GRADE 7 · UNIT 4 · LESSON 7

Finding the Radius and Diameter from the Circumference

MA.7.GR.1.3

I can find the radius and diameter of a circle when I am given the circumference.

Warm-Up

1. A circle: diameter 8 cm. Circumference? Use 3.14.
2. A circle: radius 8 cm. Circumference? Use 3.14.
3. Why is question 2's answer double question 1's?
4. A circle: diameter 5 in. Circumference, in terms of π?

Warm-Up

1. A circle: diameter 8 cm. Circumference? Use 3.14. **25.12 cm**
2. A circle: radius 8 cm. Circumference? Use 3.14. **50.24 cm**
3. Why is question 2's answer double question 1's?

   A radius of 8 means a diameter of 16.
4. A circle: diameter 5 in. Circumference, in terms of π? **5π in**

Vocabulary

circumference

the distance all the way around a circle

diameter

a segment through the center with both ends on the circle — the distance across

radius

a segment from the center to the circle — half the diameter

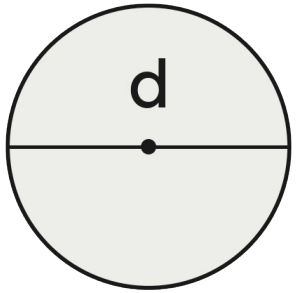
π

the number every circumference is divided by to get its diameter, about 3.14

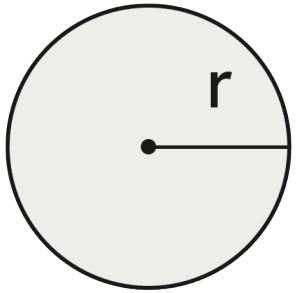
Notes

I. One circle, two formulas

The circumference is the distance around. The diameter goes across; the radius goes halfway.



$C = \pi d$



$C = 2\pi r$

Notes

II. Forwards and backwards

diameter × π = CIRCUMFERENCE: multiply

circumference ÷ π = DIAMETER: divide

For the radius, do both steps: divide by π and halve.

25.12 ÷ 3.14 = 8, and half of 8 is 4.

Notes

III. When π cancels

If the circumference is given in terms of π, dividing by π cancels it exactly.

C = 30π in, so d = 30π ÷ π = 30 in

No rounding and no 3.14. The answer is exact.

If it is given as a decimal, use 3.14 and expect a decimal back.

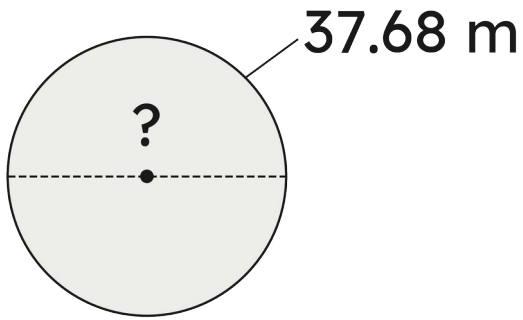
C = 25.12 cm, so d = 25.12 ÷ 3.14 = 8 cm

Example 1

A walkway runs all the way around a circular water tank.

It is 37.68 m long. How far is it across the tank?

What has the walkway measured? What is the dashed line across the middle? Which formula connects them?



Example 1

Which number do we already have — C, or d?

$$C = \pi d$$

Example 1

How do we get d on its own?

$$C = \pi d$$

$$37.68 = \pi \cdot d$$

Example 1

$C = \pi d$

$37.68 = \pi \cdot d$

$d = 37.68 \div 3.14$

$d = 12$

Answer: 12 m

Your Turn

A circle has a circumference of 21.98 m.

Find its diameter. Use 3.14.

Your Turn

A circle has a circumference of 21.98 m.

Find its diameter. Use 3.14.

$$d = C \div 3.14$$

$$d = 21.98 \div 3.14 = 7$$

Answer: 7 m

Example 2

Two large pizzas, both 12.99 dollars. Which one is bigger across?

Pizzeria: circumference = 43.96 in

Little Italy: diameter = 13.25 in

You cannot compare these yet. Why not?

Example 2

$$d = 43.96 \div 3.14 = 14$$

Now they are both diameters. Which is bigger?

Example 2

$$d = 43.96 \div 3.14 = 14$$

Convert first, compare second. Never compare a distance around to a distance across.

Answer: Pizzeria is bigger — 14 in against 13.25 in.

Your Turn

Wheel A has a circumference of 87.92 in. Wheel B has a diameter of 27.5 in.

Which wheel is bigger across, and by how much? Use 3.14.

Your Turn

Wheel A has a circumference of 87.92 in. Wheel B has a diameter of 27.5 in.

Which wheel is bigger across, and by how much? Use 3.14.

Wheel A: $d = 87.92 \div 3.14 = 28$

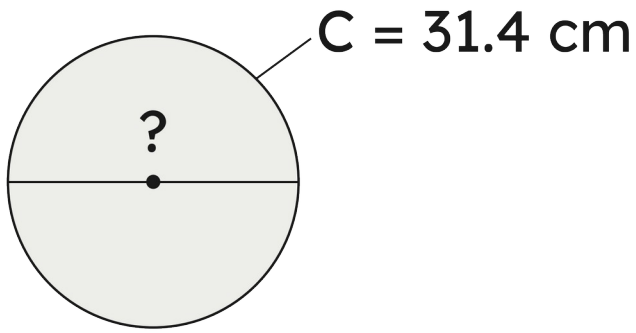
Wheel B: $d = 27.5$

Difference: $28 - 27.5 = 0.5$

Answer: Wheel A, by 0.5 in

Whiteboards · Question 1 of 9

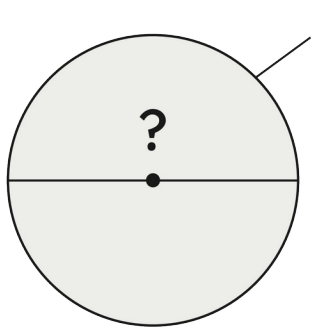
Find the diameter.



Answer it.

Whiteboards · Question 1 of 9

Find the diameter.



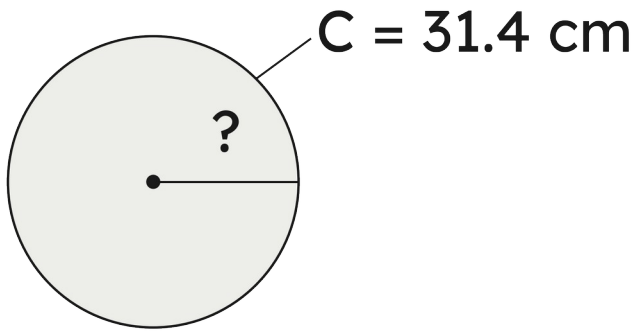
$d = C \div 3.14$

$d = 31.4 \div 3.14 = 10$

Answer: 10 cm

Whiteboards · Question 2 of 9

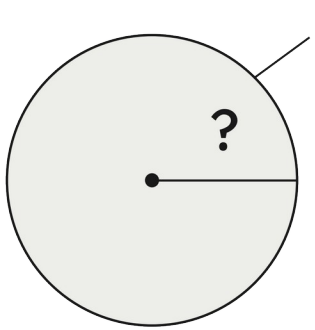
Find the radius.



Answer it.

Whiteboards · Question 2 of 9

Find the radius.



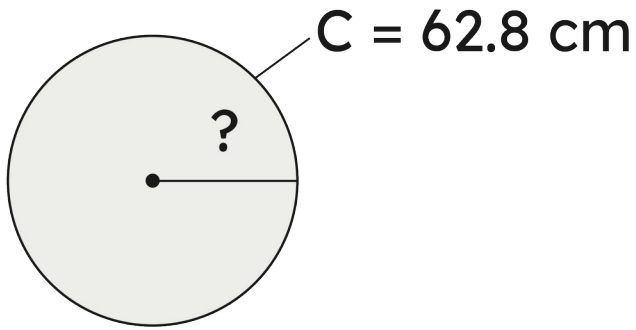
$d = 31.4 \div 3.14 = 10$

$r = 10 \div 2 = 5$

Answer: 5 cm

Whiteboards · Question 3 of 9

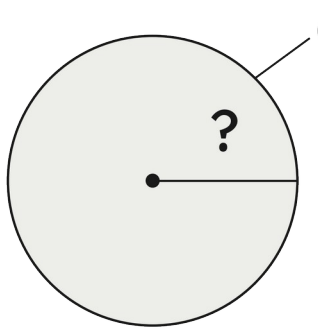
Find the radius.



Answer it.

Whiteboards · Question 3 of 9

Find the radius.



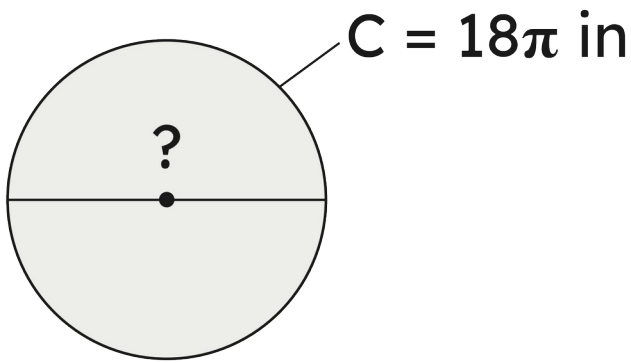
$d = 62.8 \div 3.14 = 20$

$r = 20 \div 2 = 10$

Answer: 10 cm

Whiteboards · Question 4 of 9

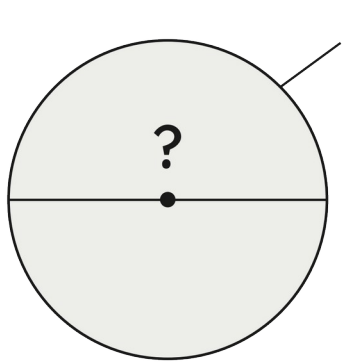
Find the diameter.



Answer it.

Whiteboards · Question 4 of 9

Find the diameter.



$d = C \div \pi$

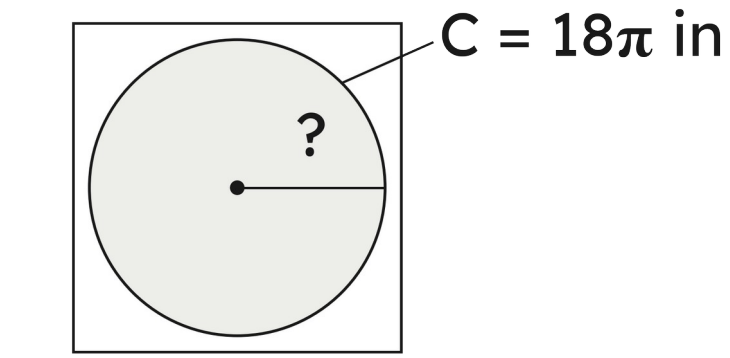
$d = 18\pi \div \pi = 18$

Answer: 18 in exactly

Whiteboards · Question 5 of 9

A disk with a circumference of 18π in is cut from a card 20 in wide.

Find the radius of the disk.

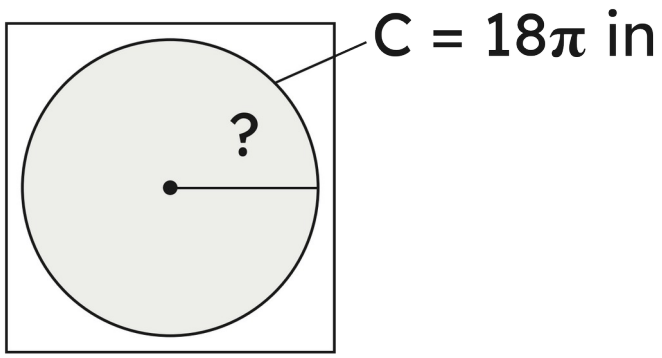


Answer it.

Whiteboards · Question 5 of 9

A disk with a circumference of 18π in is cut from a card 20 in wide.

Find the radius of the disk.



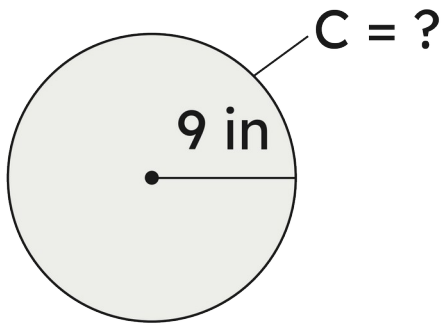
$d = 18\pi \div \pi = 18$

$r = 18 \div 2 = 9$

Answer: 9 in

Whiteboards · Question 6 of 9

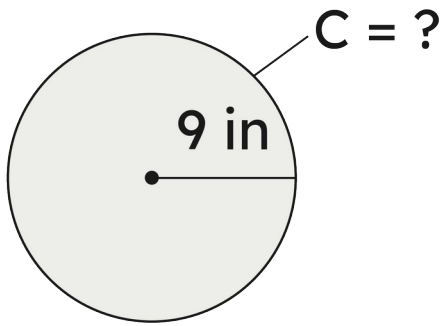
Find the circumference in terms of π.



Answer it.

Whiteboards · Question 6 of 9

Find the circumference in terms of π.



$C = 2\pi r = 2 \times \pi \times 9$

$2 \times 9 = 18$, so $C = 18\pi$

Answer: 18π in

Whiteboards · Question 7 of 9

A circular garden has a 100.48 ft walkway around its edge. Fredrick runs a hose from the edge to a fountain at the center.

How long must the hose be? Use 3.14.

A. 16 ft

B. 50.24 ft

C. 315.51 ft

D. 32 ft

Answer it.

Whiteboards · Question 7 of 9

A circular garden has a 100.48 ft walkway around its edge. Fredrick runs a hose from the edge to a fountain at the center.

How long must the hose be? Use 3.14.

The walkway is the circumference: $d = 100.48 \div 3.14 = 32$

The hose is a radius: $r = 32 \div 2 = 16$

Answer: A — 16 ft

Whiteboards · Question 8 of 9

A Ferris wheel carries a rider 44π m in one full turn.

How far is the rider's seat from the center of the wheel?

A. 69.08 m

B. 138.16 m

C. 44 m

D. 22 m

Answer it.

Whiteboards · Question 8 of 9

A Ferris wheel carries a rider 44π m in one full turn.

How far is the rider's seat from the center of the wheel?

$$d = 44\pi \div \pi = 44$$

$$r = 44 \div 2 = 22$$

Answer: D — 22 m

Whiteboards · Question 9 of 9

Wheel 1 has a circumference of 81.64 in. Wheel 2 has a diameter of 27 in.

Which wheel is bigger across, and by how much? Use 3.14.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Wheel 1 has a circumference of 81.64 in. Wheel 2 has a diameter of 27 in.

Which wheel is bigger across, and by how much? Use 3.14.

Wheel 1: $d = 81.64 \div 3.14 = 26$

Wheel 2: $d = 27$

Difference: $27 - 26 = 1$

Answer: Wheel 2, by 1 in.

Before You Go

Divide by π to go from around to across.

For the radius, halve as well — either order.

If the circumference has a π in it, the π cancels and the answer is exact.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 4 test.

Today's skills — all required

Find the radius or diameter of a circle given the circumference (2CM)