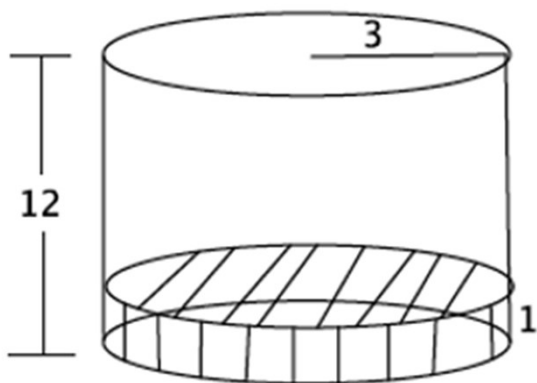


## Volumes of Cones & Cylinders

1. Oscar wants to fill with water a bucket that is the shape of a right circular cylinder. It has a 6-inch radius and 12-inch height. He uses a shovel that has the shape of a right circular cone with a 3-inch radius and 4-inch height. How many shovelfuls will it take Oscar to fill the bucket up level with the top?

2. A cylindrical tank (with dimensions shown below) contains water that is 1-foot deep. If water is poured into the tank at a constant rate of  $20 \frac{ft^3}{min}$  for 20 min., will the tank overflow? Use 3.14 to estimate  $\pi$ .



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$$\begin{aligned}V &= \pi r^2 h \\V &= \pi(6)^2(12) \\V &= 432\pi\end{aligned}$$

*The volume of the bucket is  $432\pi \text{ in}^3$ .*

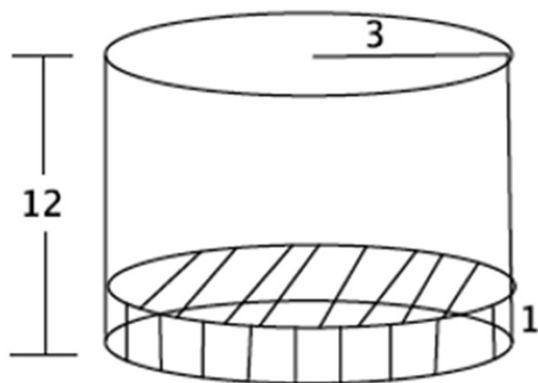
$$\begin{aligned}V &= \frac{1}{3} \pi r^2 h \\V &= \frac{1}{3} \pi(3)^2(4) \\V &= 12\pi\end{aligned}$$

*The volume of shovel is  $12\pi \text{ in}^3$ .*

$$\frac{432\pi}{12\pi} = 36$$

*It would take 36 shovelfuls of water to fill up the bucket.*

2. A cylindrical tank (with dimensions shown below) contains water that is 1-foot deep. If water is poured into the tank at a constant rate of  $20 \frac{\text{ft}^3}{\text{min}}$  for 20 min., will the tank overflow? Use 3.14 to estimate  $\pi$ .



$$\begin{aligned}V &= \pi r^2 h \\V &= \pi(3)^2(12) \\V &= 108\pi\end{aligned}$$

*The volume of the tank is about  $339.12 \text{ ft}^3$ .*

$$\begin{aligned}V &= \pi r^2 h \\V &= \pi(3)^2(1) \\V &= 9\pi\end{aligned}$$

*There is about  $28.26 \text{ ft}^3$  of water already in the tank. There is about  $310.86 \text{ ft}^3$  of space left in the tank. If the water is poured at a constant rate for 20 min.,  $400 \text{ ft}^3$  will be poured into the tank, and the tank will overflow.*

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