

Suppose that water is pouring into a swimming pool in the shape of a right circular cylinder at a constant rate of 5 cubic feet per minute. If the pool has radius 7 feet and height 9 feet, what is the rate of change of the height of the water in the pool when the depth of the water in the pool is 7 feet?

**Solution**

Because this is a right circular cylinder, we should expect that the height of the water will rise at a constant rate, therefore, the height of 9 feet is irrelevant.

$$V = \pi * r^2 * h = \pi * 7^2 * h = \pi * 49h$$

$$\frac{dV}{dh} = 49\pi \gg \frac{dV}{dt} * \frac{dt}{dh} = 49\pi \gg 5 * \frac{dt}{dh} = 49\pi \gg \frac{dt}{dh} = \frac{49\pi}{5}$$

$$\frac{dh}{dt} = 5/(49\pi) = 0,032481 \text{ feet/min}$$