Graph the function. Describe the domain and range.

1. $y = \begin{cases} 2x + 4, & \text{if } x \le -1 \\ \frac{1}{3}x - 1, & \text{if } x > -1 \end{cases}$

2. $y = \begin{cases} 1, & \text{if } 0 \le x < 3 \\ 0, & \text{if } 3 \le x < 6 \\ -1, & \text{if } 6 \le x < 9 \\ -2, & \text{if } 9 \le x < 12 \end{cases}$

Write an equation in slope-intercept form of the line with the given characteristics.

3. slope $= \frac{2}{5}$; y-intercept $= -7$

4. passes through $(0, 6)$ and $(3, -3)$

5. parallel to the line $y = 3x - 1$; passes through $(-2, -8)$

6. perpendicular to the line $y = \frac{1}{4}x - 9$; passes through $(1, 1)$

Write an equation in point-slope form of the line with the given characteristics.

7. slope $= 10$; passes through $(6, 2)$

8. passes through $(-3, 2)$ and $(6, -1)$

9. The first row of an auditorium has 42 seats. Each row after the first has three more seats than the row before it.

   a. Find the number of seats in Row 25.
   b. Which row has 90 seats?

10. The table shows the amount x (in dollars) spent on advertising for a neighborhood festival and the attendance y of the festival for several years.

    a. Make a scatter plot of the data. Describe the correlation.
    b. Write an equation that models the attendance as a function of the amount spent on advertising.
    c. Interpret the slope and y-intercept of the line of fit.

Advertising (dollars), x	Yearly attendance, y
500	400
1000	550
1500	550
2000	800
2500	650
3000	800
3500	1050
4000	1100

11. Consider the data in the table in Exercise 10.

    a. Use a graphing calculator to find an equation of the line of best fit.
    b. Identify and interpret the correlation coefficient.
    c. What would you expect the scatter plot of the residuals to look like?
    d. Is there a causal relationship in the data? Explain your reasoning.
    e. Predict the amount that must be spent on advertising to get 2000 people to attend the festival.

12. Let a, b, c, and d be constants. Determine which of the lines, if any, are parallel or perpendicular. Explain.
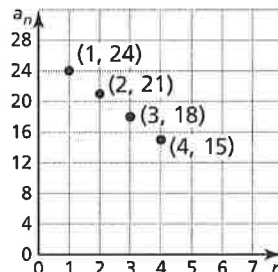
    Line 1: $y - c = ax$ Line 2: $ay = -x - b$ Line 3: $ax + y = d$

13. Write a piecewise function defined by three equations that has a domain of all real numbers and a range of $-3 < y \le 1$.

1. Which function represents the arithmetic sequence shown in the graph?

   (A) $f(n) = 15 + 3n$

   (B) $f(n) = 4 - 3n$

   (C) $f(n) = 27 - 3n$

   (D) $f(n) = 24 - 3n$

2. Which of the inequalities are equivalent?

   | $3x + 6 \leq 8 + 2x$ | $5x - 5 \geq 7x - 9$ | $12 - 3x \leq 18$ | $-2 - \frac{3}{2}x \geq -3 - x$ |

3. Complete the table for the four situations below. Explain your reasoning.

   a. the price of a pair of pants and the number sold

   b. the number of cell phones and the number of taxis in a city

   c. a person's IQ and the time it takes the person to run 50 meters

   d. the amount of time spent studying and the score earned

Situation	Correlation		Causation	
	Yes	No	Yes	No
a.				
b.				
c.				
d.				

4. Consider the function $f(x) = x - 1$. Select the functions that are shown in the graph. Explain your reasoning.

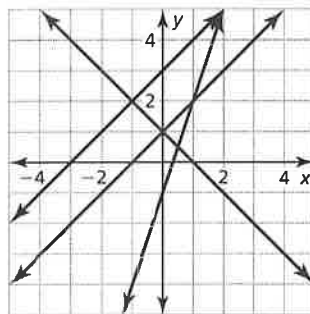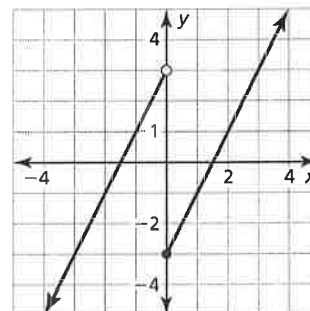 | $g(x) = f(x + 2)$ | $h(x) = f(3x)$ |
   | $k(x) = f(x) + 4$ | $p(x) = f(-x)$ |
   | $r(x) = 3f(x)$ | $q(x) = -f(x)$ |

5. Use the numbers to fill in values for m and b in the equation $y = mx + b$ so that its graph passes through the points $(6, 1)$ and $(-2, -3)$.

| -5 | -2 | -1 | $-\frac{1}{2}$ | 0 | $\frac{1}{2}$ | 1 | 2 | 5 |

6. Fill in the piecewise function with $-$, $+$, $<$, $\leq$, $>$, or $\geq$ so that the function is represented by the graph.

$$y = \begin{cases} 2x \;\rule{0.6cm}{0.25cm}\; 3, & \text{if } x \;\rule{0.6cm}{0.25cm}\; 0 \\ 2x \;\rule{0.6cm}{0.25cm}\; 3, & \text{if } x \;\rule{0.6cm}{0.25cm}\; 0 \end{cases}$$

7. You claim that you can create a relation that is a function, and your friend claims that she can create a relation that is not a function. Using the given numbers, create a relation of five ordered pairs that supports your claim. What relation of five ordered pairs can your friend use to support her claim?

| -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |

8. You have two coupons you can use at a restaurant. Write and solve an equation to determine how much your total bill must be for both coupons to save you the same amount of money.

20% OFF your entire purchase

$5 Off any meal of $10 or more

9. The table shows the daily high temperatures x (in degrees Fahrenheit) and the numbers y of frozen fruit bars sold on eight randomly selected days. The equation $y = 3x - 50$ models the data.

Temperature (°F), x	54	60	68	72	78	84	92	98
Frozen fruit bars, y	40	120	180	260	280	260	220	180

a. Select the points that appear on a scatter plot of the residuals.

| $(92, -6)$ | $(78, 96)$ | $(60, -10)$ | $(84, 58)$ | $(98, -64)$ |

| $(72, 94)$ | $(54, -72)$ | $(96, 78)$ | $(60, 10)$ | $(68, 26)$ |

b. Determine whether the model is a good fit for the data. Explain your reasoning.