

## MATHEMATICS 605

# CIRCLES

area	A measure of the surface of a solid expressed in square units.
circle	A plane curve that is everywhere equidistant from a given fixed point, its center.
circumference	The boundary line around a circle.
diameter	The straight line segment passing through the center of a circle or sphere, which is only as wide as the circle or sphere.

The **circle** is a unique figure that requires special formulas to solve for the perimeter and area.

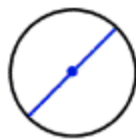
First, let's learn some special definitions for circles.

The **diameter** is the distance across the circle through the center.

The **radius** is the distance from the center of the circle to the edge of the circle.

The **circumference** is the distance around the outside of the circle.

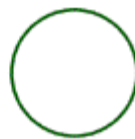
The **area** is the measurement of the flat surface of the circle.



Diameter



Radius



Circumference



Area

To many people the circle was special and the object of study. Thus, for a long time mathematicians have known the formula for finding the **circumference** of a circle. Studying the circumference and diameter of a circle mathematicians discovered the constant value  $\pi$ . The value of  $\pi$  is the ratio of the circumference of any circle to its diameter. No matter what the size of the circle this ratio always stays the same. The decimal 3.14 is used to represent the fraction  $22/7$ .

The formulas for both the **circumference** and the **area** of a circle make use of this ratio.

$$C \text{ (Circumference)} = \pi \text{ (pi: 3.14)} \times d \text{ (Diameter)}$$

$$C = \pi d$$

$$A \text{ (Area)} = \pi \text{ (pi: 3.14)} \times r^2 \text{ (Radius multiplied by itself)}$$

$$A = \pi r^2$$

**Example:**

Using the formulas above, find the circumference and area of a circle with a diameter of 10 inches.

$$C = 3.14 \times 10 \text{ Substitute 10 inches for } d.$$

=31.4 in Label the answer.

$$A = 3.14 \times 5 \times 5 \text{ Substitute 5 inches for } r \text{ (The radius is half of the diameter.)}$$

= 78.50 or 78.5 sq. in Label the answer. Area is given in square units