

Section 3.10, Related rates

Exercise 1. A ladder 5m long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 50cm/s, how fast is the top of the ladder sliding down the wall when the bottom is 3m from the wall.

Exercise 2. If the volume of a spheric balloon with is increasing at the rate of $1\text{cm}^3/\text{s}$. Find the rate of increase of the area when the radius is 20cm.

Exercise 3. (7p219) A street light is at the top of a 15ft-tall pole. A man 6ft tall walks away from the pole with a speed of 5 ft/s along a straight path

1. How fast is the tip of his shadow moving when he is 40ft from the pole.

2. How fast is his shadow lengthening at that point?

Exercise 4. (21p220) Gravel is being dumped from a conveyor belt at a rate of $30\text{ft}^3/\text{min}$ and its coarseness is such that it forms a pile in the shape of a cone whose base diameter and height are always equal. How fast is the height of the pile increasing when the pile is 10ft high?

Exercise 5. (30p220) A lighthouse is on a small island 3km away from the nearest point P on a straight shoreline and its light makes 4 revolution per minutes. How fast is the beam of light moving along the shoreline when it is at 1km from P ?