

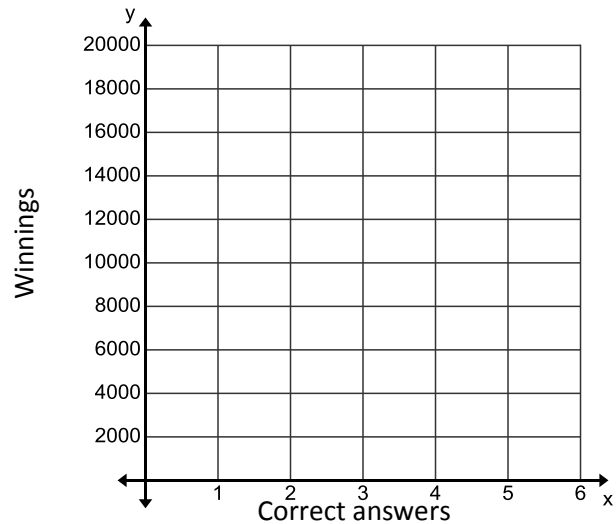
Unit 3 Review: Linear & Exponential Relationships

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: _____

4)

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

Linear, exponential, neither?

Equation: _____

5)

| | | | | | | |
|--------|---|---|---|----|----|----|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| $g(x)$ | 2 | 4 | 8 | 16 | 32 | 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?

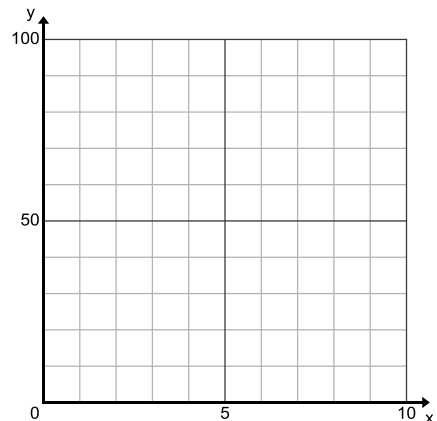
11. Given the following equation: $y = 0.62(4)^x$

- 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?

Fill in the table. Use it to graph each equation.

12. $y = 100(.75)^x$

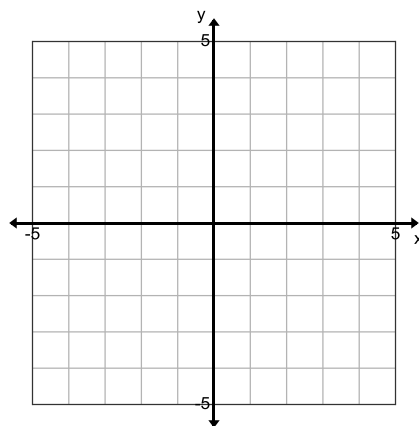
| x | y |
|---|---|
| | |
| | |
| | |
| | |



Fill in the table. Use it to graph each equation.

13. $y = 4 - 3(x - 1)$

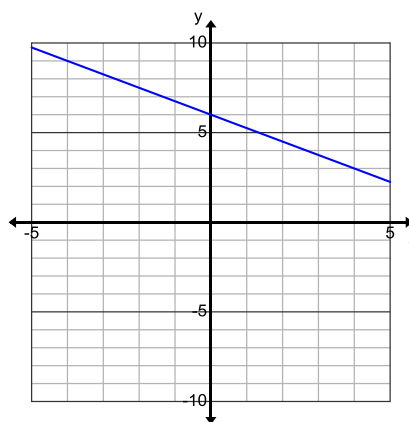
| x | y |
|---|---|
| | |
| | |
| | |
| | |



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

14.

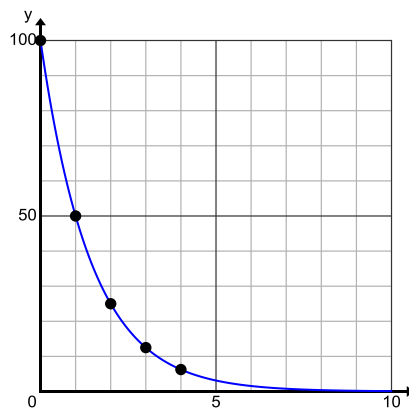
| x | y |
|---|---|
| | |
| | |
| | |
| | |



explicit equation:

15.

| x | y |
|---|---|
| | |
| | |
| | |
| | |



explicit equation: