

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

- a. Why can this NOT be a linear pattern? Be specific.
 - b. Write an exponential model for the situation
 - c. Find how many bacteria there will be after one month
 - d. When will the number of bacteria exceed 1 billion?
3. 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

- a. Why can this NOT be an exponential pattern? Be specific
- b. Write a linear model for the situation
- c. Find how far he will run after one hour
- d. When will he have run 26 miles?

4. Mr. Maurer claims that your salary is linear but your investments are exponential.
- What does he mean?
 - 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.
 - 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.
 - Why is the plan in part c exponential?
 - 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)
- Do you know if the function $f(x)$ is linear or exponential? Explain.
 - If $f(x)$ is linear, what is $f(2)$?
 - If $f(x)$ is exponential, what is $f(2)$?
 - Write an equation for $f(x)$ if f is linear.
 - Write an equation for $f(x)$ if f is exponential.
 - What is $f(15)$ if f is linear? Does that answer make sense?
 - What is $f(15)$ if f is exponential? Does that answer make sense?
6. What is the difference between linear and exponential functions?