MATH 422 Week 6 Quiz Name_____
Date_____

Directions: Answer each question to the best of your ability. **Show your reasoning** and/or process used to answer the question(s) where it is appropriate. A calculator will be necessary for this quiz. You are not permitted to use a device that has internet capability. There are 5 questions.

1. (3 pts)

For the table below, could the table represent a function that is linear or exponential? Why? What is the justification for the choice of a model?

x	f(x)
0	30
1	60
2	120
3	240

Circle your choice:

$f(x)$ is linear exponential

Provide reasoning for your choice:

2. (3 pts)

North Atlantic right whales have been experiencing an "unusual mortality event" since 2017. Deaths are outpacing births, and the average lifespan continues to decline due to increased threats from human activity. The estimated population in 2017 was approximately 400 whales. Their population **declines** at a rate of 3% per year.

Suppose P represents population, and x the number of years of growth. An exponential model for the population can be written in the form $P = a \cdot b^x$. Write the model for this situation.

P =

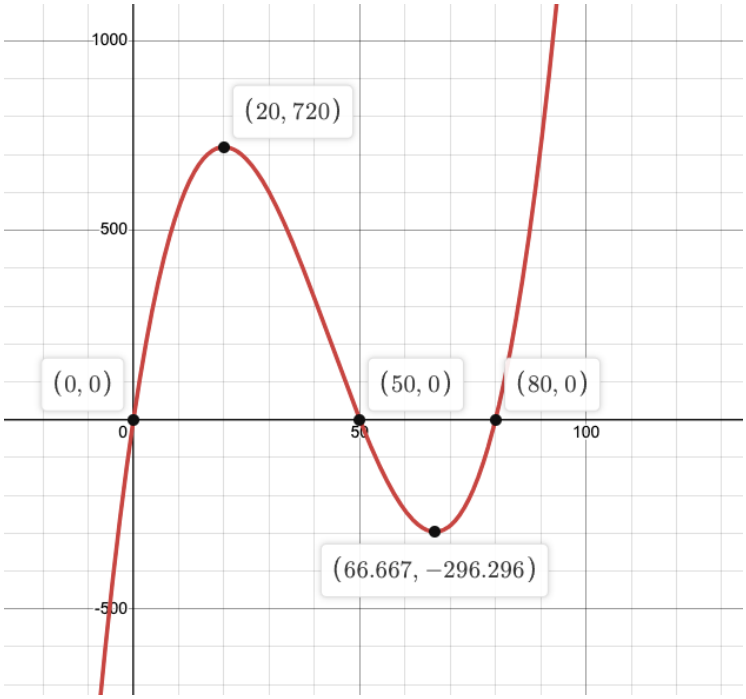
3. (3 pts)

A graph is shown of a profit function for a company that sells subscriptions to a streaming service.

x is the quantity of subscribers

y is the profit from subscriptions

At the maximum, how much $ does the company make **per subscriber**?



4. (3 pts)

The fox population in a certain region has an annual growth rate of 6 percent per year. It is estimated that the population in the year 2000 was 10600.

(a) $P(x) = 10600 \cdot (1.06)^x$ is the model used by the state's department of fish and wildlife to track the fox population for ten years after 2000.

(b) Use the function from part (a) to **estimate** the fox population in the year 2008.
Your answer is (the answer should have only 3 significant digits).

5. (3 pts)

A vehicle purchased for $25,000 depreciates at a compound rate of 8%. Determine the approximate value of the vehicle 15 years after purchase. Round to the nearest whole dollar.

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