LESSON MAKER PRO

Circle Power

Use radius and diameter to find circumference and area.

GRADE 7 · 7.GSR.5.4

7.GSR.5.4 "Explore and describe the relationship between pi, radius, diameter, circumference, and area of a circle to derive the formulas for the circumference and area of a circle."

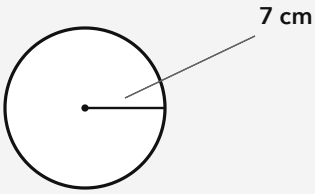
NAME _____ DATE _____

CIRCLE CONNECTIONS

For every circle, circumference divided by diameter equals pi, so C = pi × d. Because d = 2r, you can also write C = 2pi × r. The area of a circle is A = pi × r^2.

WORKED EXAMPLE

Use the circle shown. Find its circumference and area in terms of pi.

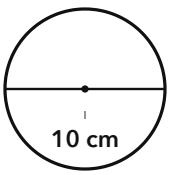


1. The radius is 7 cm, so d = 2 × 7 = 14 cm.
2. Find circumference: C = pi × 14 = 14pi cm.
3. Find area: A = pi × 7^2.
4. A = 49pi cm^2.

Answer: Circumference = 14pi cm; area = 49pi cm^2.

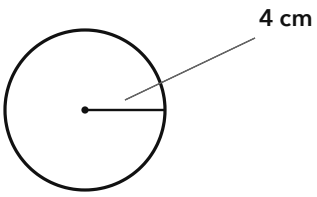
PRACTICE 6 problems

1 Use the circle shown, with diameter 10 cm. What is its circumference in terms of pi?



ANSWER _____

2 Use the circle shown, with radius 4 cm. What is its area in terms of pi?



ANSWER _____

3 A circle has a diameter of 18 cm. Find its radius and circumference in terms of pi.

ANSWER _____

_____

4 A circle has a radius of 6 m. Find its circumference and area in terms of pi.

ANSWER _____

_____

5 A circle has a circumference of 24pi inches. Find its diameter and radius.

ANSWER _____

_____

6 A circle has an area of 81pi square centimeters. Find its radius and diameter.

ANSWER _____

_____

APPLY IT Show your work

1 A skateboard wheel has a radius of 5 cm. How far does the wheel roll in 12 complete turns? Give your answer in terms of pi.

WORK SPACE

ANSWER _____

2 A student designs a circular sticker with a diameter of 16 cm. How much trim is needed for the edge, and how much printable surface does the sticker have? Give both answers in terms of pi.

WORK SPACE

ANSWER _____

3 Explore the circumference-diameter relationship. Complete C/d in each row. What stays constant? Start with C/d = pi and multiply both sides by d to develop a formula for C. Substitute d = 2r to develop the radius form. Explain why both formulas describe the same circle. Use separate paper for the equation chain and explanation.

CIRCLE RELATIONSHIPS

Diameter d (cm)	Circumference C (cm)	C/d
2	2pi	_____
4	4pi	_____
6	6pi	_____

ANSWER _____

CHALLENGE One step up

Circle A has a circumference of 20pi cm. Circle B has twice the diameter of Circle A. Find the area of Circle B in terms of pi. Explain how you found it.

WORK SPACE AND ANSWER

ANSWER KEY

Circle Power

GRADE 7 · 7.GSR.5.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the circle shown, with diameter 10 cm. What is its circumference in terms of pi?	**10pi cm**
2	Use the circle shown, with radius 4 cm. What is its area in terms of pi?	**16pi cm^2**
3	A circle has a diameter of 18 cm. Find its radius and circumference in terms of pi.	**Radius = 9 cm; circumference = 18pi cm**
4	A circle has a radius of 6 m. Find its circumference and area in terms of pi.	**Circumference = 12pi m; area = 36pi m^2**
5	A circle has a circumference of 24pi inches. Find its diameter and radius.	**Diameter = 24 in.; radius = 12 in.**
6	A circle has an area of 81pi square centimeters. Find its radius and diameter.	**Radius = 9 cm; diameter = 18 cm**

PART 2 · APPLY IT

1. **120pi cm** One turn covers the circumference, 2pi × 5 = 10pi cm. Multiply 10pi by 12 turns.
2. **Trim = 16pi cm; printable surface = 64pi cm^2.** Use the diameter for circumference, C = pi × 16. The radius is 8 cm, so the area is pi × 8^2.
3. **Every ratio is pi. C/d = pi gives C = pi d. Since d = 2r, C = pi(2r) = 2pi r. Both formulas use the same circumference because the diameter is twice the radius.** Require the learner-completed ratios, both equation chains, and an explanation connecting radius and diameter. These exact examples illustrate the relationship; use the given general C/d = pi relationship for the general formula development.

CHALLENGE

400pi cm^2. Circle A has diameter 20 cm because C = pi × d. Circle B has diameter 40 cm and radius 20 cm, so its area is pi × 20^2 = 400pi cm^2.

Accept equivalent exact forms, such as 2pi r for circumference, when the correct given value is substituted. Require units and clear labels when an item asks for more than one measurement.