

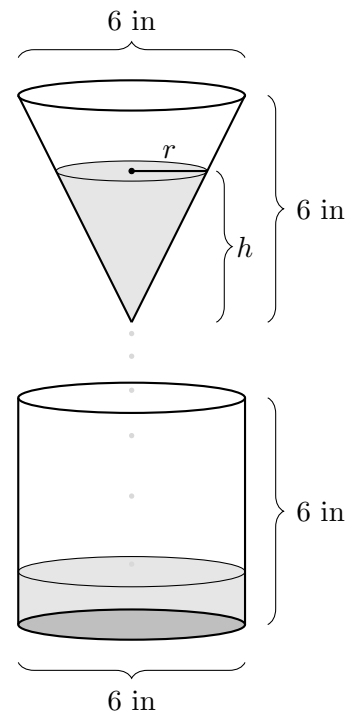
3. [9 points] Coffee is draining from a cone filter into a cylindrical pot, as shown in the figure to the right. The height and diameter of both the filter and the coffee pot are 6 inches.

Let  $r$  be the radius of the circular surface and  $h$  be the height of the coffee remaining in the filter, both measured in inches. Note that the shape of the filter implies that  $r = \frac{h}{2}$ .

Recall that the volume of a cone with radius  $r$  and height  $h$  is  $\frac{1}{3}\pi r^2 h$ , while the volume of a circular cylinder with radius  $R$  and height  $H$  is  $\pi R^2 H$ .

At the moment in time when the height of the coffee in the filter is 5 inches, the coffee is draining from the filter at a rate of 10 cubic inches per minute.

- a. [5 points] At what rate is the height of the coffee in the filter decreasing at that moment? *Include units.*



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

- b. [4 points] At what rate is the height of the coffee in the pot increasing at that moment? *Include units.*

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