

Unit 3 Review: Linear & Exponential Relationships

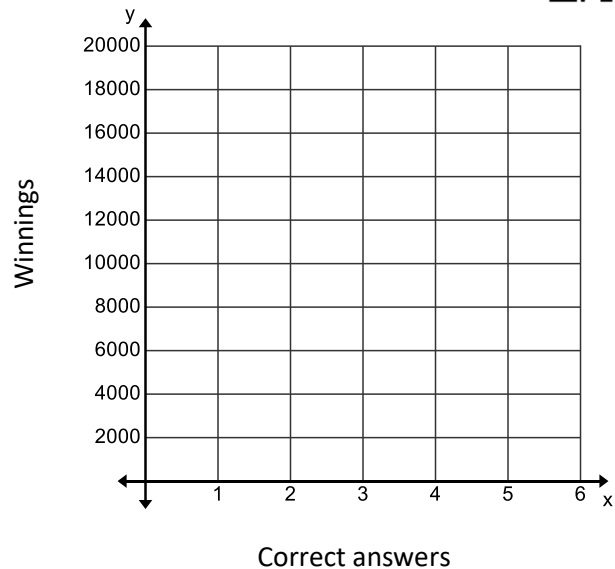
1. JJ’s ambition is to compete in a national bike race when he graduates high school, but he will need to purchase a new racing bike by then. After a lot of research, he finds a bike that suits him. The bike costs \$1,500. Over the summer, JJ raises \$1,000 by doing odd jobs and collecting contributions from his family and friends. He invests the money in an account that pays 8% interest per year on the balance in the account. How long it will take JJ’s account to be worth \$1,500? Show your work. (Hint: make a table.)

2. Lance is a contestant on a Quiz show. Every time he answers a question correctly, his winnings **double**. If he answers the first question correctly, his winnings are \$1,000; if he answers the second question correctly, his winnings increase to \$2,000; and so on.



a. Complete the table to show Lance’s winnings after each correct answer.

Correct Answers	Winnings
1	
2	
3	
4	
5	



- b. On the grid above, graph the data from the table.
- c. Write a recursive equation for the relationship in the table.
- d. Write an explicit equation for the relationship in the table.
- e. How many questions must Lance answer correctly to win \$128,000?

Tell whether each relationship below is linear, exponential, or neither.
If it is linear or exponential, write an explicit equation.

3)

x	0	1	2	3	4	5
$f(x)$	2	9	16	23	30	37

Linear, exponential, neither?

Equation: _____

5)

x	0	1	2	3	4	5
$g(x)$	2	4	8	16	32	64

Linear, exponential, neither?

Equation: _____

4)

x	0	1	2	3	4	5
$g(x)$	$\frac{1}{16}$	$\frac{1}{4}$	1	4	16	64

Linear, exponential, neither?

Equation: _____

6)

x	0	1	2	3	4	5
y	1	4	8	32	64	256

Linear, exponential, neither?

Equation: _____

7. Use the three tables below to answer the following questions. The numbers are rounded to the nearest whole number.

Table 1

Year	Pika
0 (2010)	500
1 (2011)	300
2 (2012)	180
3 (2013)	108

Table 2

Year	Pika
0 (2010)	500
1 (2011)	513
2 (2012)	526
3 (2013)	539

Table 3

Year	Pika
0 (2010)	500
1 (2011)	520
2 (2012)	541
3 (2013)	562

a. Which table shows a population of pika **growing** at a rate of 4% per year?

b. Which table shows a population of pika **decreasing** at a rate of 40% per year?

c. Which table(s) are exponential? Explain.

d. Which table(s) are linear? Explain.

Questions 8-9 are not multiple choice questions. You need to answer each part.

8. A city of 3,125,000 people has a 1.5% annual *increase* in population. Write an equation and determine the city's population after each of the following number of years.

Equation: _____

- a. 1 year b. 5 years c. 25 years

9. A \$45,000 purchase *decreased* 8% in value per year. Write an explicit equation and determine the value of the purchase after each of the following number of years.

Equation: _____

- a. 1 year b. 5 years c. 25 years

10. A \$7,000 violin increases in value by 20% each year.

- a. What is the growth rate? b. What is the growth factor?

11. Given the following equation: $y = 0.62(4)^x$

- a. Is it growth or decay?
b. What is the growth/decay factor of this equation?
c. What is the growth/decay rate of the equation?

Given the following equations, give the decay or growth rate. Tell if it is growth or decay.

12. $y = 4(0.7)^x$ 13. $Y = 4(1.7)^{x-3}$ 14. $f(x) = 2.5^x$ 15. $g(x) = 10(0.05)^{x-1}$

Growth or decay? Growth or decay? Growth or decay? Growth or decay?

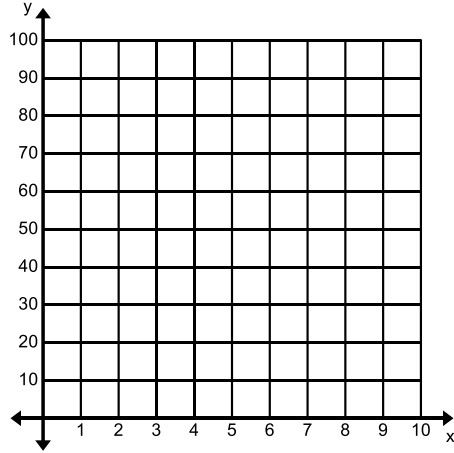
Factor: _____ Factor: _____ Factor: _____ Factor: _____

Rate: _____ Rate: _____ Rate: _____ Rate: _____

Fill in the table. Then use it to graph each equation.

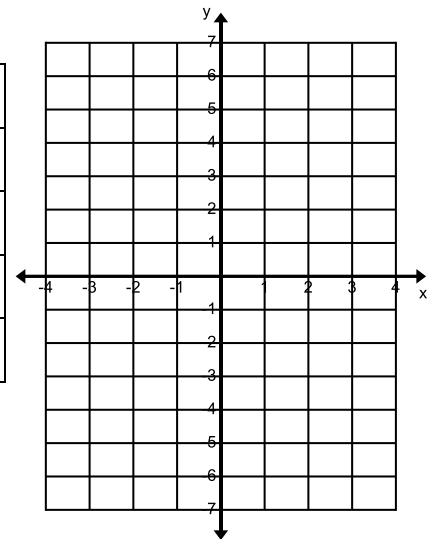
13. $Y = 100(.75)^x$

X	y



14. $Y = 4 - 3(x - 1)$

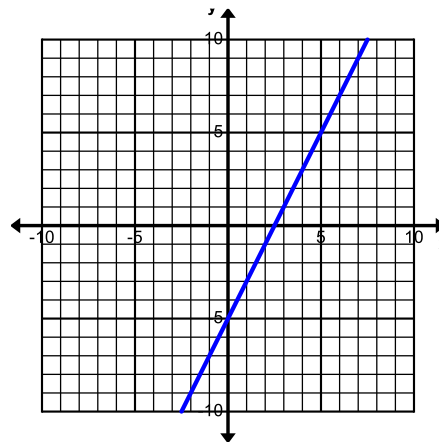
X	y



Fill in the table. Use it to write an equation for each graph.

15.

X	y

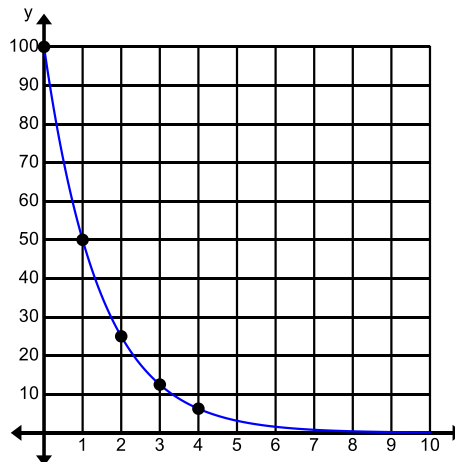


explicit equation:

16.

X	y

explicit equation:



Working hard at math can help your brain grow. You can do this!