7. Sand is pouring onto a conical pile in such a way that at a certain instant the height is 80 inches and is increasing at 5 inches per minute and the radius is 50 inches and is increasing at 2 inches per minute. How fast is the volume increasing at that instant? (The volume of a cone is \( V = \frac{1}{3} \pi r^2 h \).)

Let \( V(t) \) = the volume of the sand at time \( t \)
\( h(t) \) = the height of the sand at time \( t \)
\( r(t) \) = the radius of the base of the sand at time \( t \)

At a certain instant we have \( h = 80 \) \( \frac{dh}{dt} = 5 \) \( r = 50 \) \( \frac{dr}{dt} = 2 \)

We want \( \frac{dV}{dt} \) at the instant

\[
\frac{dV}{dt} = \frac{2}{3} \pi r^2 \frac{dh}{dt} + \frac{1}{3} \pi h^2 \frac{dr}{dt}
\]

\[
\left. \frac{dV}{dt} \right|_{\text{at inst.}} = \frac{2}{3} \pi (50)^2 \cdot 80 \cdot 5 + \frac{1}{3} \pi (80)^2 \cdot 5 \quad \frac{\text{in}^3}{\text{min}}
\]