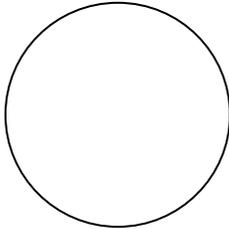**Math 1312**
Section 8.4
Circumference and Area of a Circle

Definitions:

A **circle** (symbol O) is the set of all points in a plane that are at the same distance from the center.

The **diameter** is a chord through the center of a circle.

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

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

Definition: π is a constant equal to 3.14 or 3.1416 or $\dfrac{22}{7}$.

Theorem 1: The circumference of a circle is given by the formula $C = \pi d$ or $C = 2\pi r$.

Definition: The length of an arc is the distance between the endpoints of the arc.

Theorem 2: In a circle whose circumference is C, the length ℓ of an arc whose degree measure is m is given by $\ell = \dfrac{m}{360} \cdot C$.

Theorem 3: The area A of a circle whose radius has length r is given by $A = \pi r^2$.

Example 1: Find the diameter, circumference, and the area of a circle whose radius is 8 cm.

**Example 2**: Find the radius, the diameter, and the area of a circle whose circumference is 22π in.

Example 3: Find the radius and circumference of a circle whose area is $49\pi \ m^2$.

Example 4: Find the length of a 48^0 arc in a circle whose diameter is 14.

Example 5: Find the length of a 72^0 arc in a circle whose circumference is 45π.

Example 6: Find the radius of a circle if a 90^0 arc has length of 6π.

Example 7: Find the exact area of the shaded region.
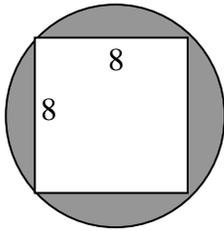
Example 8: Find the exact area of the shaded region (regular hexagon is inscribed in a circle of radius 6).