Math 112 Written Homework: Polynomial Functions

Student Name:_____
Instructor: Laird
Math 112 Section: 062

*Directions: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.*

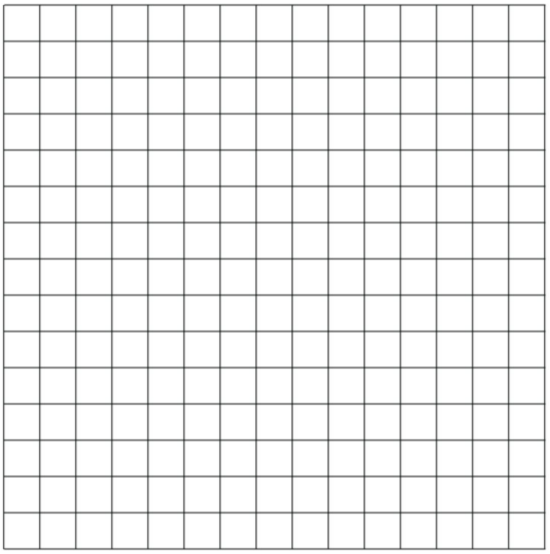
1. Apple iPhone sales (in millions of units) between 2007 and 2015 can be closely modeled by the polynomial function $y = f(t) = -0.4442t^3 + 7.0873t^2 - 0.2478t + 3.9307$, where $t$ is time in years since 2007.

   Define the variables:

   $t$ :

   $y$ :

   Graph this function in an appropriate window, label completely.



   What is the $y$-intercept, and what does this tell you in practical terms?

   What sales does this model predict in the year 2013?

   Do you think this model can be used to predict sales into the future, such as in the year 2022? Why or why not? (Note that the actual sales were 153.5 million that year.)

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2. A package can be sent by mail only if the sum of its height and perimeter of the base is not more than 96 inches.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Write a function to represent the volume of a box that has a square base and can be sent in the mail.

   What dimensions of such a box will give the maximum volume?

   What is the maximum volume?

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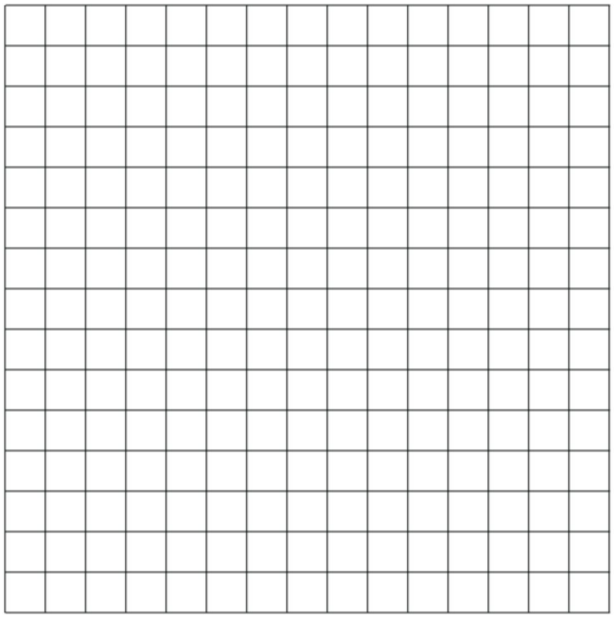
3. If \$1000 is invested at an interest rate, $r$, compounded annually, the amount in the account after 4 years is given by the polynomial function $A(r) = 1000(1 + r)^4$.

   Define the variables:

   $r$ :

   $A$ :

   Graph this function in an appropriate window.



   Describe how this function is transformed from the graph of $f(r) = r^4$.

   At what interest rate would the money need to be invested in order to yield \$1200 after 4 years?