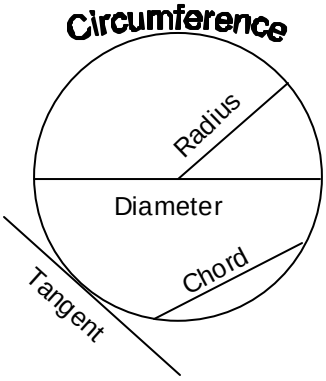
3-4-7 Circles



The diameter of a circle is the distance from one side of a circle to the other through the middle. The radius is the distance from the center to the edge of the circle.
A tangent touches the circle in one place. A chord touches in two places.

On the back of this page, draw a black circle.
Draw a red diameter.
Draw a green radius.
Draw a blue tangent.
Draw an orange chord.
Draw the circumference purple.

Circumference

As a group **measure** at least 6 different circles. Please use centimeters for your measurements. Fill in the measurements in the table below.

	Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
Circumference						
Diameter						
Divide the Circumference by the diameter.						

What is the **mean** (average) of the numbers in the last row of your table?_____

This number is close to Pi. π is the Greek letter for Pi. The answer won't be exactly pi because there is no way to get an exact measurement.

π is an irrational number just a little bigger than 3. It is a decimal that goes on forever and is not repeating. Sometimes 3.14 is used to approximate π. 3.14 is rounded off from 3.141592653583979..... We can also approximate π by the fraction 22/7. Try dividing this out to see how close it is.

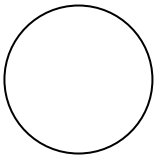
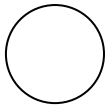
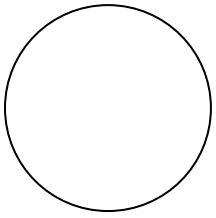
Review
A decimal that goes on forever like 0.333... is rational. 0.333... can be written as the ratio of two integers, 1/3 π is irrational and cannot be written as a fraction

The ratio of the circumference to the diameter is pi. $\frac{C}{d} = \pi$

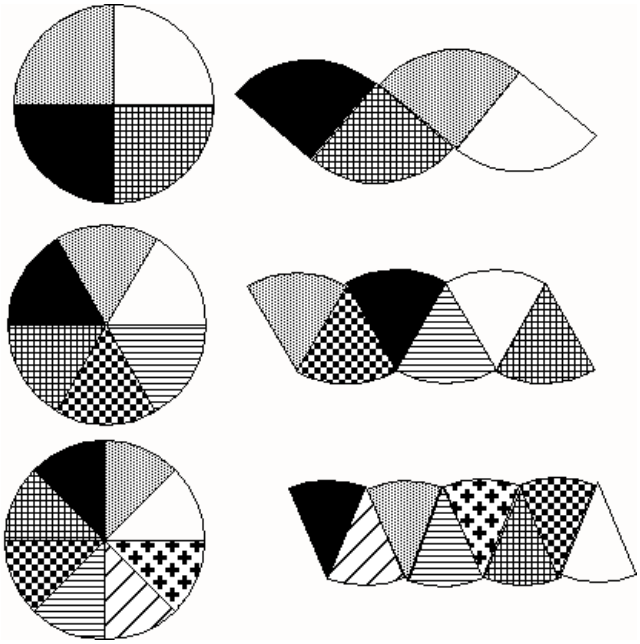
Solving for the circumference gives $C = \pi d$ Because the diameter is twice the radius, another form of the formula is $C = 2\pi r$ For a circle with radius of 12 cm the circumference is 12π or 37.7cm.

Practice: Measure the diameter of the following circles then find the circumference.

a)

Area



Each circle has been cut and rearranged. Notice the smaller the sections the more the rearranged area looks like a parallelogram.

The height of the parallelogram is the radius.
The base is half of the circle.
Study the diagram to see this for yourself.

The area is the radius multiplied by half the circumference.

$A = r \cdot \frac{1}{2}C = r \cdot \frac{1}{2}\pi d = r \cdot \frac{1}{2}\pi 2r$

Simplifying yields $A = \pi r^2$

For a circle of radius 10 feet the area is $A = \pi r^2 = \pi(10)^2 = 100\pi$ This answer is good.

You may also punch 100xπ in your calculator or 100x3.14=314.

Practice: Find the area of the four circles in set a) above.

Find the area and circumference of the following.

A circle with

b) radius 3 cm

diameter 2 feet

diameter 7 inches

c) radius 3.4 miles

radius 4 ¾ inches

diameter 3 $^1/_7$ inches

d) an area of 12 m^2

a circumference of 15 feet

an area of 81 sq. in.

e) A sprinkler waters in a circular pattern. If the length from the center to the edge of the water's reach is 5 feet, what is the area watered?

A circular tablecloth is 60 inches in diameter. How long would a piece of lace have to be to go around the outside of the cloth?

Find the area and perimeter of the floor of a child's wadding pool that is 80 inches in diameter.

f) A CD is to be labeled with an expensive coating. The printable area is 4.5 inches in diameter less the inner circle that is 1.5 inches in diameter. If the coating costs $3 per square foot, find the cost to coat 3000 CDs.

The fence for the petting zoo is portable and roughly circular. What would the radius need to be to have approximately 200 sq. ft.? How many 5 foot long panels are needed to make the fence?

How many square feet of aluminum are needed to make 500 soup cans 2 inches in diameter and 5 inches tall?