Concept: The Circle

Name:

COMPUTER COMPONENT

Instructions: In UMATH X follow the **Content Menu** path:

Measurement and Geometry > Circles

Work through all Sub Lessons of the following Lessons **in order**:

- *In This Topic*
- *Circles All Around Us!*
- *Radius, Circumference and Diameter*
- *PI – A Special Number*
- *Circumference of a Circle*
- *AREA of a Circle*

Additional Materials Required: Compass and string.

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

SUMMARY

1. Circles are all around you. What can you recall?

(a) Since you got out of bed this morning, list the names of any six objects that you saw that were perfect circles.

(Answers will vary)	

(b) From where you are sitting right now (either at a computer workstation or at your desk), look around you and record five more objects that are circles. (*Common aren't they*.)

(Answers will vary)	

2. **As work through the computer exercises, fill in the blanks below.** *These notes will serve you well as you work through the* **OFF COMPUTER** *exercises.*

The *RADIUS* of a circle is the **Distance** from the **Center** of a **Circle** to any **Point** on the periphery of the circle.

The *DIAMETER* of a circle is **Twice** as long as the **Radius**. This is because the DIAMETER passes through the **Center** of a circle from one side of the circle to the **Other** side.

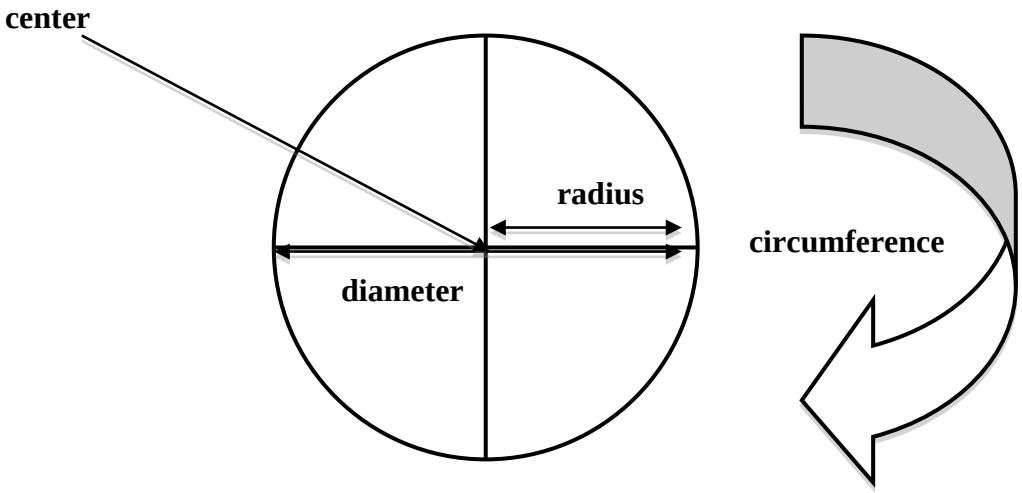
The CIRCUMFERENCE of a circle is similar to the **Perimeter** of a rectangle. It is the distance around the curved outside edge of the **Circle**.

In Mathematics, we will occasionally use a value that is known as a mathematical constant. One such special value is called *pi*. The symbol π is from the Greek language and represents *pi* with the value **3.14**. No matter what the size of circle, the value of π remains constant. From a circle representing the orbit of Planet Earth to a gene in a strand of DNA, the value of π is always **3.14**.

From your computer work, you will have noticed that π was used in the shortcuts to find both the **circumference** and the **area** of a circle. In the chart below, enter the formula shortcuts that were developed with the use of the software.

Circle Attribute	**Formula (Shortcut)**
Circumference (radius is known)	**C = 2 x π x r**
Circumference (diameter is known)	**C = π x d**
Area (radius must be calculated)	**A = π r 2**

3. Add four (4) different label s to this model of a circle:



OFF COMPUTER EXERCISES

1. Show by a diagram how these ideas relate to the measurement of a **radi**us, a Diameter or the Circumference of a circle:

The turning light (**radi**ation) of a lighthouse that extends for many kilometres. ***The turning light is the center of a large circle, with the outside being the distance at which the light is visible to ships in the area.***	A **radi**o station sends its signal to its listeners. ***The radio station's tower is the center of the broadcast area in which the station's signal can be received. When a receiver (radio) gets too far away from this centre, the signal becomes weak and the station fades.***

A compass needle models **diameter**. ***The compass needle extends from one edge of the circular frame to the other, just like a line through the center of a circle.***	Captain James Cooke **circum**navigates the Earth ***Captain Cooke sailed around the world, which is a sphere.***

2. School Trip Anyone? In your school gym, you will probably find a number of circles painted on the floor and perhaps on the walls. For each circle that you measure, it is important to estimate your answer before you actually measure and 'crunch' the numbers. Be sure to use the correct units on measure in your final answer. (e.g. m^2) Complete as many circles as you can.

Test Circle	Estimate of Circumference	Actual Circumference	Estimate of Area (units^2)	Actual Area (units^2)
Circle 1				
Circle 2				
Circle 3				
Circle 4				

(Answers will vary)

3. In this exercise, you will be given an attribute of a circle. Your job is two-fold:

- Use a compass set to draw the circle that fits the attribute. Make your best guess for this.
- For the actual circle that you draw, measure the radius or diameter and calculate using the appropriate formula, the actual attribute. Compare this to the original to see how closely you were able to estimate.

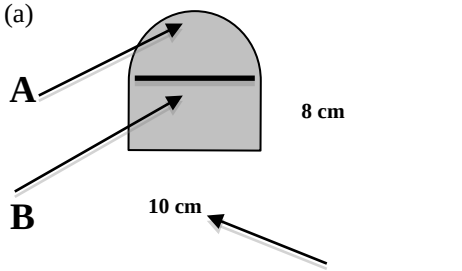
Circumference is 10 cm ***Diameter = 3.18 cm*** ***Radius = 1.59 cm*** ***(Model circles will be included.)*** ***Actual-_____***	**Area is 28 cm^2** ***Diameter = 5.97 cm*** ***Radius = 2.99 cm*** ***(Model circles will be included.)*** ***Actual-_____***
Circumference is 16 cm ***Diameter = 5.09 cm*** ***Radius = 2.55 cm*** ***(Model circles will be included.)*** ***Actual-_____***	**Area is 20 cm^2** ***Diameter = 5.05 cm*** ***Radius = 2.52 cm*** ***(Model circles will be included.)*** ***Actual-_____***

Were your estimates accurate? *Explain.*

(Responses will vary)

4. Find the circumference(s)/perimeter(s) and area of the following shaded areas:
HINT: Break in to easier shapes.

(a)



Area of 'A' = half of (πr^2)
$= \frac{1}{2} \times (3.14 \times 5 \times 5)$
$= 39.26\ cm^2$

Area of 'B' = l × w
$= 10 \times 8$
$= 80\ cm^2$

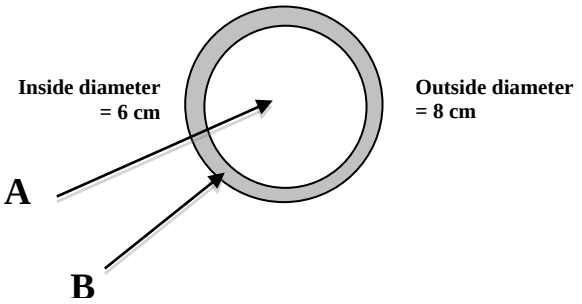
Total Area = A + B
$= 39.26 + 80$
$= 119.26\ cm^2$

Circum. of A = half of (π×d)
$= \frac{1}{2} \times (3.14 \times 10)$
$= 15.70$ cm

Perimeter of B = side + side + side
$= 10 + 8 + 8$
$= 26$ cm

Total Perimeter = A + B
$= 15.70 + 26$
$= 41.70$ cm

(b)



Area of 'A' = πr^2
$= 3.14 \times 6 \times 6$
$= 113.10\ cm2$

Area of 'B' = πr^2
$= 3.14 \times 8 \times 8$
$= 201.06\ cm2$

Total Area = B - A
$=201.06 - 113.10$

Circumference = π×d
(shaded) $= 3.14 \times 8$
$= 25.12$ cm

Reflect on what you were required to do when you found the area of (b) that you didn't need to do for (a).

You need to subtract the area of the inner circle from the area of the outer circle to determine the area of the shaded portion (find the area of two circles).