Baylor University
Hankamer School of Business
Department of Finance, Insurance & Real Estate

Risk Management, Spring 2024 Name: _____
Dr. Garven
Problem Set 1

Show your work and write as legibly as possible. Good luck!

Problem 1 (12 points): Find the derivative of the following function with respect to x:

$$f(x) = 4x^5 - 3x^4 + 6x^3 - 8x^2 + 2x - 1$$

Problem 2 (12 points): Find the derivative of the following function with respect to x:

$$h(x) = (5x^2 - 3x + 2)^{\frac{1}{3}}$$

Problem 3 (12 points): Find the derivative of the following function with respect to x:

$$k(x) = e^{(5x)}$$

Problem 4 (12 points): Find the derivative of the following function with respect to x:

$$f(x) = \ln(3x^2 - 2x + 4)$$

Problem 5 (12 points): Find the partial derivatives of the following function with respect to x and y:

$$f(x, y) = x^2 + 3xy + y^3$$

Problem 6 (40 points): As the manager of your firm, you wish to determine how many gadgets to manufacture, such that profit is maximized. Your chief economist estimates that the fixed costs of operating your manufacturing facility total \$60,000, whereas variable costs come to $\$6x^2$, where x indicates the total number of gadgets produced. The competitively determined price per gadget is \$1,800.

A. (8 points): What is total revenue, expressed in terms of x?

B. (8 points): What is total cost, expressed in terms of x?

C. (8 points): What is marginal revenue?

D. (8 points): What is marginal cost?

E. (8 points): How many gadgets should your company produce; i.e., what value for x maximizes total profit? How can you be sure that this is the profit-maximizing, and not profit-minimizing value for x?