LESSON MAKER PRO

Circle Connections

Use one measurement to find more.

GRADE 7 · 7A.GM.B.36

7A.GM.B.36 "Explain the relationships among circumference, diameter, area, and radius of a circle to demonstrate understanding of formulas for the area and circumference of a circle. a. Informally derive the formula for area of a circle. b..."

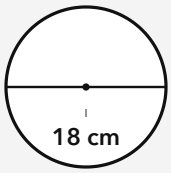
NAME _____ DATE _____

HOW THE FORMULAS CONNECT

A circle's diameter is twice its radius, so its circumference is $C = \pi d = 2\pi r$. If you rearrange many thin wedges of a circle, they make a shape close to a rectangle with base πr and height r. This suggests that the circle's area is $A = \pi r \times r = \pi r^2$.

WORKED EXAMPLE

Find the circumference and area of the circle shown. Leave your answers in terms of π.

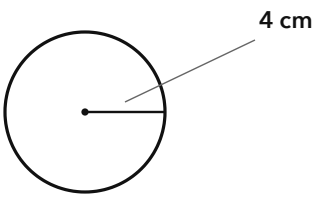


1. The radius is $18 \div 2 = 9$ cm.
2. $C = \pi d = 18\pi$ cm.
3. $A = \pi r^2 = \pi \times 9^2 = 81\pi$ cm^2.

Answer: Circumference: 18π cm; area: 81π cm^2

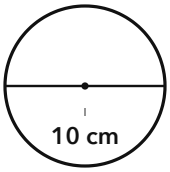
PRACTICE 6 problems

1 Find the circumference of the circle shown. Leave your answer in terms of π.



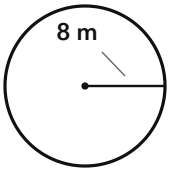
ANSWER _____

2 Find the area of the circle shown. Leave your answer in terms of π.



ANSWER _____

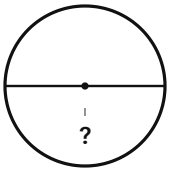
3 Find both the circumference and area of the circle shown. Leave your answers in terms of π.



ANSWER _____

_____

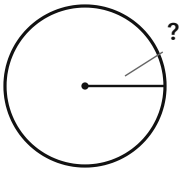
4 The circumference of this circle is 30π mm. Find its diameter and radius.



ANSWER _____

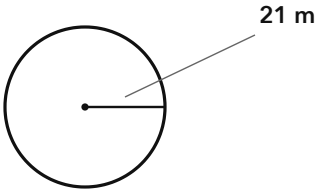
_____

5 The area of this circle is 36π cm^2. Find its radius.



ANSWER _____

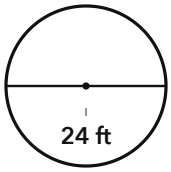
6 Find the circumference of the circle shown. Use π = 22/7.



ANSWER _____

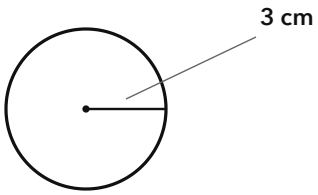
APPLY IT Show your work

1 Students mark a circular dance space at a school fair. Its diameter is shown. How much tape will outline the space, and how much floor area is inside it? Leave your answers in terms of π.



ANSWER _____

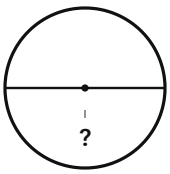
2 You design a round sticker for a water bottle. Its radius is shown. How much sticker paper does one sticker cover, and what is the distance around its edge? Leave your answers in terms of π.



ANSWER _____

CHALLENGE One step up

The circle shown has a circumference of 28π cm. A second circle has twice its diameter. Find the second circle's area, then explain how its area compares with the first circle's area.



WORK SPACE AND ANSWER

ANSWER KEY

Circle Connections

GRADE 7 · 7A.GM.B.36

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the circumference of the circle shown. Leave your answer in terms of π.	**8π cm**
2	Find the area of the circle shown. Leave your answer in terms of π.	**25π cm^2**
3	Find both the circumference and area of the circle shown. Leave your answers in terms of π.	**Circumference: 16π m; area: 64π m^2**
4	The circumference of this circle is 30π mm. Find its diameter and radius.	**Diameter: 30 mm; radius: 15 mm**
5	The area of this circle is 36π cm^2. Find its radius.	**6 cm**
6	Find the circumference of the circle shown. Use π = 22/7.	**132 m**

PART 2 · APPLY IT

1. **Tape: 24π ft; floor area: 144π ft^2** The tape follows the circumference, π × 24 = 24π ft. The radius is 12 ft, so the area is π × 12^2 = 144π ft^2.
2. **Sticker paper: 9π cm^2; distance around the edge: 6π cm** Use A = πr^2 to find 9π cm^2. Use C = 2πr to find 6π cm.

CHALLENGE

The second circle's area is 784π cm^2. The first diameter is 28 cm, so its radius is 14 cm and its area is 196π cm^2. Doubling the diameter doubles the radius, making the area 4 times as large.

Accept equivalent exact expressions in terms of π. In the challenge, accept any explanation that correctly links a doubled radius to an area multiplied by 4.