

GEOMETRY

Given a circle with a radius of 8 inches, what is the volume of the largest right circular cone you can make by cutting along one radius and overlapping the edges?

Note: The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$, where r is the radius of the base, and h is the height.

Procedure:

1. Write an expression for the height of the cone in terms of the radius of its base, r .

Hint: Use the Pythagorean Theorem.

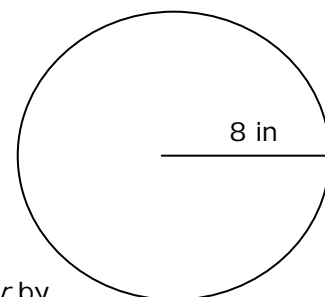
2. Using your answer from above, write an expression for the volume in terms of r by substituting for h , in the formula, $V = \frac{1}{3}\pi r^2 h$.

3. Graph the function you found in #2, use ZoomFit to see the graph. Adjust the window if needed.

4. Use the **CALC** menu to find the maximum of the function. Interpret the results in the context of the problem.

5. What volume is achieved when a radius of 6 inches is used for the base of the cone?

6. What should the radius of the base of the cone be to achieve a volume of 70 cubic inches?



A Coke can (right circular cylinder) has a volume of 354 cu. units. What radius and height require the least amount of aluminum to make the can? Find the minimum amount of aluminum required.

Formula for volume of a cylinder is, $V = \pi r^2 h$, where r is the radius of the base, and h is the height of the can.

Formula for surface area of a cylinder is, $SA = 2\pi r^2 + 2\pi rh$.

Procedure:

1. Solve the volume formula for h . Substitute in 354 for the volume. Your result should be an equation for h in terms of r .

2. Substitute your new h into the surface area formula to find SA in terms of r .

3. Graph the function you found in #2.

4. What is the radius and height needed to generate the smallest possible surface area?
5. What two different values for a radius will generate a surface area of 500 square units?
6. What surface area will be generated using a radius of 10 units?