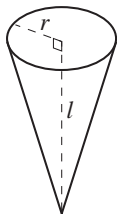
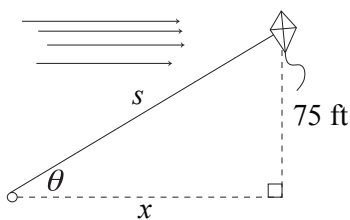


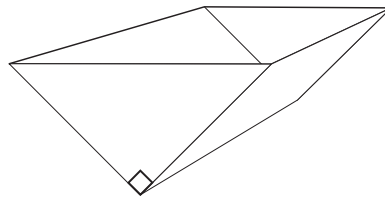
- The area of a rectangle with width x and length y is increasing at a rate of 41 in^2 per second at the instant when $x = 7$ and $y = 10$. If the width is increasing at a rate of 2 in/sec , find the rate at which the length is either increasing or decreasing.
- A stone thrown into a pond creates a ripple in the shape of a circle. If the area of that circle is increasing at a rate of $1200\pi \text{ cm}^2/\text{sec}$ when the radius is 12 cm , find the rate at which the radius is increasing.
- A cone-shaped icicle is dripping from the roof. The radius of the icicle is decreasing at a rate of 0.2 centimeters per hour, while the length is increasing at a rate of 0.8 centimeters per hour. If the icicle is currently 4 centimeters in radius and 20 centimeters long, find the rate at which the volume is changing. The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 l$.



- A girl is flying a kite in a wind blowing parallel to the ground at a rate of 50 feet per minute, and at an altitude of 75 feet above her hand. If the altitude of the kite remains constant and the girl allows the string to unwind freely, at the instant when she has let out 125 feet, (a) how fast will the string unwind and (b) at what rate is the angle θ changing? Assume the string is straight.



- Water is being pumped into a trough that is 3 feet long and 2 feet across the top and its ends are isosceles right triangles (see figure).



If the water is rising at a rate of 2 inches per minute when the height of the water is 8 inches, find the rate at which the water is being pumped into the trough.

Related Rates Answers

1. increasing at a rate of 3 in/sec
2. 50 cm/sec
3. decreasing at a rate of $\frac{32\pi}{5} \approx 20.106$ cm³ per hour
4. (a) 40 feet per minute; (b) decreasing at $\frac{6}{25}$ radians/minute
5. 1,152 in³/min or $\frac{2}{3}$ ft³/min