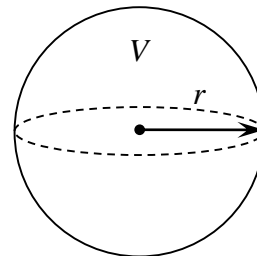




Examples 7.1 – Related Rates

- The radius of a spherical balloon is decreasing at a constant rate of 1.5 cm/min. How fast is air being released when the radius is 20 cm?



Solution: Related Variables Equation:

Related Rates Equation:

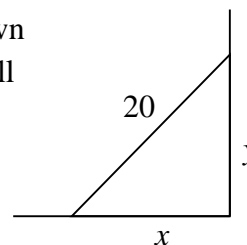
Given:

Want:

Substitute:

Answer:

- As a 20-ft ladder leans against a wall, the top of the ladder is slipping down the wall at a rate of 2 ft/s. How fast is the foot moving away from the wall when the top is 10 ft above the ground?



Solution: Related Variables Equation:

Related Rates Equation:

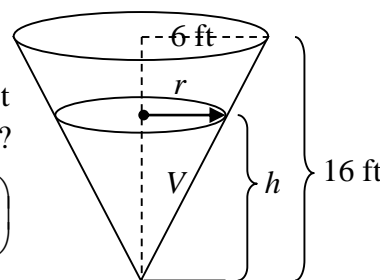
Given:

Want:

Substitute:

Answer:

- Suppose water is draining from a conical tank. The radius of the top of the tank is 6 ft, and the height of the tank is 16 ft. If the water flows out of the tank at a rate of 10 ft³/min, how fast is the height of the water decreasing when the water is 8 ft deep?



Solution: Related Rates Equation: $\frac{dV}{dt} = \frac{\pi}{3} \left(2r \cdot \frac{dr}{dt} \cdot h + r^2 \cdot \frac{dh}{dt} \right)$

Given:

Want:

Substitute:

Answer: