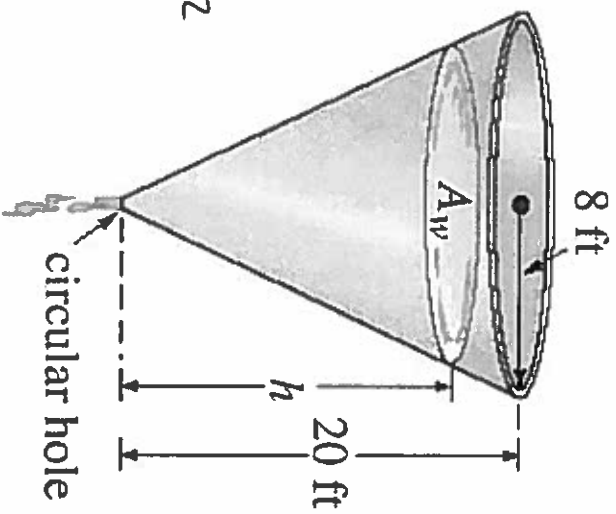
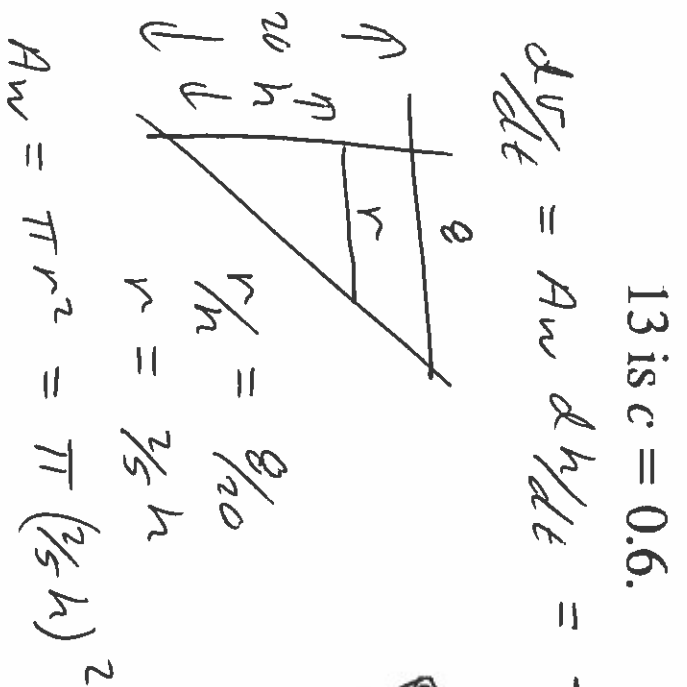


14. The right-circular conical tank shown in Figure 1.3.13 loses water out of a circular hole at its bottom. Determine a differential equation for the height of the water h at time $t > 0$. The radius of the hole is 2 in., $g = 32 \text{ ft/s}^2$, and the friction/contraction factor introduced in Problem 13 is $c = 0.6$.



$$\frac{dV}{dt} = A_w \frac{dh}{dt} = -c A_h \sqrt{2gh} = -0.6 \pi \left(\frac{2}{12}\right)^2 \sqrt{64h}$$

$$\frac{dh}{dt} = \frac{-0.6 \pi \left(\frac{2}{12}\right)^2 8 h^{1/2}}{\pi \left(\frac{2}{5}\right)^2 h^2}$$

$$\frac{dh}{dt} = -0.6 \left(\frac{5}{12}\right)^2 8 h^{-3/2}$$

FIGURE 1.3.13 Conical tank in Problem 14