Math 180: Calculus I **Fall 2014**

October 23

TA: Brian Powers

1. The hypotenuse of an isosceles right triangle is decreasing in length at a rate of 4 m/s.

   (a) At what rate is the area of the triangle changing when the legs are 5m long?

   (b) At what rate are the length of the legs of the triangle changing?

   (c) At what rate is the area of the triangle changing when the area is 4 m^2?

2. A swimming pool is 50m long and 20m wide. Its depth decreases linearly along the length from 3m to 1m. It is initially empty and filled with water at 1 m^3/min.

   (a) How fast is the water level rising 250 minutes after the filling begins?

   (b) How long will it take to fill the pool?

3. An inverted conical water tank with height of 12ft and radius of 6ft is drained through a hole in the vertex at a rate of 2 ft^3/sec. What is the rate of change of the water depth when the water depth is 3ft?

4. A hot-air balloon is 150 ft above the ground when a motorcycle (traveling in a straight line on a horizontal road) passes directly underneath it going 58.67 ft/s. If the balloon rises vertically at a rate of 10 ft/s, what is teh rate of change of the distance beween the motorcycle and the balloon 10 seconds later?

5. A boat leaves a port traveling due east at 12 mi/hr and at the same time another boat leaves traveling northeast at 15 mi/hr. The angle θ of the line between the two boats is measureed from due north. What is the rate of change of this angle 30 minutes after they leave port? 2 hr after they leave port?