***Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***Note:***

* ***This homework is to be done individually.***
* ***Before doing this assignment, work on the practice problems.***
* ***Word-process formulas using Equation Editor and diagrams using Drawing Tool.***
* ***Word-process your assignment within this template. Do not create a new file.*** ***If you do any work in Excel, copy and paste it into this document.***
* ***Include ALL steps.*** ***Incomplete solutions will receive partial credit.***

**Assignment Problem 1**

Given

1. Find the difference quotient
2. Use the definitional formula given below to find the derivative of the function.
3. Find the value of the derivative at *x* = 3.

Word-process your solution below.

**Assignment Problem 2**

Given,

1. Use the Power Rule to find derivative of the function.
2. Find the value of the derivative at x = 4.

Word-process your solution below.

**Assignment Problem 3**

The revenue and cost functions for producing and selling quantity *x* for a certain production facility are given below.

1. Determine the profit function *P*(x).
2. Use Excel to graph the functions *R*(x), *C*(x) and *P*(x) for the interval . Copy and paste the graph below. Note: Use Scatter plot with smooth lines and markers.
3. Compute the break-even quantities.
4. Determine the average cost at the break-even quantities.
5. Determine the marginal revenue *R’*(x).
6. Determine the marginal cost *C’*(x)
7. At what quantity is the profit maximized?

Word-process your solution below.

**Assignment Problem 4**

Manchester Co. stocks Part #567. The annual demand rate for the part is constant and known to be 4000 units/year. The part is purchased at a cost of $4/unit from an independent supplier. The annual holding cost for Part #567 is 25% of the per-unit purchase price, per year. Every time an order is placed, a fixed cost of $80 is incurred. (**Hints**: *Pay close attention to units.)*

1. What is the optimal order quantity for minimizing the average annual total cost?

The new two questions are bonus.

1. **(10 pts)** What is the optimal number of times per year for Champaign Co. to place an order?
2. **(10 pts)** What is the corresponding average annual total cost?