

TOPIC 1

Circles and Ratio

Lesson 1.1a/b

Pi: The Ultimate Ratio

Exploring the Ratio of Circle Circumference to Diameter

Lesson1. 2a/b

That's a Spicy Pizza!

Area of Circles

Lesson 1.3a/b

Circular Reasoning

Solving Area and Circumference Problems

Objective

Exploring the Ratio of Circle Circumference to Diameter

Warm-Up



Scale up or down to determine an equivalent ratio.

1. $\frac{18 \text{ miles}}{3 \text{ hours}} = \frac{?}{1 \text{ hour}}$

2. $\frac{\$750}{4 \text{ days}} = \frac{?}{1 \text{ day}}$

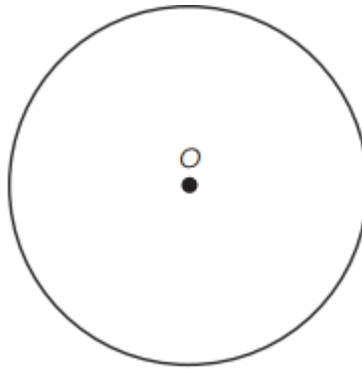
3. $\frac{12 \text{ in.}}{1 \text{ ft}} = \frac{?}{5 \text{ ft}}$

4. $\frac{48 \text{ oz}}{3 \text{ lb}} = \frac{?}{1 \text{ lb}}$

GETTING STARTED

Across and Around

A circle is shown with a point drawn at the center of the circle. The name of the point is O, so let's call this Circle O.



1. Analyze the distance around the circle.

a. Use a string and a centimeter ruler to determine the distance around the circle.

b. How does your measurement compare to your classmates' measurements? Summarize the similarities and differences.

2. Draw a line from a point on the circle to the center of the circle, point O.

a. Measure your line using your centimeter ruler.

b. How does your measurement compare to your classmates' measurements? Summarize the similarities and differences.



Analyzing the Parts of a Circle



Everyone can identify a circle when they see it, but defining a circle is a bit harder. Can you define a circle without using the word round? Investigating how a circle is formed will help you mathematically define a circle.

1. Follow the given steps to investigate how a circle is formed.

Step 1: In your notebook, draw a point and label the point A.

Step 2: Use a centimeter ruler to locate and draw a second point that is exactly 5 cm from point A. Label this point B.

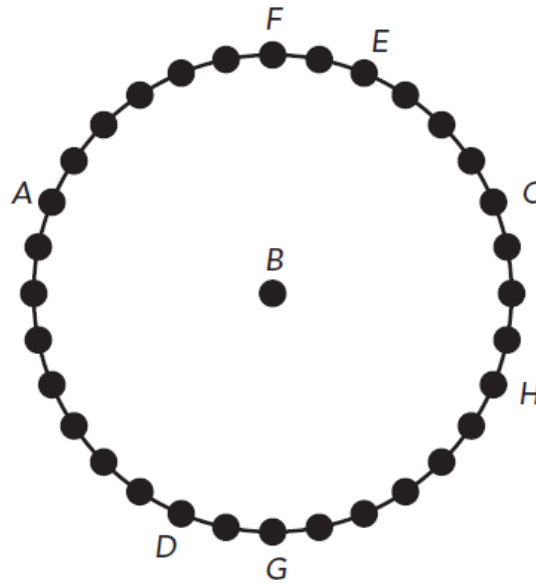
Step 3: Locate a third point that is exactly 5 cm from point A. Label this point C.

Step 4: Repeat this process until you have drawn at least ten distinct points that are each exactly 5 cm from point A.

2. How many other points could be located exactly 5 cm from point A? How would you describe this collection of points in relation to point A?

3. Define the term circle without using the word round.

A circle is a collection of points on the same plane equidistant from the same point. The center of a circle is the point from which all points on the circle are equidistant. Circles are named by their center point.



4. Use the circle shown to answer each question.
- Name the circle.

The radius of a circle is a line segment formed by connecting a point on the circle and the center of the circle. The distance across a circle through the center is the diameter of the circle. The diameter of a circle is a line segment formed by connecting two points on the circle such that the line segment passes through the center point. The distance around a circle is called the circumference of the circle.

- Identify a radius of the circle.
 - Identify a diameter of the circle.
 - Are all radii of this circle the same length? Explain your reasoning.
5. What is the relationship between the length of a radius and the length of a diameter?



Measuring the Distance Around a Circle



Let's explore circles. Use circles A, B, D, E, and O provided by Mr. Gilbes. Circle O is the same as the circle from the activity Across and Around.

1. Use a string and a centimeter ruler to measure the distance from a point on the circle to the center and the distance around each circle. Record your measurements in the table. In the last column, write the ratio of Circumference : Diameter in fractional form.

| Circle | Circumference | Radius | Diameter | $\frac{\text{Circumference}}{\text{Radius}}$ |
|----------|---------------|--------|----------|--|
| Circle A | | | | |
| Circle B | | | | |
| Circle O | | | | |
| Circle D | | | | |
| Circle E | | | | |

2. Average the ratios recorded for $\frac{\text{Circumference}}{\text{Radius}}$. What is the approximate ratio for the circumference to the diameter for the set of circles? Write the approximate ratio as a fraction and as a decimal.

3. How does your answer to Question 2 compare to your classmates' answers?

4. Average all of your classmates' answers to Question 3. Write the approximate ratio of circumference to the diameter as a fraction and as a decimal.



LESSON 1.1a
Pi: The Ultimate Ratio

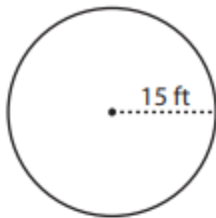


Objective

Exploring the Ratio of Circle Circumference to Diameter

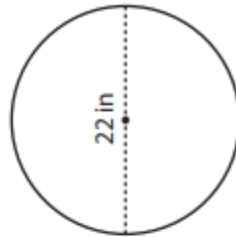
Find the area of each circle in terms of π .

1)



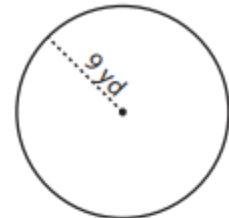
Area =

2)



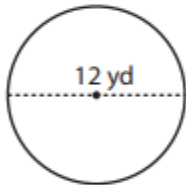
Area =

3)



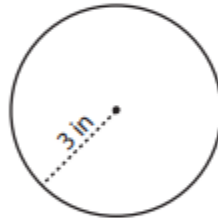
Area =

4)



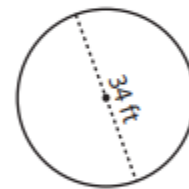
Area =

5)



Area =

6)



Area =

7) If the radius is 10 ft, what will be the area of the circle?

a) $100\pi \text{ ft}^2$ b) $400\pi \text{ ft}^2$ c) $25\pi \text{ ft}^2$ d) $2\pi \text{ ft}^2$

8) What is the area of a circle with a diameter of 16 in?

a) $256\pi \text{ in}^2$ b) $64\pi \text{ in}^2$ c) $32\pi \text{ in}^2$ d) $16\pi \text{ in}^2$

