameter of circle A? 4 m

2. What is the diameter of circle B? _____

3. What is the radius of circle A? _____

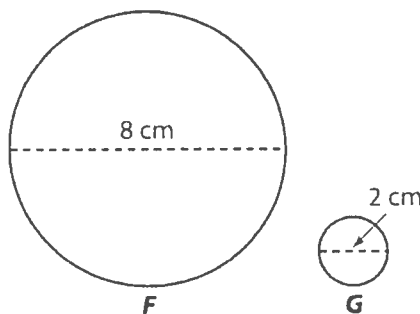
4. What is the radius of circle B? _____

5. Are the radius and diameter of the two circles proportional? Explain.



6. The circumference of circle F is about 25 cm.
a. Write a proportion to find the circumference of circle G. _____

b. What is the circumference of circle G?



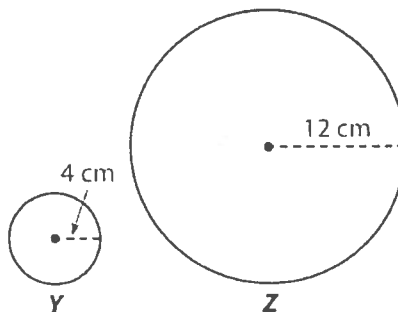
7. The circumference of circle Y is about 25 cm.

a. What is the diameter of circle Y?

b. What is the diameter of circle Z?

c. Write a proportion to find the circumference of circle Z. _____

d. What is the circumference of circle Z?



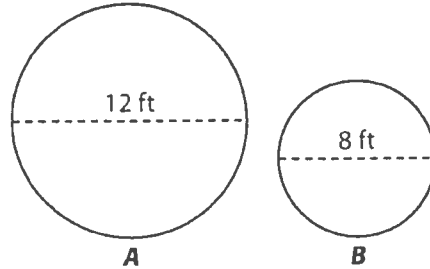
LESSON
4-4

Ratios and Pi

Practice and Problem Solving: A/B

Use the figures to answer the questions.

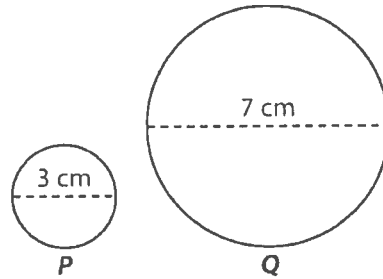
1. What is the diameter of circle A? _____
2. What is the diameter of circle B? _____
3. What is the radius of circle A? _____
4. What is the radius of circle B? _____



5. Are the radius and diameter of the two circles proportional? Explain.

6. The circumference of circle Q is 21 centimeters.

- a. Write a proportion to find the circumference of circle P. _____
- b. What is the circumference of circle P?



Solve.

7. Chad has a dinner plate with a radius of 16 inches. What is the circumference of the dinner plate? (Remember, $\frac{C}{d} = 3.14$.)

8. A circular walking path has a diameter of 45 yards. What is the distance around the walking path? (Remember, $\frac{C}{d} = 3.14$.)

9. The path of a rotating fan has a diameter of about 18 inches and a circumference of about 56 inches. The path of a smaller model of the fan has a circumference of about 9 inches. What is the diameter of the rotation path of the smaller model? Round to the nearest tenth.
