Name: _____
MATH 108
Fall 2023
HW 2: Due 09/12

"You only have to do a few things right in your life so long as you don't do too many things wrong."
–Warren Buffett

Problem 1. (10pt) Suppose that the revenue and cost function for a certain item are given by $R(q) = 45.99q$ and $C(q) = 11.13q + 576000$, respectively.

(a) How much does the company sell each item for? How much does it cost to make each item?

(b) What are the fixed costs for the production of this good?

(c) What is the profit or loss if the company produces and sells ten-thousand of these items?

(d) What is the break-even point? At least many items does this company need to sell in order to make a profit on this item?

Problem 2. (10pt) Howard just started a small business cleaning service called *Grossbusters*. For now, he is renting a truck for $1,550 per month. On average, he charges $110 per cleaning and uses approximately $4.86 in supplies per cleaning.

(a) What are the fixed and variable costs for Howard's cleaning service?

(b) Find the cost function for Howard's business.

(c) Find the revenue function for Howard's business.

(d) Find the break-even point for Howard's business. What is the minimal amount of cleanings Howard must book per month to make a profit?

(e) How many cleanings must Howard book each month to make a monthly profit of $8,000 (translating to a yearly profit of $96,000)? Does this seem feasible?

Problem 3. (10pt) Suppose a company produces two items, q_1 and q_2, and has a cost function given by $C(q_1, q_2) = 56.20q_1 + 19.45q_2 + 7192$.

(a) What are the fixed costs for producing these two items?

(b) What is the total cost associated with producing 30 of the first item and 65 of the second item?

(c) How much does it cost to produce the first item? How much does it cost to produce the second item?

Problem 4. (10pt) Suppose that you have a revenue function given by $R(q) = 120q$ and a cost function given by $C(q) = 70q + 1600$.

(a) What are the revenue and cost at a production level of 80 units?

(b) Without finding the profit function, find the break-even point for the production/sale of this item.

(c) Find the profit function, $P(q)$.

(d) Compute $P(80)$. Explain how you could use (a) to find $P(80)$.