Algebra 2 Name:\_\_\_\_\_\_\_\_\_\_\_\_

Linear Vs Exponential Practice

1. What is different about a linear pattern versus an exponential pattern?
2. Mr. Maurer is studying bacteria on a piece of bread that a student left in his classroom. He made the following table to keep track of the amount of bacteria.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X = days | 0 | 1 | 2 | 3 | 4 | 5 |
| Y = # of bacteria | 10 | 20 | 40 | 80 | 160 | 320 |

* 1. Why can this NOT be a linear pattern? Be specific.

* 1. Write an exponential model for the situation

* 1. Find how many bacteria there will be after one month

* 1. When will the number of bacteria exceed 1 billion?
1. Mr. Maurer is training for his marathon and keeps track of how far he has run over time.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| X = minutes | 0 | 8 | 16 | 24 | 32 | 40 |
| Y = miles | 0 | 1 | 2 | 3 | 4 | 5 |

* 1. Why can this NOT be an exponential pattern? Be specific
	2. Write a linear model for the situation

* 1. Find how far he will run after one hour

* 1. When will he have run 26 miles?

4. Mr. Maurer claims that your salary is linear but your investments are exponential.

1. What does he mean?

1. A teacher’s gross salary is $50,000 annually. They pay an average of 30% in taxes. They currently have $10,000 in student loan debt. Write a linear model to represent the amount of money a teacher has, ignoring all other incomes and expenses.

1. My savings account currently has $5,000 and earns an interest rate of 3%. Write a formula for the amount of money in the savings account, ignoring all other deposits or withdrawals.

1. Why is the plan in part c exponential?
2. When will the savings account be worth more than the teacher’s salary?

5. A new car becomes a used car as soon as it is driven off the lot. Used cars *depreciate* in value (in other words, they decrease in value). This makes buying a new car a poor investment if you only consider the dollar amount of the car. Suppose you buy a new car anyway, because you just love that “new car smell.” The price of the original car is $14,999. The price of a used car of the same make and model that is 1 year old is $10,999. Let f(x) model the price of the car over time, where f(x) = price ($) and x = time (years)

1. Do you know if the function f(x) is linear or exponential? Explain.

1. If f(x) is linear, what is f(2)?

1. If f(x) is exponential, what is f(2)?

1. Write an equation for f(x) if f is linear.

1. Write an equation for f(x) if f is exponential.

1. What is f(15) if f is linear? Does that answer make sense?
2. What is f(15) if f is exponential? Does that answer make sense?