

Circle Power

Use radius, diameter, pi, 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

Pi tells how many diameters fit around a circle, so circumference is $C = \pi d$. Since diameter is twice the radius, you can also use $C = 2\pi r$. The area inside a circle is $A = \pi r^2$.

WORKED EXAMPLE

A circle has a radius of 9 units. Find its circumference and area in terms of pi.

1. $d = 2r = 2(9) = 18$ units
2. $C = \pi d = \pi(18) = 18\pi$ units
3. $A = \pi r^2 = \pi(9^2) = 81\pi$ square units

Answer: Circumference: 18π units;

Area: 81π square units

PRACTICE 6 problems

- 1** A circle has a diameter of 10 cm. Find its circumference in terms of pi.

ANSWER _____

- 2** A circle has a radius of 4 m. Find its area in terms of pi.

ANSWER _____

- 3** A circle has a circumference of 16π inches. Find its diameter.

ANSWER _____

- 4** A circle has an area of 25π square units. Find its radius.

ANSWER _____

- 5** A circle has a radius of 2 cm. Find its circumference and area in terms of pi.

ANSWER _____

- 6** Circle P has a diameter of 8 units, and Circle Q has a diameter of 12 units. How much greater is the circumference of Circle Q than the circumference of Circle P?

ANSWER _____

APPLY IT Show your work

- 1** A student is making a circular patch for a backpack. The patch has a radius of 7 cm. How much fabric is needed to cover the front of the patch? Give the exact area.

WORK SPACE

ANSWER _____

- 2** The school esports club makes a circular logo with a diameter of 14 inches. They want to place trim all the way around its edge. How much trim do they need? Give the exact length.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A circle has a circumference of 20π units. Find its area in terms of π . Explain how the circumference helped you find the radius.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A circle has a diameter of 10 cm. Find its circumference in terms of pi.	10pi cm
2	A circle has a radius of 4 m. Find its area in terms of pi.	16pi square m
3	A circle has a circumference of 16pi inches. Find its diameter.	16 inches
4	A circle has an area of 25pi square units. Find its radius.	5 units
5	A circle has a radius of 2 cm. Find its circumference and area in terms of pi.	Circumference: 4pi cm; Area: 4pi square cm
6	Circle P has a diameter of 8 units, and Circle Q has a diameter of 12 units. How much greater is the circumference of Circle Q than the circumference of Circle P?	4pi units

PART 2 • APPLY IT

- 49pi square cm** Use the area formula with $r = 7$. $A = \pi(7^2) = 49\pi$ square cm.
- 14pi inches** Trim goes around the edge, so find circumference. $C = \pi(14) = 14\pi$ inches.

CHALLENGE

100pi square units. Since $20\pi = 2\pi r$, $r = 10$. Then $A = \pi(10^2) = 100\pi$ square units.

Accept answers written with pi in any equivalent order, such as $\pi(49)$ for 49π . For the challenge, accept a correct explanation that uses $C = \pi d$ or $C = 2\pi r$ to find the radius first.