- *Worksheet 5*

1. A 13 foot ladder is leaning against a wall when the base starts to slide away. By the time the base is 12 feet from the house, the base is moving at 5 feet/second.
   (a) How fast is the top of the ladder sliding down the wall?
   (b) At what rate is the area of the triangle formed by the ladder against the wall changing?
   (c) At what rate is the angle θ between the ladder and the ground changing?
2. A girl flies a kite at a height of 300 feet, with the wind carrying the kite horizontally away at 25 feet/second. How fast must she let out the string when the kite is 500 feet away?
3. Water is flowing at a rate of 50 m^3/sec from a conical reservoir of base radius 45 meters and height 6 meters.
   (a) How fast is the water level falling when the water is 5 meters deep?
   (b) How fast is the radius of the water's surface changing then?
4. A particle moves along a parabola $y = x^2$ in the first quadrant in such a way that the x coordinate is increasing at 10 meters per second. How fast is the angle of inclination θ of the line joining the particle to the origin when $t = 3$ seconds.