Explaining Area and Circumference of a Circle

Lesson 1

For each object, make the measurements described in the following table. Use the string to help measure when needed. Be sure to measure in centimeters and be as precise as possible.

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| **OBJECT** | **DISTANCE FROM THE CENTER OF THE CIRCLE TO THE EDGE** | **DISTANCE ACROSS THE WIDEST PART OF THE CIRCLE** | **DISTANCE AROUND THE CIRCLE** | **DISTANCE AROUND THE CIRCLE DISTANCE ACROSS THE WIDEST PART OF THE CIRCLE** |
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1. What do you notice about the distance across the widest part of the circle and the distance from the center of the circle to the edge?

1. The distance across the widest part of the circle is called the *diameter*. Write a definition of *diameter* in your own words.

1. The distance from the center of the circle to a point on the edge is defined as the *radius*. What is the relationship between the length of the radius and the length of the diameter in each row of your table? Write an equation that relates the diameter, *d*, to the radius, *r*.

1. What do you notice about the distance around the circle divided by the diameter of the circle? (These numbers are in the last column of the table.)

1. The ratio of the distance around the circle to the diameter of the circle is defined as *pi* (*π*). Using the values in one row of your table, explain how the diameter, the distance around the circle, and piare related mathematically.

1. The distance around the circle is defined as the *circumference*. Write an equation that relates the circumference, *C*, to the diameter, *d*.

1. Using what you know about the relationship between the radius of the circle and the diameter, write an equation that relates the circumference, *C*, to the radius, *r*.

1. The diameter of a circle is 3 feet. What is the radius? What is the circumference?

1. The radius of a circle is 4.5 centimeters. What is the circumference? What is the diameter?
2. The circumference of a circle is 15.7 yards. What is the diameter? What is the radius?

1. The diameter of a circular swimming pool is 20 feet. What is the radius of the pool? What is the circumference?

1. The circumference of a pizza is 44 inches. What is the approximate radius of the pizza?

1. Measuring around the outside of a circular fence, you determine the length is 31.4 feet. How far is it across the widest part of the circle?

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Lesson 2

1. The diameter of a circle is 4 feet. What is the radius? What is the area?

1. The radius of a circle is 5 centimeters. What is the diameter? What is the area?

1. The area of a circle is 113 square yards. What is the radius? What is the diameter?

1. The diameter of a circular swimming pool is 20 feet. What is the area of the surface of the pool? What is the circumference of the pool? Write your answers as complete sentences.

1. The area of a pizza is 153.9 square inches. What is the radius of the pizza? Write your answer as a complete sentence.

1. You know the area of the garden inside a circular fence is 50 square feet. How long is the fence surrounding the garden? Write your answer as a complete sentence.

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INSTRUCTIONAL ACTIVITY SUPPLEMENT

Lesson 2

The circles below will help illustrate the relationship between the area of a circle and the area of a parallelogram. Cut out the circles one at a time and arrange the pieces so they lay next to each other, alternating up and down, to form a figure resembling a parallelogram. Be sure to keep the pieces of each circle separate as you work. In the end, you should have formed three “parallelograms” (one per circle).

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STUDENT ACTIVITY

Lessons 1 & 2

1. Define each of the following parts of a circle in your own words.
   1. Radius
   2. Diameter
   3. Circumference
   4. Area
2. Describe how the following terms are related to each other within a circle.
   1. Diameter and radius
   2. Diameter, circumference, and pi
   3. Circumference, radius, and area. (A complete circle has been rearranged into sectors below. Use the image to describe, in general, how the circumference and radius can be used to determine the area.)  
        
      
3. Write all possible formulas for each of the following measurements in a circle.
   1. Circumference
   2. Area
4. If the radius of a circle is 2.5 inches, find each of the following measurements. Show all work for each measurement.
   1. Diameter
   2. Circumference
   3. Area

1. If the diameter of a circle is 8 feet, find each of the following measurements. Show all work for each measurement.
   1. Radius
   2. Area
   3. Circumference
2. If the circumference of a circle is 6 centimeters, find each of the following measurements. Show all work for each measurement.
   1. Diameter
   2. Radius
   3. Area
3. If the area of a circle is 28.3 square centimeters, find the circumference. Show all work.

1. You are fencing in and mulching a circular area of your yard for a garden. The diameter of the circular area needs to be 7 feet. Determine how many feet of fencing you need and how many square feet the mulch must cover. Show all work and write your answers as complete sentences.

1. You are trying to decide where to buy pizza. Pizza Shop A advertises a pizza with a 14-inch diameter. Pizza Shop B advertises a pizza with a 42-inch circumference. Both pizzas are the same price. Which Pizza Shop gives you more pizza for the price? Show your work and explain the process you used to determine your answer.