Quiz 3

Name: _____ Section: _____

> Answer all 3 questions for a total of 100 points. Write your solutions in the space provided and put a box around your final answers.

1. Find the derivative of each of the following functions.

   (a) (15 points) $f(x) = \dfrac{(2x+1)(x^2-3)}{x\sqrt{x}}$

   (b) (15 points) $g(x) = \dfrac{xe^x}{x^2-3x}$

2. A t-shirt vendor at Yankee Stadium finds that the total cost of selling q t-shirts at a game is given by the cost function

$$C(q) = 9000 + .4q + .001q^2$$

and the price at which she can sell q t-shirts at a game is given by the price/demand function

$$p = 26 - .004q.$$

(a) (15 points) Find the number of t-shirts this vendor should sell in order to minimize her average cost per t-shirt.

i. (10 points) If she sells this many t-shirts what will her total cost, revenue, and profit be?

(b) (15 points) Find the number of t-shirts this vendor should sell in order to maximize her total profit.

i. (10 points) If she sells this many t-shirts what will her total cost, revenue, and profit be?

3. (20 points) Give an equation for the tangent line to the curve $y = \sqrt{1 + x^3}$ at the point $(2, 3)$.