GRADE 7 · UNIT 4 · LESSON 6

Finding Circumference

MA.7.GR.1.3

I can find the circumference of a circle.

Warm-Up

1. Diameter 20 cm, and $C \div d \approx 3.14$. About how long is C?
2. A different circle: radius 20 cm. About how long is C?
3. Why are your answers to questions 1 and 2 different?
4. Write a rule connecting C and d. Words or symbols.

Warm-Up

1. Diameter 20 cm, and C ÷ d ≈ 3.14. About how long is C?

   62.8 cm

2. A different circle: radius 20 cm. About how long is C?

   125.6 cm

3. Why are your answers to questions 1 and 2 different?

   A radius of 20 is a diameter of 40.

4. Write a rule connecting C and d. Words or symbols.

   C is about 3.14 times d.

Vocabulary

pi (π)

the ratio of any circle's circumference to its diameter; 3.14159265…

approximation

a number close to the true value but not equal to it — 3.14 and 22/7 are both approximations of π

exact answer

one written in terms of π, such as 14.6π, with nothing rounded

Notes

I. The Number Has a Name

pi (π) — the ratio of any circle's circumference to its diameter

π is the same number for every circle in the universe. That is why it gets a symbol.

π = 3.14159265… The digits never end and never repeat.

3.14 and 22/7 are approximations. Neither one is π.

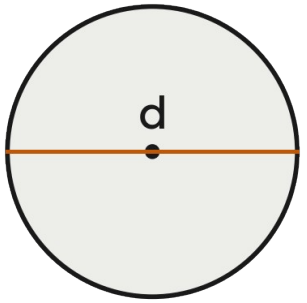
≈ means "is approximately equal to". Use it whenever you replace π with a number.

Notes

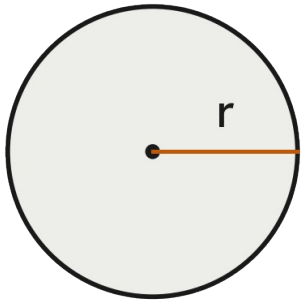
II. Two Formulas, One Idea

$C \div d = \pi$, so $C = \pi\, d$.

A diameter is two radii, so $d = 2r$. Substitute: $C = \pi(2r) = 2\pi\, r$.



$C = \pi\, d$



$C = 2\pi\, r$

Notes

Two Formulas, One Idea

They are the same formula. Use the one that matches what you were given.

Diameter: $C = \pi d$. **Radius**: $C = 2\pi r$.

Notes

III. Exact and Approximate

An answer written in terms of π is exact: $C = 14.6\pi$ in.

An answer with a number in place of π is approximate: $C \approx 45.844$ in.

The second is rounded before you even start, because 3.14 is itself rounded.

Give whichever the question asks for. If it does not say, give both.

Notes

IV. Which Number, and When to Round

Use 3.14 unless the question tells you otherwise. That is the default all year.

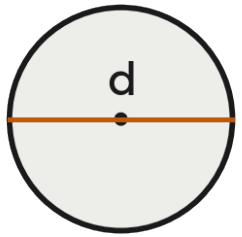
Use 22/7 when the measurement is a multiple of 7 — whole, or a fraction whose numerator is.

5¼ = 21/4, and the 21 cancels the 7: a tidy 16.5 in. With 3.14 it is 16.485.

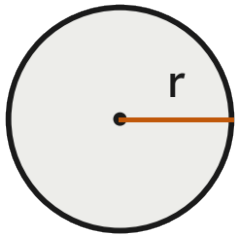
Round once, at the very end, and to whatever the question asks for.

Example 1

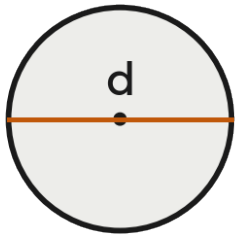
Find the circumference of each circle.



d = 10.9 in



r = 6.5 m



d = 5¼ in

$\pi = 22/7$

Which formula does each one need, and why?

Example 1

$C = \pi d$

$C = 10.9\pi$

$C \approx 34.23$

Answer: $C = 10.9\pi$ in. · $C \approx 34.23$ in.

Example 1

$$C = 2\pi r$$

$$C = 2\pi(6.5) = 13\pi$$

$$C \approx 40.82$$

Answer: $C = 13\pi$ m · $C \approx 40.82$ m

Example 1

$$C = \pi d = \left(\frac{22}{7}\right)\left(\frac{21}{4}\right)$$

$$C = \frac{462}{28}$$

$$C \approx 16.5$$

Answer: $C \approx 16.5$ in. · exact: $5\frac{1}{4}\pi$ in.

Your Turn

A slice of orange has a diameter of 4 1/8 inches.

What is its circumference? Use 3.14.

Round to the nearest tenth of an inch.

Your Turn

A slice of orange has a diameter of 4 1/8 inches.

What is its circumference? Use 3.14.

Round to the nearest tenth of an inch.

$4\ 1/8 = 4.125$

$C = 3.14 \times 4.125 = 12.9525$

To the nearest tenth: 13.0

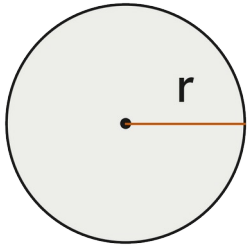
Answer: 13.0 in.

Example 2

Delanie found the circumference of this circle with $\pi = 22/7$.

Delanie's work: $C = \pi d = (22/7)(5\frac{1}{4}) = (22/7)(21/4)$

$= 462/7 = 66$ in.



r = 5¼ in

Find both mistakes.

Example 2

5¼ in. is the radius, not the diameter.

462/7 — the denominators are 7 × 4.

Answer: A radius used as a diameter, and a denominator left behind.

Example 2

$$C = \left(\frac{22}{7}\right)\left(\frac{21}{2}\right) = 33$$

She used the radius as a diameter, and she divided by 7 not 28.

Answer: 33 in., not 66

Your Turn

A Ferris wheel has a radius of 37.25 meters. Use 3.14.

How far does a rider travel in one complete turn?

Round to the nearest tenth of a meter.

Your Turn

A Ferris wheel has a radius of 37.25 meters. Use 3.14.

How far does a rider travel in one complete turn?

Round to the nearest tenth of a meter.

$$C = 2 \times 3.14 \times 37.25 = 233.93$$

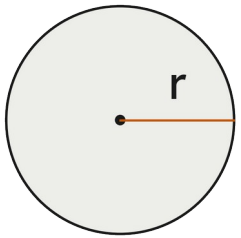
To the nearest tenth: 233.9

Answer: 233.9 m

Whiteboards · Question 1 of 9

A circle has a radius of 9 in.

Write the formula for C and substitute. Do not compute.



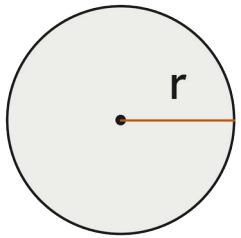
r = 9 in

Answer it.

Whiteboards · Question 1 of 9

A circle has a radius of 9 in.

Write the formula for C and substitute. Do not compute.



r = 9 in

A radius is given, so use $C = 2\pi r$

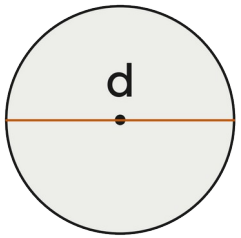
$C = 2\pi(9)$

Answer: $C = 2\pi(9)$

Whiteboards · Question 2 of 9

A circle has a diameter of 14 cm.

Write the formula for C and substitute. Do not compute.



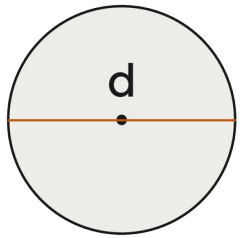
d = 14 cm

Answer it.

Whiteboards · Question 2 of 9

A circle has a diameter of 14 cm.

Write the formula for C and substitute. Do not compute.



d = 14 cm

A diameter is given, so use $C = \pi d$

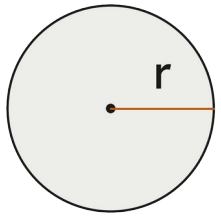
$C = \pi(14)$

Answer: $C = \pi(14)$

Whiteboards · Question 3 of 9

A circle has a radius of 4.5 m. Use the formula $C = \pi d$.

Substitute into $C = \pi d$. Do not compute.



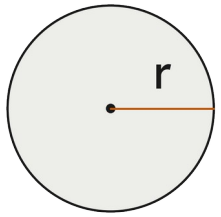
r = 4.5 m

Answer it.

Whiteboards · Question 3 of 9

A circle has a radius of 4.5 m. Use the formula $C = \pi d$.

Substitute into $C = \pi d$. Do not compute.



r = 4.5 m

The formula needs a diameter: $d = 2 \times 4.5 = 9$

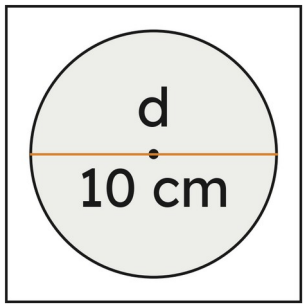
$C = \pi(9)$

Answer: $C = \pi(9)$

Whiteboards · Question 4 of 9

A circle 10 cm across is cut from a square card 12 cm on a side.

Find the circumference of the circle. Use 3.14.



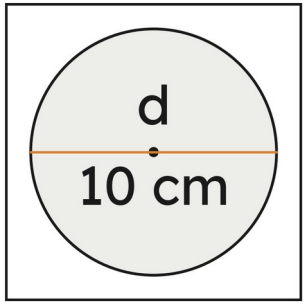
card: 12 cm on a side

Answer it.

Whiteboards · Question 4 of 9

A circle 10 cm across is cut from a square card 12 cm on a side.

Find the circumference of the circle. Use 3.14.



card: 12 cm on a side

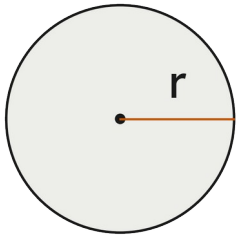
The circle is 10 cm across.

$C = 3.14 \times 10 = 31.4$

Answer: C = 31.4 cm

Whiteboards · Question 5 of 9

Find the circumference. Use 3.14.

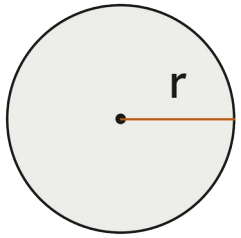


r = 3 in

Answer it.

Whiteboards · Question 5 of 9

Find the circumference. Use 3.14.



r = 3 in

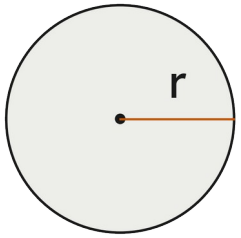
A radius is given, so use $C = 2\pi r$

$C = 2 \times 3.14 \times 3 = 18.84$

Answer: C = 18.84 in.

Whiteboards · Question 6 of 9

Give the exact circumference, in terms of π.

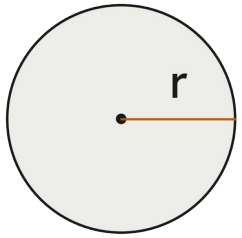


r = 3½ in

Answer it.

Whiteboards · Question 6 of 9

Give the exact circumference, in terms of π.



r = 3½ in

$C = 2\pi r = 2 \times \pi \times 3.5$

$2 \times 3.5 = 7$, so $C = 7\pi$

Answer: $C = 7\pi$ in.

Whiteboards · Question 7 of 9

The Johnson family is fencing a circular pool with a radius of 15.6 ft.

How many feet of fencing do they need? Use 3.14 and round to tenths.

A. 97.968 ft

B. 98.0 ft

C. 764.15 ft^2

D. 48.98 ft

Answer it.

Whiteboards · Question 7 of 9

The Johnson family is fencing a circular pool with a radius of 15.6 ft.

How many feet of fencing do they need? Use 3.14 and round to tenths.

$$C = 2 \times 3.14 \times 15.6 = 97.968$$

To the nearest tenth: 98.0

Answer: B — 98.0 ft

Whiteboards · Question 8 of 9

Denise paints the outer edge of a clock face. Its diameter is 9 3/5 in.

How long is the edge? Use 3.14 and round to the nearest hundredth.

A. 30.14 in

B. 29.36 in

C. 30.1 in

D. 60.29 in

Answer it.

Whiteboards · Question 8 of 9

Denise paints the outer edge of a clock face. Its diameter is 9 3/5 in.

How long is the edge? Use 3.14 and round to the nearest hundredth.

$9\ 3/5 = 9.6$

$C = 3.14 \times 9.6 = 30.144$

To the nearest hundredth: 30.14

Answer: A — 30.14 in

Whiteboards · Question 9 of 9

A circle has a radius of 8.2 in. Aziyia used $C = 2\pi r$ with 3.14. Jamal used $C = \pi d$ and kept π in his answer.

Finish both, then say whose answer is more accurate.

Write your answer in sentences.

Whiteboards · Question 9 of 9

A circle has a radius of 8.2 in. Aziyia used $C = 2\pi r$ with 3.14. Jamal used $C = \pi d$ and kept π in his answer.

Finish both, then say whose answer is more accurate.

Aziyia: $2 \times 3.14 \times 8.2 = 51.496$

Jamal: $d = 2 \times 8.2 = 16.4$, so $C = 16.4\pi$

Jamal's is exact. 3.14 is a rounded π.

Answer: 51.496 in, 16.4π in, Jamal

Before You Go

Read the label, then pick the formula.

An answer in terms of π is exact. Leave it alone.

Circumference is a length. Never square the unit.

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

Circumference of circles (9FM)

Center, radius, and diameter of a circle (7RY)