Scanned Exam Two Math 180, Business Calculus, Summer 2017

Name:

Directions: Please answer the following questions. You may print the assessment and write your solutions out or write up your solutions using a tablet. You must show justification for each solution or you will not receive full credit for the problem. Problem One is worth twenty-five points. Each additional problem is worth ten points. Scan your solutions and upload them to the named folder under the MyMathLab Dropbox by **11:59 PM CDT, Sunday, July 2nd**.

(25 points) **Problem 1.** Watch the following *MathTalk* video on the first derivative and Marginal Analysis. You can find a link to the video here: MathTalk Video.

Write two paragraphs or about 500 words describing a scenario in which a real business would use Marginal Analysis. Be sure to include the product/service being provided. Also, include verbal descriptions of the costs that would contribute towards the total costs and the kinds of revenue that can be counted in the total revenue function. Based on your descriptions, describe the interval on which the function would have maximum profit.

Submit your response to the Discussion Board located in MyMathLab by Friday, June 30th at 11:59 PM CDT. If your response is not submitted by this time, you will lose five points (if submitted by the ultimate deadline). You must also respond to at least one other persons' post by Sunday, July 2nd at 11:59 PM CDT in order to get full credit. If you do not respond to another post, you will lose five points.

When you respond to your peer's post, be sure to include one area of strength in their description and one area of improvement.

(10 points) **Problem 2.** A company produces a certain item. Consider the graphs of the total cost and revenue functions for producing x items, where x, R and C are in thousands of items. $R(x)$ is the dotted graph and $C(x)$ is the solid line.

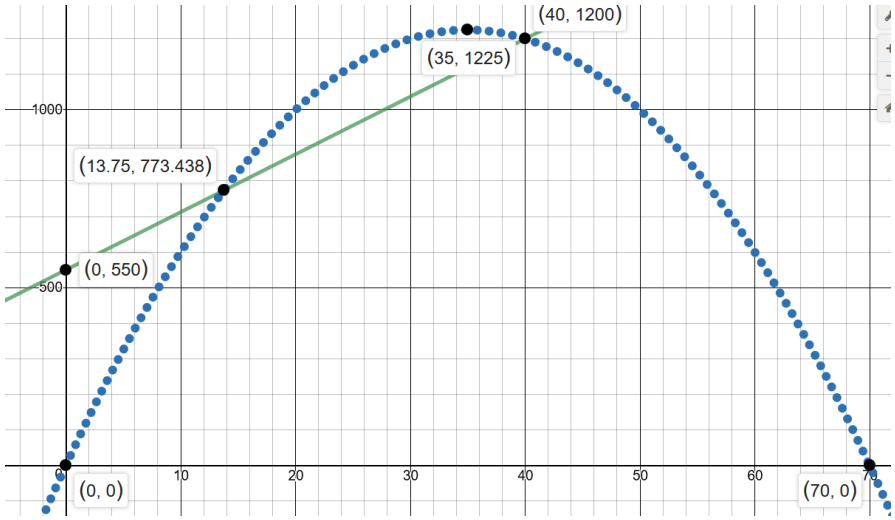

Figure 1: y=R(x) and C(x)

(a) On what interval is the marginal revenue for the company positive? Explain, in terms of the item, what this means.

(b) On what interval is the company profitable? Explain how you can determine this from the graph.

(c) Approximately how many items should the company produce to achieve maximum revenue? What is the maximum revenue? Is this the same value at which the company will achieve maximum profit? Justify your answer.

(15 points) **Problem 3.** The price-demand equation and the total cost function for the production of SMRT watches are given by:

$$x = 9000 - 30p \text{ and } C(x) = 150000 + 30x$$

where x is the number of watches that can be sold at price p per watch and $C(x)$ is the total cost of producing x watches.

1. Express the price p as a function of the demand, x and find its domain.

2. Find the marginal cost function.

3. Find the revenue function and state its domain.

4. Find the marginal revenue function.

5. Find $R'(3000)$. Use differentials to approximate the change in revenue from 3000 to 3010 watches.

6. Find the profit function.

7. Find the marginal profit function.

8. Use the marginal profit function to estimate the profit generated from producing 4500 watches.