

Related Rates 3

1. A funnel is the shape of an inverted cone is 30 cm deep and has a diameter across the top of 20 cm. Liquid is flowing out of the funnel at the rate of $12\text{cm}^3/\text{sec}$. At what rate is the height of the liquid decreasing at the instant when the liquid in the funnel is 20 cm deep?
2. Gas is escaping a spherical balloon at the rate of $4\text{cm}^3/\text{min}$. How fast is the surface area shrinking when the radius is 24 cm?
3. In a right triangle, leg x is increasing at the rate of 2m/s while leg y is decreasing so that the area of the triangle is always equal to 6m^2 . How fast is the hypotenuse z changing when $x = 3\text{ m}$?

- A thin circular metal disk change size when heated. The disk is being heated so that its radius is increasing at a rate of 0.03 mm/sec . How fast is the area of the disk (one circular face) changing when the radius is 200 mm ?
- A boat is pulled into a dock by rope attached to it and passing through a pulley on the dock positioned 5 m higher than the boat. If the rope is being pulled in at a rate of 2 m/sec , how fast is the boat approaching the dock when it is 12 m away from the dock?
- A woman 2 m tall walks towards a lamppost on level ground at a rate of 0.5 m/sec . The lamp on the post is 5 m high. How fast is the length of her shadow decreasing when she is 3 m from the post?