

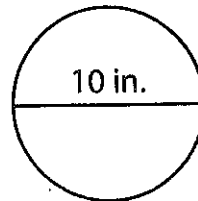
Standard 7.G.4 (L–M)

**Circumference & Area**

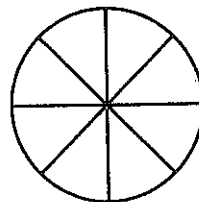
You know how to find the circumference of a circle, but can you find the area of a circle? Remember, to find the area of a rectangle you multiply its length times its width.

$$A = l \times w$$

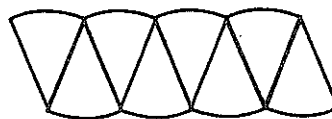
A circle obviously does not have a length and a width. We only know the diameter.



We can make the circle look like something else by cutting it into eight equal sections, as shown in the diagram below.



Then we can pull the pieces apart and arrange them to form a shape that looks similar to a parallelogram, as shown below.



If we cut an end piece in half and move it to the opposite side, the shape looks more like a rectangle.



The figure above looks something like a rectangle. If the slices of the circle were made just a bit smaller, the rounding would not be as visible and it would look even more like a rectangle.

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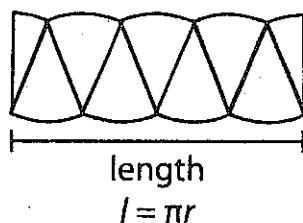
What are the length and the width of the new figure? The slices of the circle were placed in an alternating pattern, so the length of the figure is equal to half of the circle's circumference. You know the formula for finding the circumference of a circle.

$$C = \pi d$$

You also know that the diameter is 2 times the radius. So you can express circumference as shown below.

$$C = 2\pi r$$

One-half the circumference would be  $\pi r$ . The length of the new figure is  $\pi r$ .



If you look at the figure one more time, you can see that its width is equal to the circle's radius.



Now you can write a formula to find the area of a circle.

$$A = l \times w$$

$$A = \pi r \times r$$

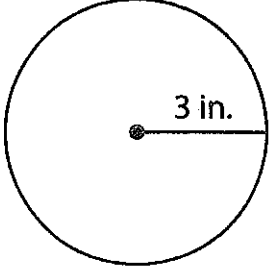
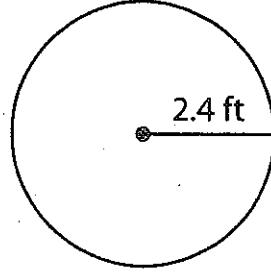
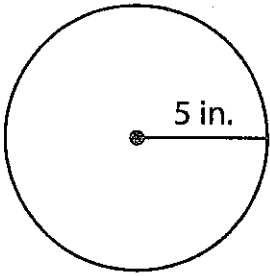
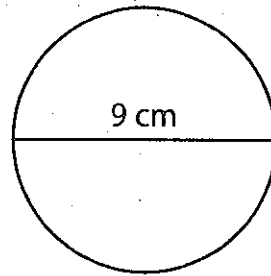
$$A = \pi r^2$$

The area formula for a circle is  $A = \pi r^2$ .

**Remember:** Apply the order of operations when you find the area of circles. Calculate exponents before doing other multiplication.

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**Try It:** Use the formula  $A = \pi r^2$  to find the area of each circle below. Use 3.14 for  $\pi$ . Show all of your work.

<p>1.</p>  <p style="text-align: center;">3 in.</p>       <p>Answer: _____</p>	<p>3.</p>  <p style="text-align: center;">2.4 ft</p>       <p>Answer: _____</p>
<p>2.</p>  <p style="text-align: center;">5 in.</p>       <p>Answer: _____</p>	<p>4.</p>  <p style="text-align: center;">9 cm</p>       <p>Answer: _____</p>

**Think About It:** What is the area formula of a semicircle? How do you know?

**Riddle Me This**

**A. Directions:** Determine the area of each item below. Round your answers to the nearest hundredth. Then, match each answer with a letter from the code chart that follows to answer the riddle. (Note: Use 3.14 for  $\pi$ .)

- 1. A semicircular dinner mat has a diameter of 8 inches. A = \_\_\_\_\_
- 2. The radius of a personal pizza is 3.5 inches. A = \_\_\_\_\_
- 3. A flying disc has a diameter of 13 inches. A = \_\_\_\_\_
- 4. The radius of a clock face is 9 inches. A = \_\_\_\_\_
- 5. A silver dollar has a radius of 2.5 centimeters. A = \_\_\_\_\_

**What has a head but never weeps, has a bed but never sleeps, can run but never walks, and has a bank but no money?**

**Code Chart**

A	E	I	R	V
254.34	25.12	132.67	38.47	19.63

\_\_\_\_\_

4      2      3      5      1      2

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**B. Directions:** Determine the area of each item below. Round your answers to the nearest hundredth. Then, match each answer with a letter from the code chart that follows to answer the riddle. (Note: Use 3.14 for  $\pi$ .)

- 6. The diameter of a round window is 24 inches. A = \_\_\_\_\_
- 7. A drain has a radius of 5.6 inches. A = \_\_\_\_\_
- 8. The radius of a pizza is 11 inches. A = \_\_\_\_\_
- 9. A round swimming pool has a diameter of 20 feet. A = \_\_\_\_\_
- 10. The diameter of a drink coaster is 3.9 inches. A = \_\_\_\_\_
- 11. The face of a watch has a diameter of 4.1 centimeters. A = \_\_\_\_\_
- 12. The radius of a small pie is 2.8 inches. A = \_\_\_\_\_

**What goes up and never comes down?**

**Code Chart**

A	E	G	O	R	U	Y
98.47	11.94	452.16	314	24.62	13.2	379.94

\_\_\_\_\_

8    9    11    12            7    6    10

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**C. Directions:** Determine the area of each item below. Round your answers to the nearest hundredth. Then, match each answer with a letter from the code chart that follows to answer the riddle. (Note: Use 3.14 for  $\pi$ .)

- 13. An apple pie has a radius of 5 inches. A = \_\_\_\_\_
- 14. A fried egg has a diameter of 15 centimeters. A = \_\_\_\_\_
- 15. A door's peephole has a diameter of 2 centimeters. A = \_\_\_\_\_
- 16. A conference table has a radius of 30 inches. A = \_\_\_\_\_
- 17. A potholder has a diameter of 21 centimeters. A = \_\_\_\_\_
- 18. A DVD has a radius of 5.5 centimeters. A = \_\_\_\_\_
- 19. A circular family portrait has a diameter of 8 inches. A = \_\_\_\_\_
- 20. A round fan has a diameter of 16 inches. A = \_\_\_\_\_
- 21. A lollipop has a diameter of 6.3 centimeters. A = \_\_\_\_\_

**Besides Tuesday and Thursday, which two days start with T?**

**Code Chart**

A	D	M	N	O	R	T	W	Y
346.19	78.5	200.96	3.14	94.99	31.16	2,826	176.63	50.24

\_\_\_\_\_

16   18   13   17   19            17   15   13

\_\_\_\_\_

16   18   20   18   21   21   18   14