Concepts
Circumference and Area of Circles

Based on power point presentations by Pearson Education, Inc.
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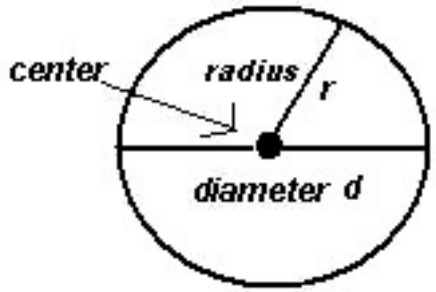
Learning Objectives

1. Memorize the definition of a circle.
2. Memorize and use the circumference formula of circles.
3. Memorize and use the area formula of circles.

NOTE: This lesson contains some examples. You can find more examples in the "Examples" document also located in the appropriate MOM Learning Materials folder.

1. Definition of a Circle

A circle is a 2-dimensional shape made by drawing a curve that is always the same distance from a center.



Radius

The radius ***r*** of a circle is the length of the line from the center of the circle to any point on its edge. The plural form is radii (pronounced "ray-dee-eye").

Diameter

The diameter ***d*** of a circle is a line segment between to points on the circle which passes through the **center** of the circle. The diameter is twice as long as the radius, ***d = 2r***, which is a line segment between one point on the circle and the center of the circle.

2. Circumference of Circles (1 of 2)

The circumference *C* of circles is their perimeter. There exists a special relationship between the circumference of a circle and its diameter. That is, if we divide the circumference of ANY circle by its diameter, the quotient is always the same number, namely the number π (pi).

We can express this as, $\frac{C}{d} = \pi$ and given that ***d = 2r***, we can also state $\frac{C}{2r} = \pi$.

Remember that π is is a non-repeating, non-terminating decimal approximately equal to 3.141592654. **In this course, always use the π button on your calculator and NOT the decimal approximation 3.14.**

When we solve both equations above for *C*, which is the circumference, we get two formulas for the circumference of circles, namely

C = dπ or ***C = 2πr***

Circumference of Circles (2 of 2)

Example 1:

Find the circumference *C* of a circle whose diameter is 16 cm. First give an exact answer (express in terms of π) and then find the decimal equivalent rounded to a whole number.

Since the diameter is given, we will use the formula $C = d\pi$.

Given is a diameter of $d = 16$, then $C = 16\pi$, **which is the exact answer.**

To find the decimal equivalent of this answer, we use the following calculator input:

16	×	π	ENTER

Note: Always use the π button!

We find that the circumference *C* is approximately 50 cm.

3. Area of Circles (1 of 2)

There also exists a special relationship between the area *A* of a circle and the square of its radius. That is, if we divide the area by the square of the radius, the quotient is always the number π.

We can express this as $\frac{A}{r^2} = \pi$.

We can now solve for the area *A* to get the formula for the area of a circle, namely

$$A = \pi r^2$$

Area of Circles (2 of 2)

Example 2:

Find the area *A* of a circle whose diameter is 12 centimeters. First give an exact answer (express in terms of π) and then find the decimal equivalent rounded to a whole number.

Required formulas: $A = \pi r^2$ and $d = 2r$

We are given $d = 12$ so that $r = 6$. Therefore, $A = 6^2\pi$ and $A = 36\pi$, **which is the exact answer.**

To find the decimal equivalent of this answer, we use the following calculator input:

Note: Always use the π button!

We find that the area *A* is approximately equal to 113 cm^2. **Please note that the area units are squared.**