MATH 2554 (Calculus I)
Summer 2015

Name: _____

Mon 29 June 2015

Quiz 9: Optimization ($\oint$4.4) plus Related Rates

Directions: You have 40 minutes to complete this quiz. Make sure you include units and **answer the question.** This quiz is closed book and you must work alone.

1. Suppose that when a circular plate of metal is heated in an oven, its radius increases at a rate of 0.2 cm/min. At what rate is the plate's area increasing when the radius is 25 cm?

2. Suppose an airline policy states that all baggage must be box-shaped with a sum of length, width, and height not exceeding 108 in. What are the dimensions and volume of a square-based box with the greatest volume under these conditions?

3. A rectangle is constructed with one side on the positive x-axis, one side on the positive y-axis, and one vertex on the line $y = 10 - 2x$. What dimensions maximize the area of the rectangle? What is the maximum area?

4. A rectangular bathtub that is 3 ft wide and 6 ft long is being filled with water. How fast is the water level rising if water is filling the tub at a rate of 0.7 ft^3/min?