LESSON MAKER PRO

# Circle Connections

*Find exact distances and areas using pi.*

**GRADE 7 · MT.7.G.3**

**MT.7.G.3** "Know and use the formulas for the area and circumference of a circle and give an informal derivation of the relationship between the circumference and area of a circle..."

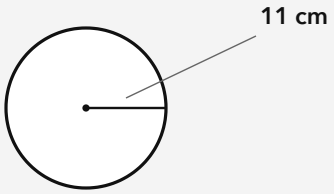
NAME _____ DATE _____

## THE BIG IDEA

For a circle, circumference is $C = 2\pi r$ and area is $A = \pi r^2$, where r is the radius. If you know the diameter, divide it by 2 to find the radius. You can also slice and rearrange a circle to explore how its circumference and area are related.

## WORKED EXAMPLE

Find the circumference and area of the circle shown. Leave both answers in terms of pi.

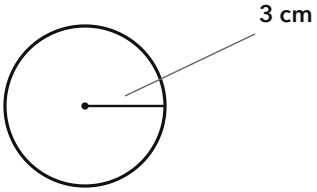



1. The radius is 11 cm.
2. $C = 2\pi(11) = 22\pi$ cm.
3. $A = \pi(11)^2 = 121\pi$ cm$^2$.

**Answer: Circumference: 22pi cm; area: 121pi cm$^2$.**

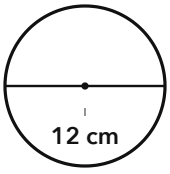
## PRACTICE 6 problems

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



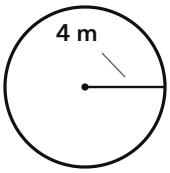

ANSWER _____

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



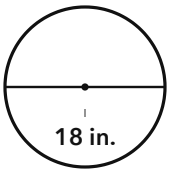

ANSWER _____

**3** Find the area of the circle shown. Leave your answer in terms of pi.



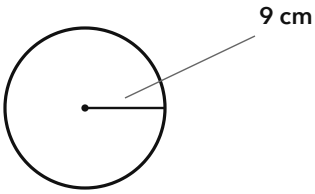

**ANSWER** _____

**4** Find the circumference of the circle shown. Leave your answer in terms of pi.



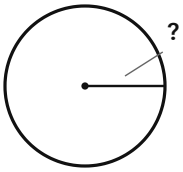

**ANSWER** _____

**5** Find both the circumference and area of the circle shown. Leave your answers in terms of pi.




**ANSWER** _____

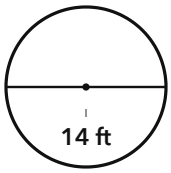
**6** The circle shown has a circumference of 16pi ft. Find its radius and area.




**ANSWER** _____

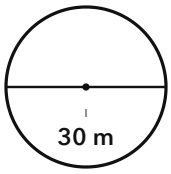
## APPLY IT Show your work

**1** At a community art fair on the Flathead Reservation, home to the Confederated Salish and Kootenai Tribes, a display mat has the circular shape shown. How much floor space does it cover? Leave your answer in terms of pi.




**ANSWER** _____

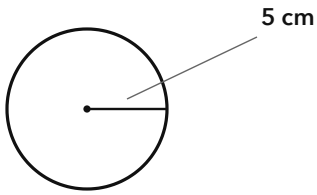
**2** Students in Browning, on the Blackfeet Reservation, plan a circular bike track with the diameter shown. How far is one lap around the track? Leave your answer in terms of pi.




**ANSWER** _____

## CHALLENGE One step up

Imagine cutting the circle shown into many narrow slices and arranging them in two alternating rows. Explain why the arrangement is nearly a rectangle with a base of half the circumference and a height equal to the radius. Then use that relationship to find the circle's area in terms of pi.




WORK SPACE AND ANSWER

**ANSWER KEY**

# Circle Connections

**GRADE 7 · MT.7.G.3**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Find the circumference of the circle shown. Leave your answer in terms of pi. | **6pi cm** |
| 2 | Find the area of the circle shown. Leave your answer in terms of pi. | **36pi $cm^2$** |
| 3 | Find the area of the circle shown. Leave your answer in terms of pi. | **16pi $m^2$** |
| 4 | Find the circumference of the circle shown. Leave your answer in terms of pi. | **18pi in.** |
| 5 | Find both the circumference and area of the circle shown. Leave your answers in terms of pi. | **Circumference: 18pi cm; area: 81pi $cm^2$.** |
| 6 | The circle shown has a circumference of 16pi ft. Find its radius and area. | **Radius: 8 ft; area: 64pi $ft^2$.** |

## PART 2 · APPLY IT

1. **49pi $ft^2$** Half of the 14 ft diameter is a 7 ft radius. The area is pi$(7)^2$ = 49pi $ft^2$.
2. **30pi m** One lap is the circumference. Use C = pi d to get 30pi m.

## CHALLENGE

**The curved edges in each row make up about half the circle's circumference, so the base is C/2. Each slice reaches from the center to the edge, making the height the radius. Since C = 10pi cm, the area is (10pi/2)(5) = 25pi $cm^2$.**

Accept equivalent exact expressions, such as 2pi(3) cm for 6pi cm. For the challenge, accept explanations that connect one row of curved edges to half the circumference and the slice height to the radius.