Math 115 Quiz 9: § 4.5, 4.6 Profit & RRates **Mon 29 November 2010**
Name: _____

You have 30 minutes to complete this quiz. Make your variables clear and consistent (so if you want to say, for example, $\frac{dy}{dx}$, you should also mention $y = f(x)$, or "y is a function of x"). Calculators are OK.

1. **Definitions/Concepts.** – *none this week* –

2. **Questions/Problems.**

   (a) Suppose that a company (called All Things Food) has hired you as a consultant. You are to help them save their failing product, "Big J's Bar-B-Q Ice Cream." You have discovered that their cost and revenue functions (in dollars) are:

   $$C(q) = 100 + 2q \qquad \text{and} \qquad R(q) = 15q^{.75},$$

   where q is the number of ice cream containers produced.

   a) What is the product's fixed cost?

   b) Last year, All Things Food produced 2400 containers of Big J's Bar-B-Q Ice Cream. What was their profit?

   c) Find formulas for marginal cost and marginal revenue, and evaluate at $q = 2400$.

   $MC(q) =$

   $MC(2400) =$

   $MR(q) =$

$MR(2400) =$

d) Big J wants to increase production to do better this year. Based on the marginal revenue and marginal cost *at this point* ($q = 2400$), explain whether Big J's strategy is sound.

e) What production level will maximize the profit available to the company?

(b) The metal frame of a rectangular box has a square base. The horizontal rods in the base are made out of one metal and the vertical rods are made out of a different metal. If the horizontal rods expand at a rate of 0.001 cm/hr and the vertical rods expand at a rate of 0.002 cm/hr, at what rate is the volume of the box expanding when the base has an area of 9 cm^2 and the volume is 180 cm^3?

3. **Computations/Algebra.** – *none this week* –