Math 1 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4-3 Exponential Growth Part 2**  Date\_\_\_\_\_\_\_\_

* *I can define an exponential function.*
* *I can determine if a function is linear or exponential given the sequence, graph or table of values.*
* *I can identify the quantity being compared and write explicit/recursive equations to describe a real-world problem.*
* *I can use technology to find the point where two functions intersect.*
* *I can determine the practical domain and range in the context of a problem. And explain how they are related to the graph.*
1. Imagine that you found a lottery ticket in a parking lot that turned out to be the sole winning ticket for a $10,000 prize. Upon claiming your prize, you are offered two options:

 **Option 1:** Receive a single payment of $10,000 now.

 **Option 2:** Receive a single payment of $20,000 in ten years.

1. Which option would you choose and why?
2. Suppose a financial planner from your bank calls and offers another option.

**Option 3:** Take the $10,000 now and invest all of the money into a certificate of deposit (CD) earning 8% interest compounded annually (annual means yearly) for ten years.

 Would you stick with the option chosen in part a, or switch to option 3? Why?

You hopefully are thinking, “I wonder how much money I would have in ten years using option 3.”

Take notes below on how to calculate the balance in your account after each year from option 3.

1. Write a recursive equation to model option 3.

1. Write an equation in function notation that would model the amount of money in the account for any number of years *x*.



1. Which equation is best to use to determine the amount of money in the account after 10 years, the recursive equation or the explicit function? Why?
2. How much money will be in the account after ten years?
3. How much more money would you get by using that plan as opposed to option 2 which paid $20,000 in ten years?
4. Find the average rate of change for the following years. Include units in your answer.
5. Years 1-2 b. Years 4-5 c. Years 9-10
6. Is the average rate of change constant? If not, why?
7. Draw a sketch of the graph and describe the pattern.
8. What domain and range would make sense for this situation?

 **Domain:**

 **Range:**

1. Using a graph page in your calculator, find the solution to the following equations and explain what the solution tells you.
2.  Solution:\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explanation:

1.  Solution:\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explanation:

1.  Solution:\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explanation:

1.  Solution:\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Explanation:

1. How much would be in an account after 10 years if $15,000 were deposited at 4% annual interest compounded yearly? Write an explicit equation to match this situation then find the answer.
2. How much would be in an account after 10 years if $5,000 were deposited at 9.7% annual interest compounded yearly? Write an explicit equation to match this situation then find the answer.

**Compare the two savings plans from questions 12 and 13 and Option 3 from the previous problems.**

1. Which one yielded the most money after 10 years?
2. Did any of the accounts double the initial amount of money deposited? If so, which one(s)?
3. Did any of the account triple the initial amount of money deposited? If so, which one(s)?