Math 150 Name:_____
Ms. Meier
Review Chapter 2

1) Find all relative extrema and state where the function increases and decreases: $f(x) = 6 - 3x + x^3$

2) Find all relative extrema and the x values at which they occur, determine any inflection points, the sketch the graph: $f(x) = 4x^3 + 3x^2 - 6x - 5$

3) Find the Absolute maximum and/or absolute minimum if they exist over the given interval:
$f(x) = x^2 + \frac{2}{x}$ *on* $(0,\infty)$

4) A computer store sells 540 printers per year. It costs $10 to store a printer for a year. To reorder, there is a fixed cost of $12, plus $5 each printer. How many times per year should the store order printers and in what lot size to minimize costs?

5) Lori's lemons has determined her annual lemon tree yield to be 320 lbs. per tree when 50 trees are planted. For each tree over 50, the yield decreases by 4 lbs per tree due to overcrowding. How many trees should Lori plant to maximize her annual yield? What is the maximum yield?

6) Differentiate implicitly to find dy/dx. The find the slope at the point (2,3)
$5x^2 - y^3 = -7$

7) Differentiate implicitly and find dy/dx: $3x^2 - 4y^2 + xy = 5$

8) The manager of a company determines when q hundred units of a particular commodity are produced, the total weekly cost of production is C thousand dollars, where: $C^2 - 3q^3 = 4{,}275$. Find the rate at which the cost is changing when q = 15 and dq/dt = 0.2 units/week.

9) Given the cost function: $C(x) = \frac{1}{5}x^2 + 4x + 57$ and the price function: $p(x) = 9 - \frac{1}{4}x$ where C(x) and p(x) are in dollars and x is the units find:

a) The profit function P(x)

b) The marginal profit function MP(x)

c) Find MP(4) and interpret

Answers:

1. Maximum 8 occurs at x = -1, min 4 occurs at x = 1. f(x) is decreasing on [-1,1], f(x) is increasing on $(-\infty,-1]\cup[1,\infty)$

2. Graph, Maximum 0 at x = -1, min. -27/4 at x = ½, inflection point at (-1/4, -27/8)

3. no absolute max, absolute minimum 3 at x = 1

4. Order 15 times, lots size of 36 printers

5. You should plant 65 trees for a maximum yield of 16900 lbs.

6. $dy/dx = \frac{10x}{3y^2}$, slope at (2,3) is 20/27

7. $dy/dx = \frac{6x+y}{8y-x}$

8. The cost is increasing by $1687.50/week (note: use c = 120)

9. a) $P(x) = 5x - \frac{9}{20}x^2 - 57$ b) $MP(x) = 5 - \frac{9}{10}x$ c) MP(4)= 1.4, the profit for the 5th unit is $1.40