Group Component

**Directions:** Work in small groups of two, three, or four people. You may use your book for reference and talk to other students in the class, even the ones who are not part of your group. Each group will hand in **one** completed group project. You must SHOW ALL WORK to receive FULL CREDIT. Make sure your answers have correct **units**! You will have one hour to complete the group part of the project.Start by reading the introduction (preferably out aloud.)

Note: Use  on your calculator, not 3.14

**ARCHAEOLOGY: SIZING POTTERY FROM A SHARD**

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The most commonly-found type of artifact is the pottery shard. (A shard is a broken piece of a pot.) Fired clay vessels are very durable and will last for thousands of years, even if they are lying on the ground surface. Since pottery styles are distinctive to particular groups of people, and the styles changed over time, pottery is a good way to determine how old a site is and what group of people lived there. Many clues about how a group of people lived can be extracted from artifacts like this.

Archaeologists also want to know what certain pottery jars might have been used for – were they for cooking, serving, or storing food, or served another purpose altogether? Since pots are usually found broken into hundreds of pieces, it is a tedious and often impossible job to glue the ones found back together. Instead, to get an idea of how large a pot was, we can calculate the circumference of its opening from a curved shard. Using a **rim shard** will tell us how large the opening was.

1. State the formula for the circumference of a circle. (found in section 2.6 in your book.) Include a legend identifying what each variable stands for. (Note: π is not a variable; it does not need to be listed in the legend.) *You will need to use this formula on one of the next pages*.
2. Consider the following diagram below, giving the measurements of a **rim shard** that was found at an archaeological digging site.

*x*

*Center of opening*

4 cm

*y*

9 cm

This is the rim shard

Write an algebraic expression for y.

(Hint: Together, 4 and y must

make up the radius, *x*.

Then solve for y)

1. Now,state the Pythagorean Theorem in general (*Recall from memory or look it up in your book*):

In a right triangle with hypotenuse *c* and legs *a* and *b* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Which of your variables from part (b) stands for the hypotenuse in the triangle in the sketch?
2. Rewrite the Pythagorean Theorem to set up an equation for **the example in part (b)**.
3. Rewrite the equation from part (e) so that it is only in terms of *x*. (**Don’t use y any longer**!)

Hint: Use part (b)

1. **Solve** your equation **for *x***: (*Don’t forget to* FOIL.)
2. Give your answer as a decimal **with units**. *Do not round.*

*x* =

1. An Archaeologist at a digging site is asked what the number he just found actually stands for. Give an explanation in words to an inquisitive passer-by what your number represents. (Use mainly layman terms, NOT just mathematical terms.)
2. Determine the circumference of the opening using the circumference formula you stated in part (a). *Round your answer to one decimal place*. [*Show the calculation and give units with your answer*.]
3. There are 2.54 cm in an inch. Convert the radius you stated in part (h) into inches. *Round your answer to two decimal places*. [*Show the calculation and give units with your answer*.]
4. Now convert the circumference from part (j) into inches. [*Show the calculation and give units with your answer*.]

***Fill in the following***:

**Summary** (measurements of this pot):

Radius in cm: r = \_\_\_\_\_\_\_\_\_ *cm*

Circumference in cm: C = \_\_\_\_\_\_\_\_\_*cm*

Radius **in inches**: **r** = \_\_\_\_\_\_\_\_\_ ***in***

Circumference **in inches**: **C** = \_\_\_\_\_\_\_\_\_ ***in***

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