Secondary Math 3   Name_____

4-2 Modeling with Exponential Functions

Write an exponential function that models the situation.

1. Initial value = 5, increasing at a rate of 17% per year.

2. Initial value = $500, compounded continuously at a rate of 8% per year.

3. Initial value = $4000, decreasing at a rate of 5.5% per year.

4. Initial value = $100 compounded monthly at a rate of 4% for 3 years.

For the following situations, write the exponential function that models the situation, then answer the questions.

5. In the year 2011, the population of Eagle Mountain was 23,161. The population was increasing at an estimated rate of 4.23% per year.

Predict the population of Eagle Mountain in 2015.

Using the same model, predict when the population reach 100,000?

6. The US Gold Dollar that was made from 1849 – 1854 (shown to the right) is currently worth

about 150$. If the coin's value increases at a rate of 2.7% per year:

Predict its value 10 years from now.

How long until it is worth $500?

7. If Hugh invests $1500 at 4% compounded semi-annually, how much money will he have after 7 years?

8. If Hugh invests $1500 at 4% compounded continuously, how much money will he have after 7 years?

9. Melba bought a car worth $15,000 in 2018. The car depreciates in value at a rate of 13% annually. In what year will her car be valued at $5000?

10. If Bob invests $2400 at 3.6% compounded continuously, how long will it take him to double his money?

11. The initial population of bacteria in a culture dish is 100. This type of bacteria divides every hour (population doubles every hour, which is a growth rate of 100%).

What is the bacterial population after 8 hours?

How long until the population reaches 200,000?

12.

Explain the Error A student has a baseball card that is worth $6.35. He looks up the appreciation rate and finds it to be 2.5% per year. He wants to find how much it will be worth after 3 years. He writes the function $f(t) = 6.35(2.5)^t$ and uses the graph of that function to find the value of the card in 3 years.

Y1=6.35(2.5)^X

X=3   Y=99.21875
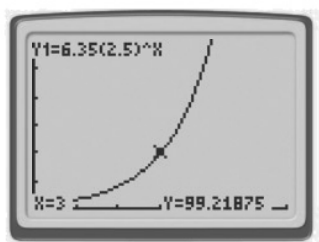
According to his graph, his card will be worth about $99.22 in 3 years.
What did the student do wrong? What is the correct answer?