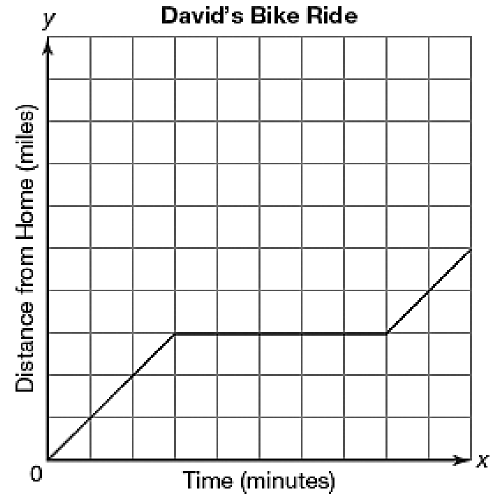
Algebra 1: 1st Semester Exam Review **Name** ____ **Period** _________

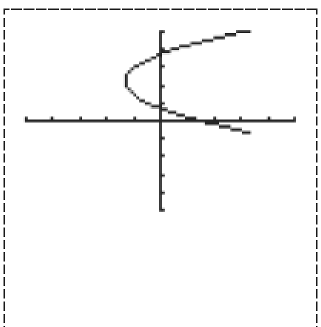
1. Hector knows there is a relationship between the number of cars he washes and the time it takes him to wash those cars. Identify the independent quantity and the dependent quantity in the problem situation.

2. David rode his bike to the park. After staying at the park for a few minutes, he then continued his ride to the grocery store. The graph shows this relationship. In the graph, what is the independent quantity and what is the dependent quantity?

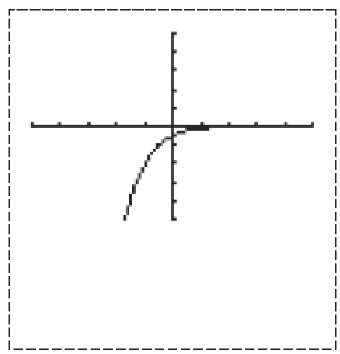


3. Tell whether each graph represents a function.

   a.

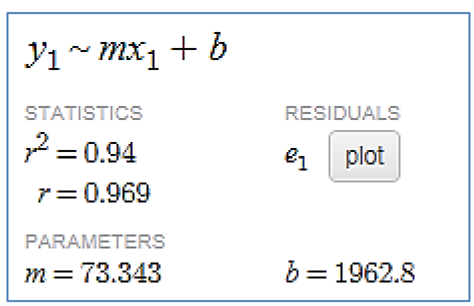


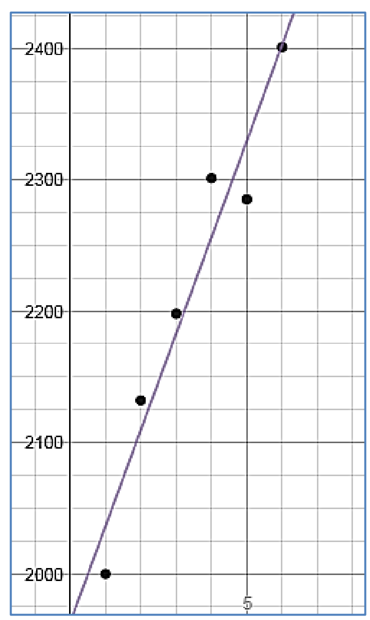
   b.



4. The graph shows the attendance for the varsity football games at Pedro's high school.

   a. Write a linear regression equation for the data. Round the slope and y-intercept to the nearest whole number.



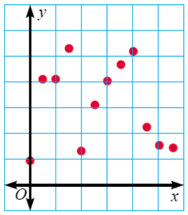


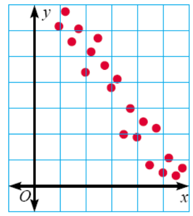
   b. Identify the correlation coefficient, or r-value, of the line. What does this value tell you?

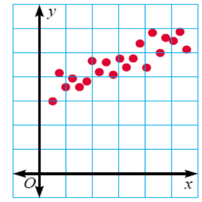
   c. Predict the attendance for game 9.

   d. At which game will the attendance be about 3000? Show your work.

5. Decide if there is a positive, negative, or no correlation for each graph.

a. 

b. 

c. 

6. An elevator in a high-rise building moves upward at a constant rate. The table shows the height of the elevator above the ground floor after various times.

a. What are the dependent and independent quantities in this problem situation? Explain your reasoning.

b. Determine the unit rate of change for the problem situation.

c. Complete the table.

d. Write an expression that represents the height for an arbitrary time *t* seconds in the last row.

e. Use function notation to determine the height of the elevator at a time of 14 seconds.

	Time	**Height**
Units	Seconds	Feet
	0	0
	1	12
	2	24
	3	
	4.5	
	5	
Expression	*t*	

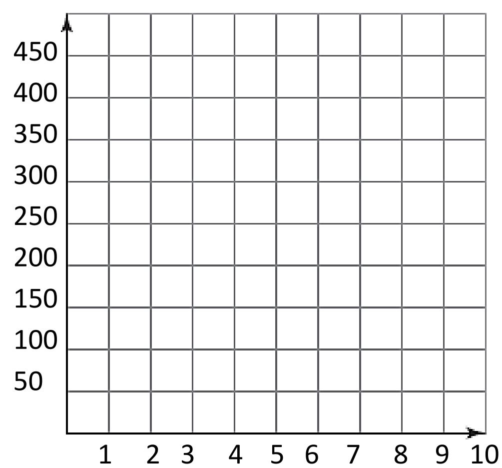
7. Suppose an elevator starts at the top floor of a high-rise building at a height of 350 feet above the ground floor and descends without stopping at a constant rate of 25 feet per second.

a. Write a function that describes the height, *h*, of the elevator after *t* seconds.

b. Graph the function that you wrote in part (*a*).

c. Estimate when the elevator is at a height of 200 feet.

d. Determine the exact time that the elevator is at a height of 200 feet.



8. Joy has \$200 to spend at the shopping mall. She decides to buy sweaters and pants with her money. Sweaters cost \$35 each and pants cost \$20 each.

   a. Write an equation to represent this problem situation. Use s to represent the number of sweaters and p to represent the number of pants.

   b. If Joy buys 3 sweaters, what is the greatest number of pants she can buy? Show your work and explain your reasoning.

   c. If Joy buys no pants, what is the greatest number of sweaters she can buy? Show your work and explain your reasoning.

9. Elena works a part-time job after school to earn money for a summer vacation. She is paid a constant rate for each hour she works. The table shows the amounts of money that Elena earned for various amounts of time that she worked.

   a. What are the dependent and independent quantities in this problem situation? Explain your reasoning.

   b. Determine the unit rate of change for the problem situation.

   c. Complete the table.

   d. Write an expression that represents the amount of money Elena earns for an arbitrary time worked of t hours.

   e. Use function notation to determine the amount of money that Elena earns for working 7.5 hours.

	Time Worked	**Amount Earned**
Units	Hours	Dollars
	2.5	22.50
	3	27.00
	3.5	31.50
	4.5	
	5	
	6	
Expression	t	

10. Josh has \$125 to spend at the electronics store. He decides to buy video games and DVDs with his money. Video games cost \$40 each and DVDs cost \$15 each.

   a. Write an equation to represent this problem situation. Use v to represent the number of video games and d to represent the number of DVDs.

   b. If Josh buys 2 video games, what is the greatest number of DVDs he can buy? Show your work and explain your reasoning.

   c. If Josh buys no DVDs, what is the greatest number of video games he can buy? Show your work and explain your reasoning.

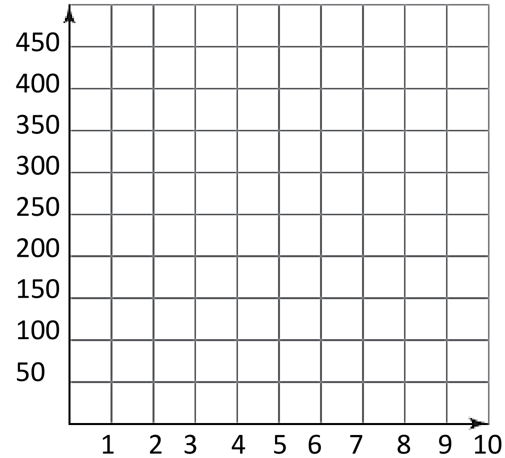
11. Taylor received a $450 gift card from his grandparents and is using it only to pay for his singing lessons, which cost $50 per month.

    a. Write a function that describes the dollar amount of money *d*, on the card after *t* months.

    b. Graph the function that you wrote in part (*a*).

    c. Taylor decides he wants to use the last of the gift card to buy some sound equipment that will cost $100. Estimate when there will be $100 remaining on the card.

    d. Determine exactly when there will be $100 remaining on the card.



12. Darla has $75 to spend at the bookstore. She decides to buy books and magazines with her money. Books cost $12 each and magazines cost $6 each.

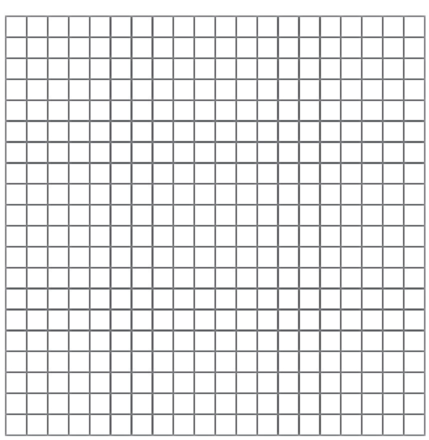
    a. Write an equation to represent this problem situation. Let *b* represent the number of books and let *m* represent the number of magazines.

    b. If Darla buys 2 books, what is the greatest number of magazines she can buy? Show your work and explain your reasoning.

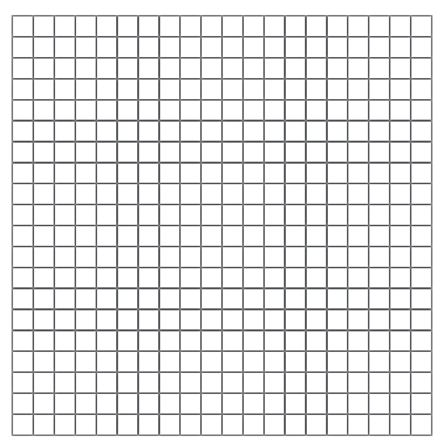
    c. If Darla buys no magazines, what is the greatest number of books she can buy? Show your work and explain your reasoning.

13. Create an equation and sketch a graph for each set of given characteristics.

a.
- is a function
- is linear
- is discrete
- is increasing



b.
- is a function
- is exponential
- is continuous
- is decreasing



14. Classify each function as increasing, decreasing, or constant.

a. $f(x) = \frac{1}{2}x - 2$

b. $f(x) = -2^x$

c. $f(x) = -3x + 4$

d. $f(x) = 5$

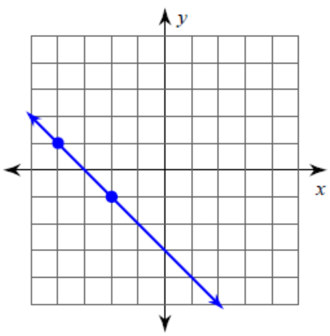
15. Evaluate the function $f(x) = 31.572x - 17.741$ at each of these values.

a. $f(6.2)$

b. $f(-27.5)$

16. Solve the equation. $5(x+4) - 8 = x + 32$

17. Find the slope from the graph.

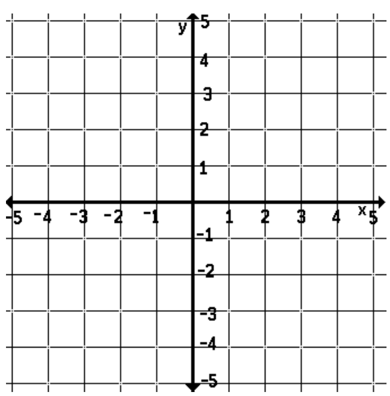


18. Find the slope using two points. $m = \frac{y_2 - y_1}{x_2 - x_1}$

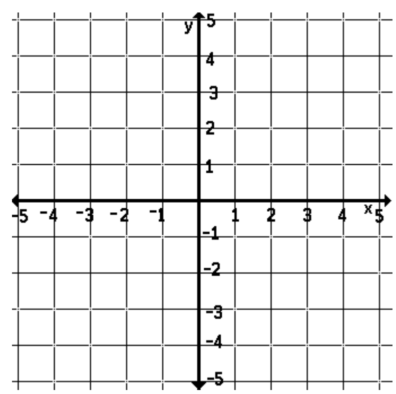
$(-2,6),(6,8)$

Graph each equation.

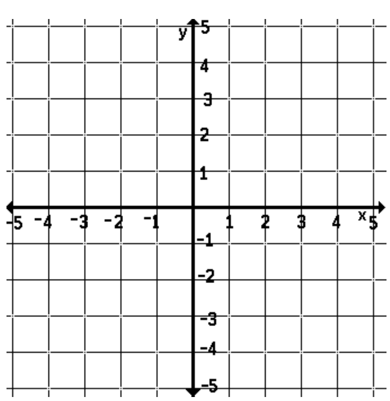
19. $y = \frac{1}{2}x - 4$



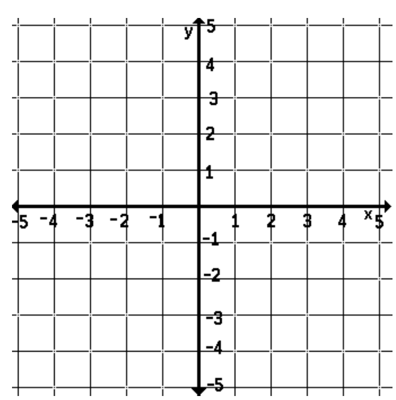
20. $4x + 3y = 6$



21. $x = 4$



22. $y = -3$



Write the slope-intercept form of each equation given a point and slope or two points. $y - y_1 = m(x - x_1)$

23. $(4, -6),\ m = 2$

24. $(-9, 6),\ m = \frac{1}{3}$

Find the slope first on these two!

25. (2, -5), (7, 0)

26. (4, -3), (6, -7)

Solve each literal equation.

27. Solve $C = 2\pi r$ for *r*.

28. Solve $A = \frac{1}{2}(b_1 + b_2)h$ for *h*.

Write each equation in standard form. Ax + By = C

29. $y = -\frac{1}{4}x + 3$

30. $y = 2x - 7$

Write each equation in slope-intercept form. y = mx + b

31. $5x + 2y = -6$

32. $2x + 3y = 9$

33. What is the *y*-intercept for the equation $7x + 2y = -14$?

34. What is the *x*-intercept for the equation $-3x - 5y = -15$?

35. A number is less than 24 or greater than 35. Write a compound inequality that represents the possible values of the number. Then graph the compound inequality on the number line.

36. Solve each inequality and graph the solution on the number line.

a. $4(x+1) \le 12$

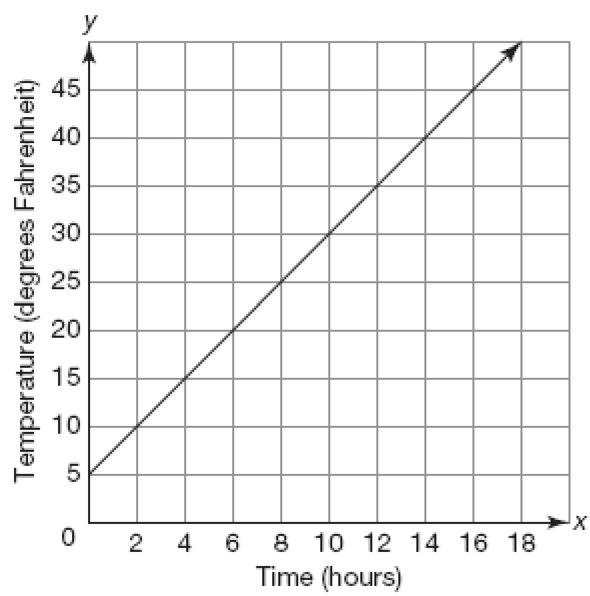
b. $-3(x-3) < 12$

37. Solve and graph each compound inequality on the number line.

a. $-6 \le 2x+2 \le 10$

b. $x+2 \le -4 \;\; or \;\; -2x < -8$

38. The graph represents the temperature range in a city over 20 hours. Luke hates extreme cold and decides he will only go outside when the temperature is 30° or greater. Draw a circle on the graph to represent when Luke will go outside.



39. Evaluate each expression. Show your work.

a. $|4-12|$

b. $|-8(7)|$

40. Solve each absolute value equation.

a. $|2x-5| = 7$

b. $|-2x+7| = 11$

c. $|x-6|+8=41$

d. $52=7|x-2|-4$

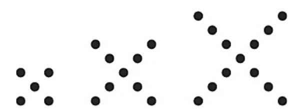
41. Consider the sequence shown.

a. Describe the pattern.

b. Draw the next two figures of the pattern.

c. Write a numeric sequence to represent the first 5 figures.

42. Consider the sequence shown.



a. Describe the pattern.

b. Draw the next two figures of the pattern.

c. Write a numeric sequence to represent the first 5 figures.

43. JoJo’s Pizza Shop made 16 pizzas on Monday, 22 pizzas on Tuesday, and 28 pizzas on Wednesday. If this pattern continues, how many pizzas will Pauline’s Pizza Shop make on Friday?

44. Bradley makes two phone calls to his friends to tell them school is cancelled because of snow. Each of those friends makes two calls to tell their friends the same news. Each of those friends makes two calls to tell their friends the same news, and so on.

a. Write a numeric sequence to represent the number of calls made in each of the first 5 sets of phone calls.

b. Is this an arithmetic or geometric sequence?

45. The Robinsons are draining their family swimming pool. After one-half hour, there are 7500 gallons of water in the pool. After one hour, there are 7200 gallons of water in the pool. After one and one-half hours, there are 6900 gallons of water in the pool. If this pattern continues, how much water will be in the pool after 3 hours?

46. Identify each sequence as arithmetic or geometric. Then determine the common difference or common ratio for each sequence.

a. 2, 5, 8, 11, 14, 17

b. -6, 12, −24, 48, −96

c. $1, \frac{1}{4}, \frac{1}{16}, \frac{1}{64}, \frac{1}{256}$

d. 0.13, 0.38, 0.63, 0.88, 1.13

e. −6, −8, −10, −12, −14

f. 200, 20, 2, 0.2, 0.02

g. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}$

h. 8, −1, −10, −19, −28

47. For each sequence, determine whether it is arithmetic or geometric. Then use the appropriate formula to determine the 15th term in the sequence.

$$a_n = a_1 + d(n-1) \qquad g_n = g_1 \bullet r^{n-1}$$

a. 5, 10, 20, 40, 80, 160

b. $\frac{1}{2}, 1, \frac{3}{2}, 2, \frac{5}{2}, 3, \frac{7}{2}$

c. −0.25, 0.5, 1.25, 2, 2.75

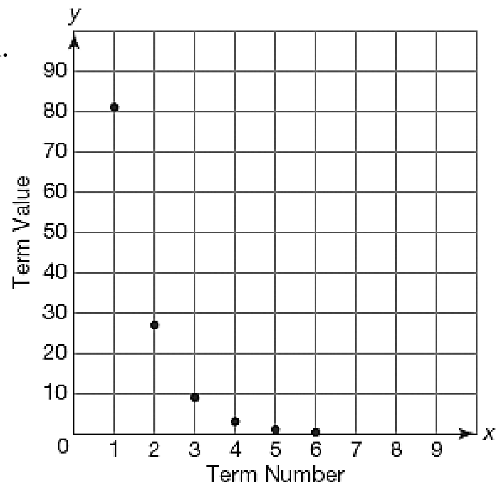
d. $4, 2, 1, \frac{1}{2}, \frac{1}{4}$

48. Determine the 50th term in the sequence defined by $a_n = -11 + 5(n-1)$.

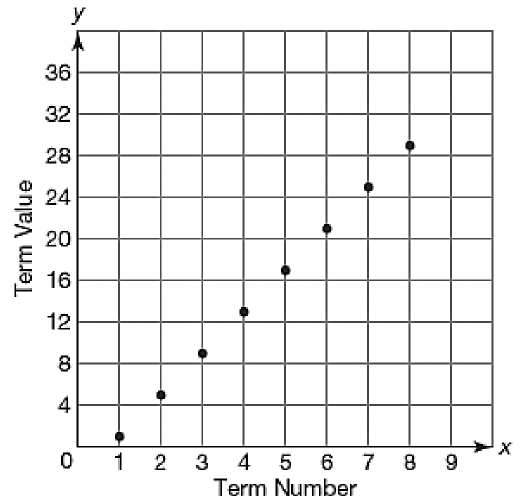
49. Determine the 7th term in the sequence defined by $g_n = 2 \cdot \left(\frac{1}{2}\right)^{n-1}$.

50. Tell whether each graph represents an arithmetic sequence or a geometric sequence. Explain your reasoning.

a.



b.



51. Identify each of the following for the function $f(x) = -4 \cdot 2^x$.
Then graph the function.

a. x-intercept(s)

b. y-intercept

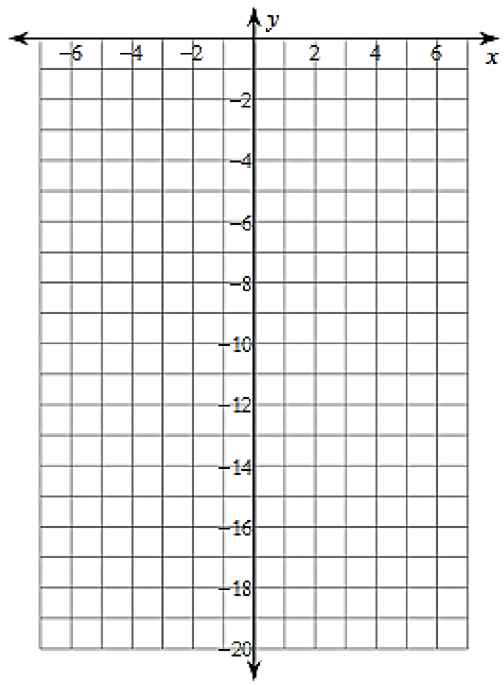
c. asymptote

d. domain

e. range

f. interval(s) of increase/decrease

x	y
-2	
-1	
0	
1	
2	



52. Identify each of the following for the function $f(x) = 3 \cdot 2^x$.
Then graph the function.

a. x-intercept(s)

b. y-intercept

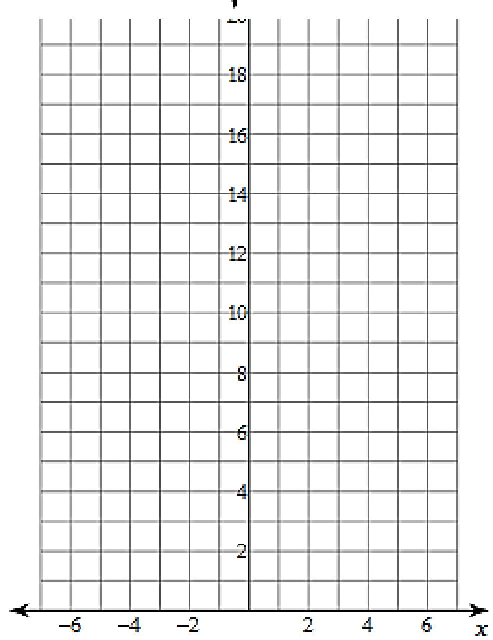
c. asymptote

d. domain

e. range

f. interval(s) of increase/decrease

x	y
-2	
-1	
0	
1	
2	



53. Use the simple and compound interest formula to complete the table. Round to the nearest cent.

Simple: $A = P + (Pr)t$

Compound: $A = P \cdot (1+r)^t$

Time	Simple Interest Balance	Compound Interest Balance
6 months		
1 year		
5 years		
20 years		

a. Complete the table for an initial deposit of $20,000 at a rate of 2.5%.

b. Determine the rate of change for each function. Show your work or explain your reasoning.

c. Compare the rates of change. What does this tell you about the graphs of the functions? Explain your reasoning.

54. Carrie is considering depositing $1,480 into an account that pays compound interest. How much will be in her account in each situation? Round to the nearest cent. $A = P(1+r)^t$

a. 1.9% for ten years

b. 3.6% for fifteen years

55. The revenue for a company this year was $750,000. Each year the revenue increases at a rate of 0.75% per year. Write a function that represents the company's revenue as a function of time in years.

56. The expenses for a company this year were $74,000. Write a function that represents the company's expenses as a function of time in years for each situation. Choose the correct rule (growth or decay).

$A = P(1+r)^t$ *or* $A = P(1-r)^t$

a. expenses increase at a rate of 2.3% per year

b. expenses decrease at a rate of 1.7% per year

57. Write the equation of each function after the translation described.

a. $f(x) = -10x$ after a translation 5 units to the right

b. $f(x) = 3^x$ after a translation 4 units up

c. $f(x) = 2x^2$ after a translation 2 units left

d. $f(x) = 4^x$ after a reflection over the y-axis

e. $f(x) = x^3$ after a translation 2 units up

f. $f(x) = x^2$ after a reflections over the x-axis

58. Describe each graph in relation to its basic function.

a. Compare $f(x) = (x+3)^2$ to the basic function $h(x) = x^2$.

b. Compare $f(x) = b^x + 1$ to the basic function $h(x) = b^x$.

c. Compare $f(x) = b^{-x}$ to the basic function $h(x) = b^x$.

d. Compare $f(x) = x^3 + 9$ to the basic function $h(x) = x^3$.

e. Compare $f(x) = b^{(x-1)}$ to the basic function $h(x) = b^x$.

59. Kendra graphed the function $f(x) = 9^x$.

a. Write a function that is a reflection of the function about the x-axis.

b. Write a function that is a reflection of the function about the y-axis.

60. Write a statement that correctly compares the *y*-intercepts of the two functions.

$g(x) = x^3 + 8$

$h(x) = x^3 - 8$