

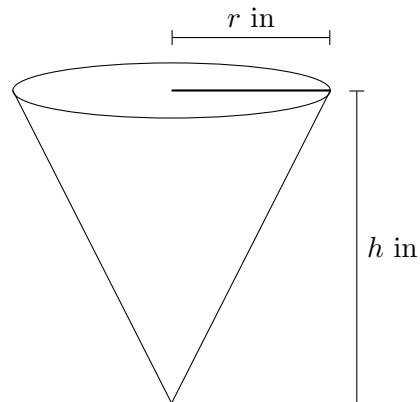
4. [8 points]

Sunny and Tyrell own an ice cream shop together. They want to sell waffle cones in the usual shape of a cone, as shown on the right. The cost, in dollars, of a waffle cone with radius  $r$  inches and height  $h$  inches is

$$\frac{r}{2} \left( \sqrt{h^2 + r^2} \right).$$

Sunny and Tyrell want to spend exactly \$5 on a waffle cone that can fit the most ice cream (i.e has the largest volume).

Note that the volume of a cone of radius  $r$  and height  $h$  is  $\frac{\pi r^2 h}{3}$ .



a. [3 points] Write a formula for  $h$  in terms of  $r$  if the cone costs \$5.

**Answer:**  $h =$  \_\_\_\_\_

b. [2 points] Write a formula for the function  $V(r)$  which gives the volume, in cubic inches, of an ice cream cone that costs \$5 in terms of  $r$  only. *Your formula should not include the letter  $h$ .*

**Answer:**  $V(r) =$  \_\_\_\_\_

c. [3 points] What is the domain of  $V(r)$  in the context of this problem?

**Answer:** \_\_\_\_\_