North Carolina Math 1 Unit 1 Assesment:
Introduction to Functions and Equations

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. What is the constant in the expression $14c^2 + 7c - 6$?

     a.   6   c.   2
     b.   −6   d.   14

_____ 2. Mina bought a plane ticket to New York City and used a coupon for 10% off the ticket price. The total cost of her ticket, with the discount, was $253.10. Which equation could she use to find the price of the ticket without the discount?

     a. $z = 253.10 + 0.10$ c. $z + 0.10(z) = 253.10$
     b. $0.10z = 253.10$ d. $z - 0.10(z) = 253.10$

_____ 3. Lucas bought an oven. His total cost of $1,249 included sales tax at the rate of 9% and an additional, untaxed delivery charge of $50. How much sales tax did he pay?

     a. $99   c. $109
     b. $63   d. $110

_____ 4. Two friends collectively travel 1700 miles to see each other. They fly toward each other to meet for a weekend. The first friend flew on an airplane and it took her 2 hours to meet her friend. The second friend leaves 15 minutes later, but her plane flew 25 miles per hour faster than her friend's plane. What was the second friend's speed to the nearest whole number?

     a.   about 467 mph   c.   about 454 mph
     b.   about 416 mph   d.   about 442 mph

_____ 5. A new furniture store is giving away six $25 gift certificates at the store every hour to celebrate its grand opening. The store manager wants to save at least 28 of the certificates to give to a local charity. If there are 220 gift certificates to start with, for how many hours should the store continue giving them away?

     a.   less than 32 hours   c.   less than or equal to 32 hours
     b.   greater than or equal to 32 hours   d.   greater than 32 hours

EA-13

_____   6. A refrigerator that costs R dollars with 7% sales tax can be described using the expression $R + 0.07R$. Which expression below is NOT the same as this expression?

   a. $1.7R$ c. $R(1 + 0.07)$
   b. $1.07R$ d. $0.07R + R$

_____   7. What is the solution to the inequality $\dfrac{3x}{8} - 3 < x - 8$?
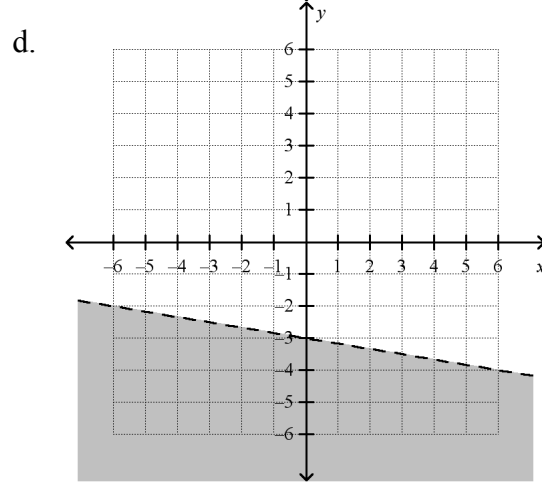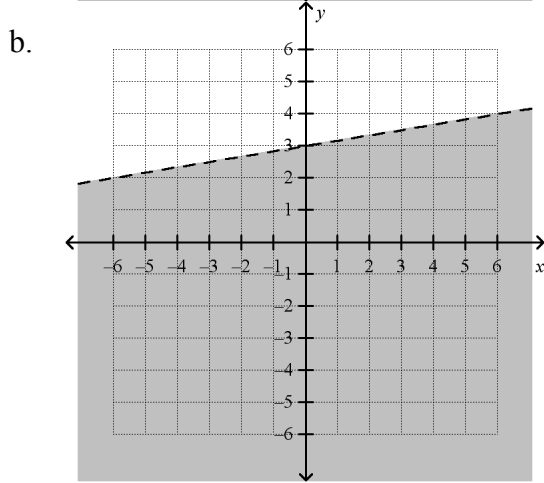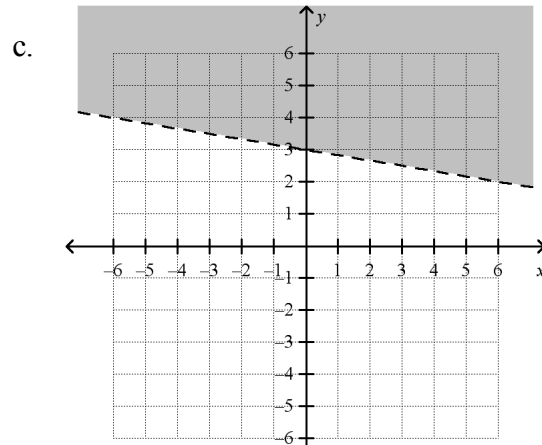
   a. $x > 8$ c. $x < 8$
   b. $x > -8$ d. $x < -8$

_____   8. What is the solution to the equation $-9x - 4 + 7x = 4 - 6x$?

   a. $x = 2$
   b. $x = -2$
   c.   There are no solutions to this equation.
   d. $x = \dfrac{1}{2}$

_____   9. The formula for calculating the volume of a cone is $V = \dfrac{1}{3}\pi r^2 h$. Solve this formula for h.

   a. $h = 3V - \pi r^2$ c. $h = \dfrac{\pi r^2}{3V}$

   b. $h = \pi r^2 - 3V$ d. $h = \dfrac{3V}{\pi r^2}$

EA-14

_____ 10. Which graph represents the solution to the inequality $y < \frac{1}{6}x - 3$?

a.

c.

b.

d.
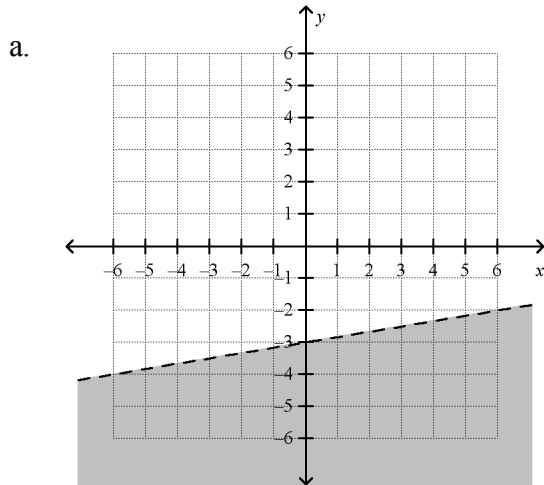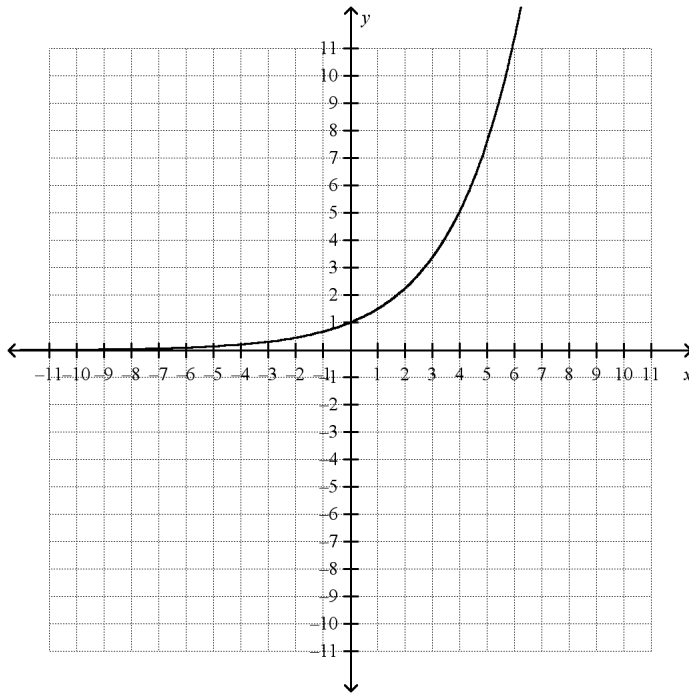

_____ 11. If $f(x) = 2x + 5$ and the domain of f is $\{2, 8, 14\}$, what is the range of $f(x)$?

a. $\{9, 21, 33\}$ c. $\{14, 26, 38\}$

b. $\{4, 16, 28\}$ d. $\{-1, 11, 23\}$

EA-15

_____ 12. From the graph below, what is the domain and range of the function $f(x) = \left(\frac{3}{2}\right)^x$?

a. Domain: {y<0}
    Range: {all real numbers}

b. Domain: {y>0}
    Range: {all real numbers}

c. Domain: {all real numbers}
    Range: {y>0}

d. Domain: {all real numbers}
    Range: {y<0}

_____ 13. The contents of the fuel tank of a car can be modeled by the function $g(x) = -0.04x + 10$, where x is in miles driven and $g(x)$ represents the amount of fuel remaining in the tank in gallons. Kira has traveled 150 miles. Which statement represents the amount of gas in gallons that she has left in her car?

a. $g(x) = 4$

b. $g(x) = 6$

c. $g(150) = 6$

d. $g(150) = 4$

4

EA-16

_____ 14. Which statement describes the graph of the function $h(x) = \log_3(x + 2)$ for the function values between $x = -1$ and $x = 0$?
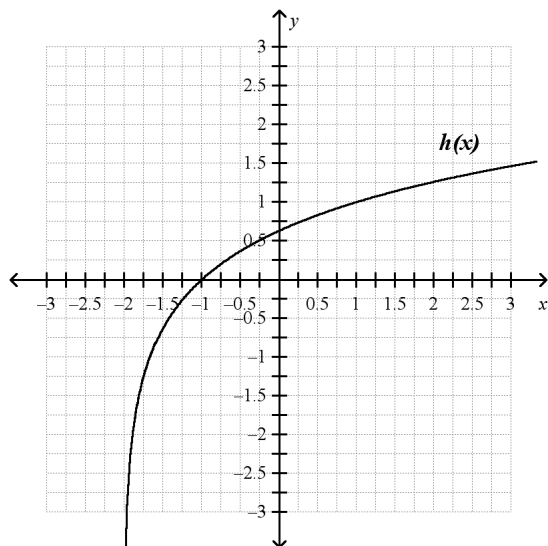
a. The function values are increasing at the same rate as the function values between $x = 0$ and $x = 1$.

b. The function values are increasing at a slower rate than the function values between $x = 0$ and $x = 1$.

c. The function values are increasing at a faster rate than the function values between $x = 0$ and $x = 1$.

d. The function values are increasing at the same rate as the function values between $x = -2$ and $x = -1$.
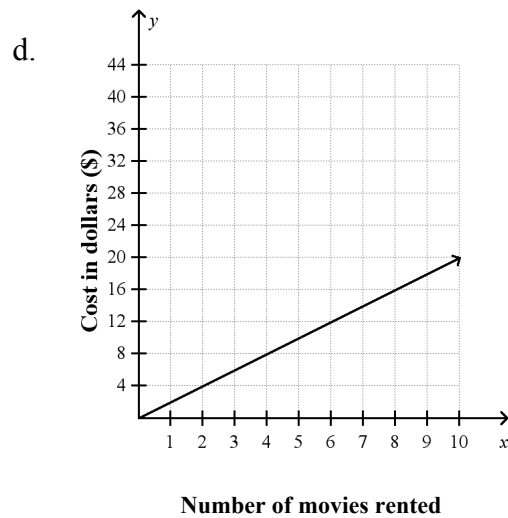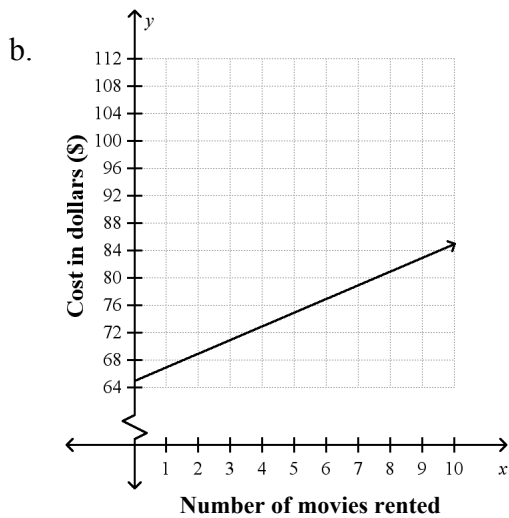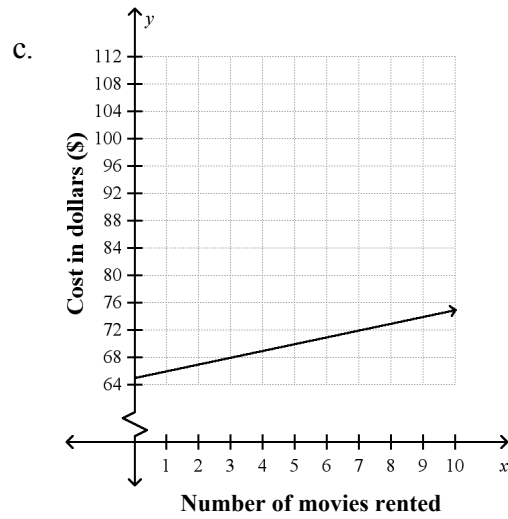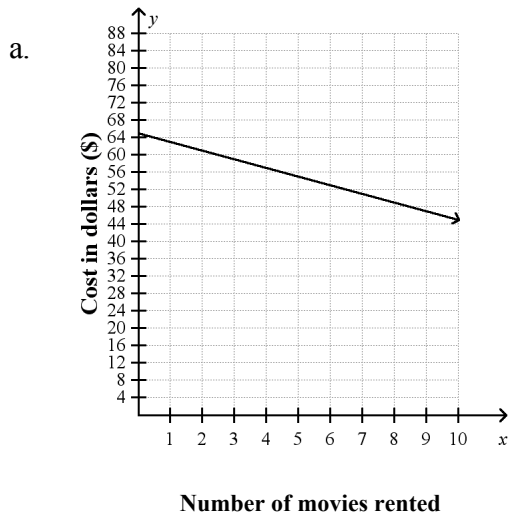
EA-17

_____   15. An online company charges $3.50 a month plus $2.00 for each song you decide to download.
             Which of the following graphs best represents this scenario?
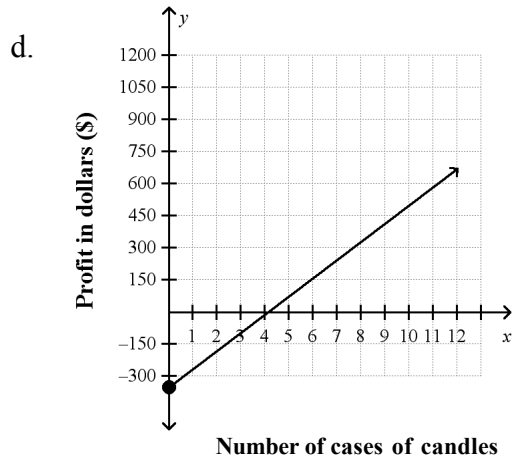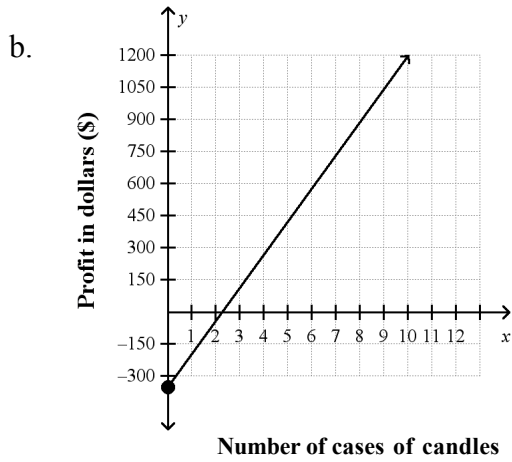
a.

c.

b.

d.
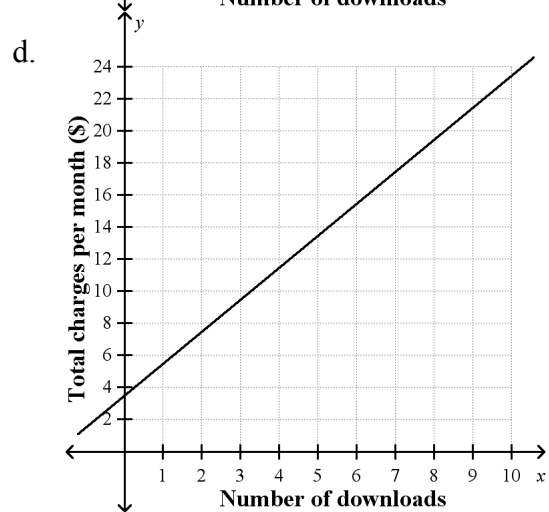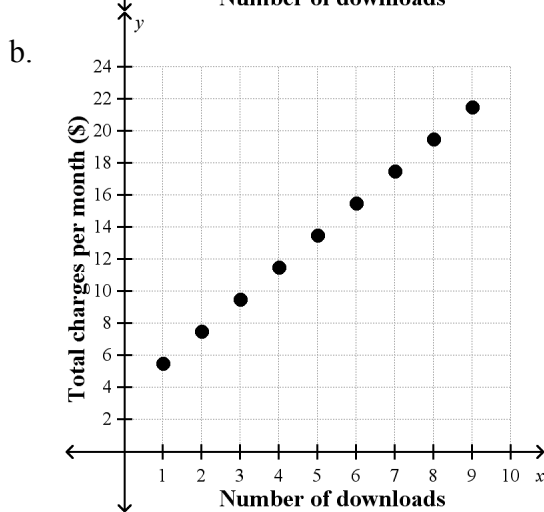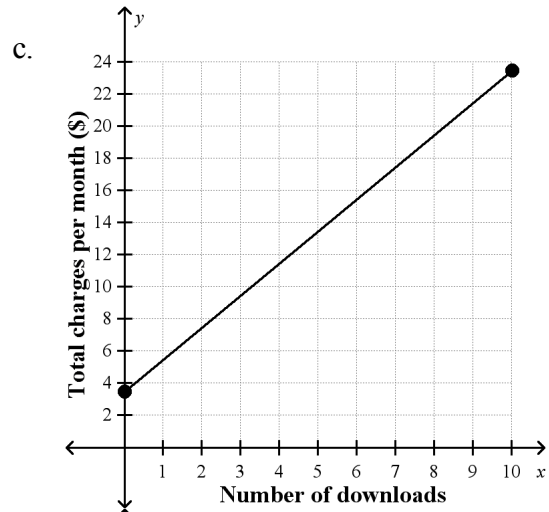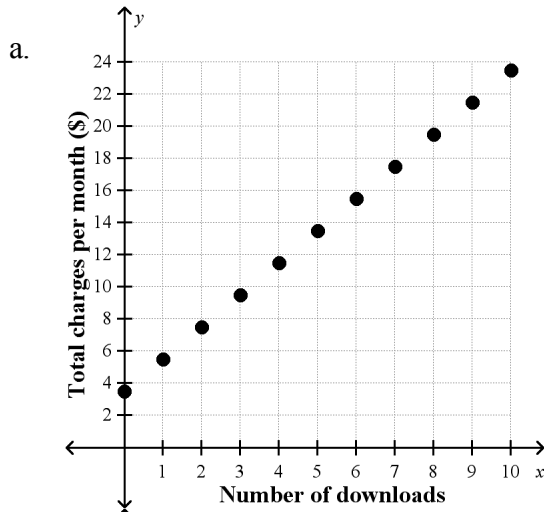
_____   16. If $a_n = a_{n-1} - 5$ and $a_5 = -15$, what is a_7?

a. −35   c. −25
b. −30   d. −20

EA-18

_____ 17. A satellite TV company charges $65 a month for service and $2 for each on-demand movie watched. What is the graph of the equation for this scenario?

a.

Number of movies rented

c.

Number of movies rented

b.

Number of movies rented

d.

Number of movies rented

7

EA-19

_____ 18. You are starting your own business making candles. You spent $350 to get started and will charge each customer $85 for a case of candles. Which graph represents the equation of your profit?
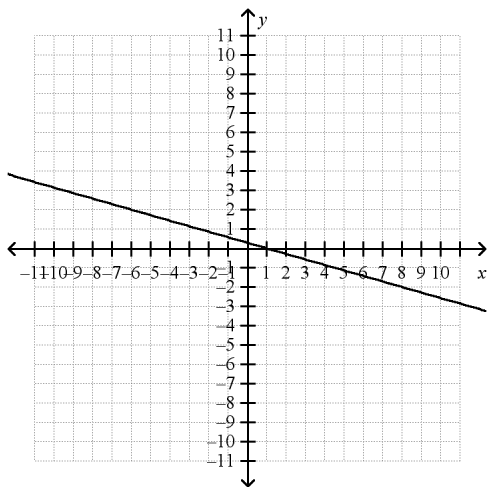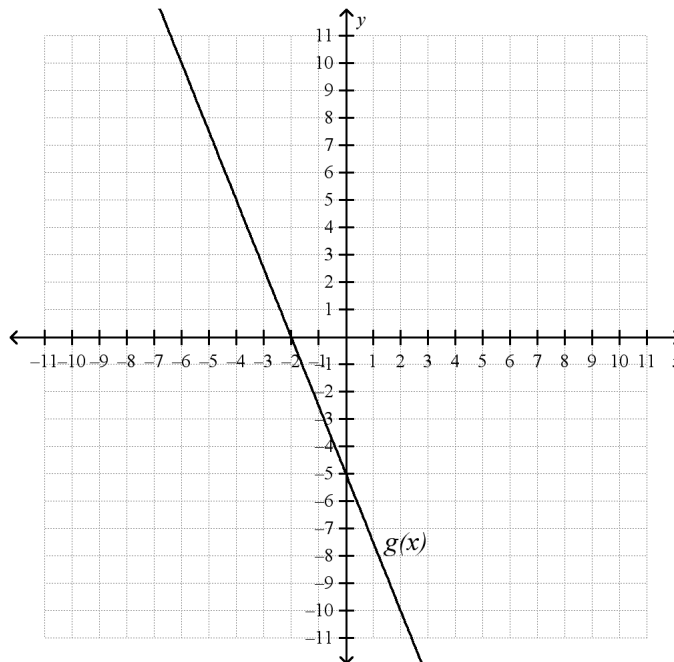
a.

Number of cases of candles

c.

Number of cases of candles

b.

Number of cases of candles

d.

Number of cases of candles

EA-20
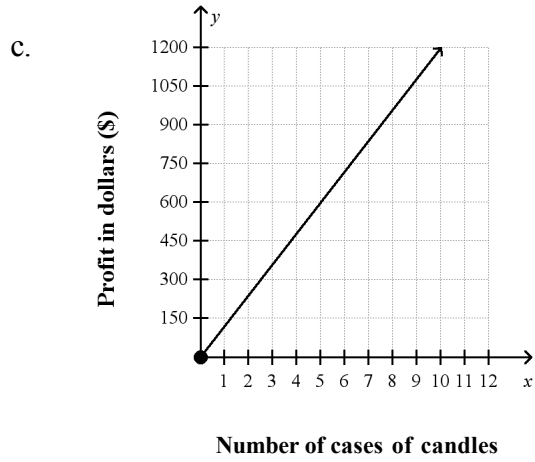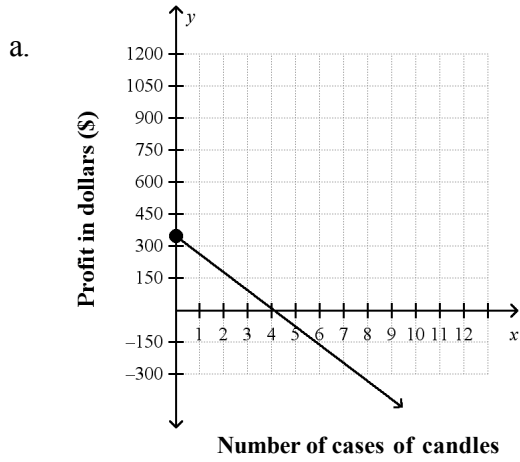
____ 19. What is the *x*-intercept of the graph below?

a. $(0, -1)$ c. $(1, 0)$
b. $(0, 1)$ d. $(-1, 0)$

____ 20. Which of the following statements is true about the functions $f(x)$ and $g(x)$?

x	f(x)
−2	−6
0	−2
2	2
4	6

a. The function $f(x)$ has a greater rate of change than the function $g(x)$.
b. The rates of change cannot be determined.
c. The rates of change for both $f(x)$ and $g(x)$ are equal.
d. The function $g(x)$ has a greater rate of change than the function $f(x)$.

9

EA-21

North Carolina Math 1 Unit 2 Assessment:
**Linear Functions**

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Given the equation and table below, which of the following statements is true about the functions $f(x)$ and $g(x)$?

$$f(x) = \frac{1}{6}x - 5$$

x	g(x)
−8	−18
−4	−6
4	18
8	30

a. The *y*-intercept of the function $f(x)$ is equal to the *y*-intercept of the function $g(x)$.
b. The *y*-intercepts cannot be determined.
c. The *y*-intercept of the function $f(x)$ is less than the *y*-intercept of the function $g(x)$.
d. The *y*-intercept of the function $f(x)$ is greater than the *y*-intercept of the function $g(x)$.

_____ 2. The graph below can be described as:
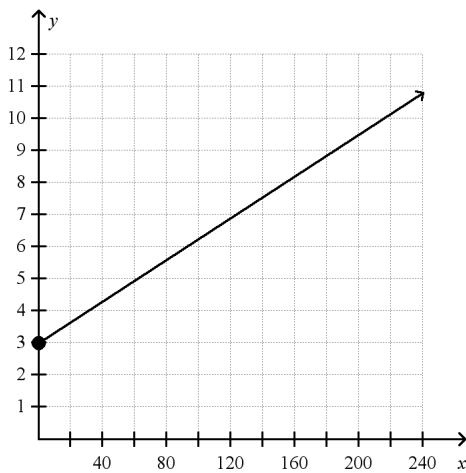
a. having no maximum and a minimum of 3
b. having a maximum of 3 and no minimum
c. having no maximum
d. having no minimum

EA-11

_____ 3. Which of the following graphs best represents the number of miles ran during a period of time?

a.

c.

b.

d.

EA-12
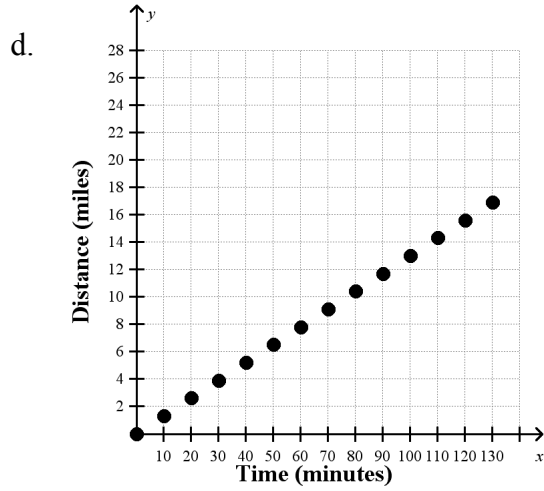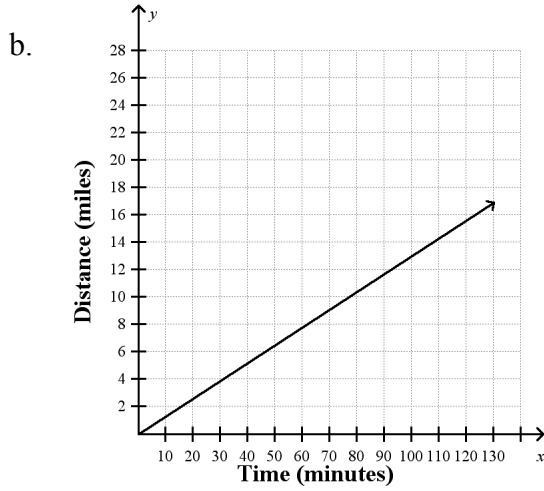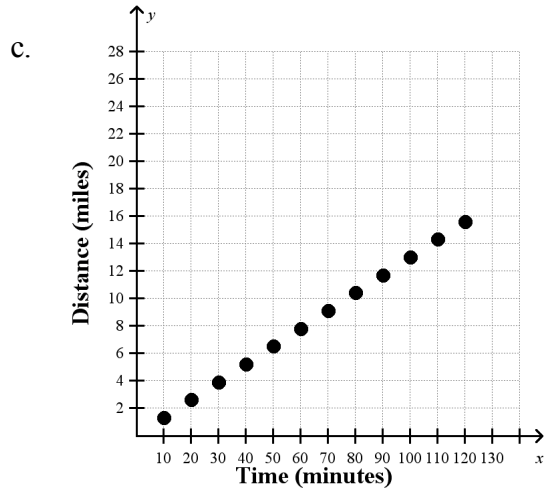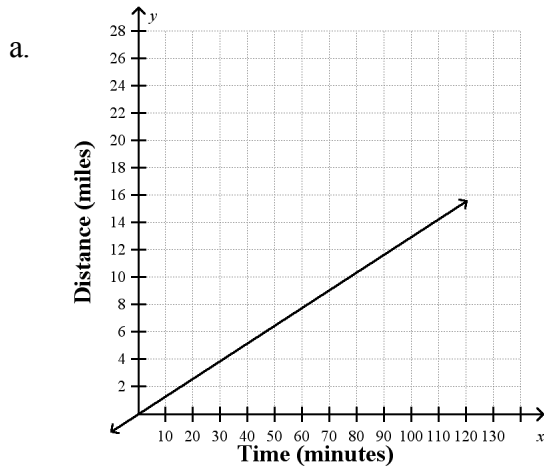
_____ 4. The graph below represents the cost to rent scooters over a period of time. What is the approximate rate of change for the function for the interval [2.5, 4.5]?
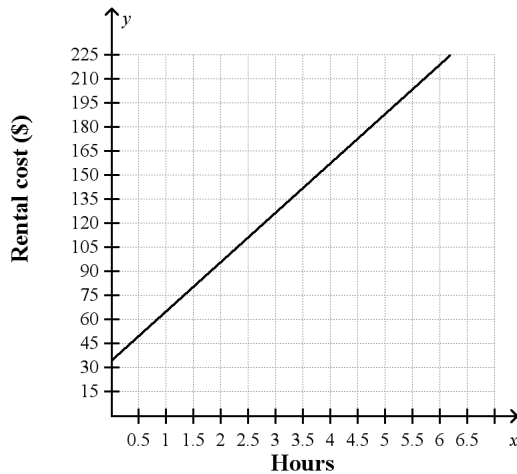

a. $30.75 per hour
b. $0.31 per hour
c. $61.50 per hour
d. The rate of change cannot be determined.

_____ 5. Use the table below to determine the rate of change for the interval [15, 20].

Weeks (x)	Amount owed in dollars (f(x))
0	1700
5	1575
10	1450
15	1325
20	1200

a. $35 per week
b. −$25 per week
c. −$125 per week
d. $25 per week

_____ 6. What is the rate of change for the function $f(x) = 2.1x - 6$ over the interval [13, 25]?

a. 21
b. 0.21
c. 2.1
d. The rate of change cannot be determined.

**EA-13**

_____ 7. What equation is parallel to the line $y = -\frac{1}{3}x + 11$ and passes through the point $(3,4)$?

a. $y = -\frac{1}{3}x + 5$ c. $y = \frac{1}{3}x + 7$

b. $y = 3x + 11$ d. $y = -\frac{1}{3}x - 5$

_____ 8. Jim has a membership to a comic book club. He pays $9.00 per month for membership and $2.50 for each comic book he purchases. What are the parameters in this scenario?

a. x and $f(x)$
b. The slope is 2.5 and the y-intercept is 9 .
c. The slope is 9 and the y-intercept is 2.5.
d. The parameters are not defined.

_____ 9. Identify the parameters in $f(x) = 3x + 7$.

a. 3 and 7   c. 0 and 7
b. m and b d. x and $f(x)$

_____ 10. The graphical representation of the solution set for $y = f(x)$ is _____.

a. is discrete   c. called a curve
b. a plane   d. a circle

_____ 11. What is true about the set of all solutions for $y = f(x)$?

a. It is infinite.   c. It can be graphed.
b. It is a set of ordered pairs.   d. all of the above

_____ 12. Which of the following is an acceptable domain for a sequence?

a. {2.25, 3, 3.75, 4.5, 5.25, 6}   c. $2 \leq n \leq 68$
b. {2, 3, 4, 5, …, ∞}   d. {–4, –3, –2, –1, 0, 1}

_____ 13. The value of a house generally increases over time. Taylor buys a house for $200,000. After 1 year, the house is worth $220,000. After 2 years, the house is worth $240,000. After 3 years, the house is worth $260,000. What function describes the relationship between the year and the house value?

a. $f(x) = 20,000x + 200,000$ c. $f(x) = 200,000 \times (1.10)^x$

b. $f(x) = 200,000x + 20,000$ d. $f(x) = 220,000 \times (1.10)^x$

EA-14

_____ 14. What explicit function represents the pattern in the table below?

| x	f(x)
0	35
1	44
2	53
3	62
4	71

a. $f(x) = -9x + 35$

b. $f(x) = 9x$

c. $f(x) = 9x + 35$

d. $f(x) = 35 \times 9^x$

_____ 15. Malia created a residual plot to analyze a linear function fitted to data. The plot is below. What does the plot tell her about her line fitted to the data?
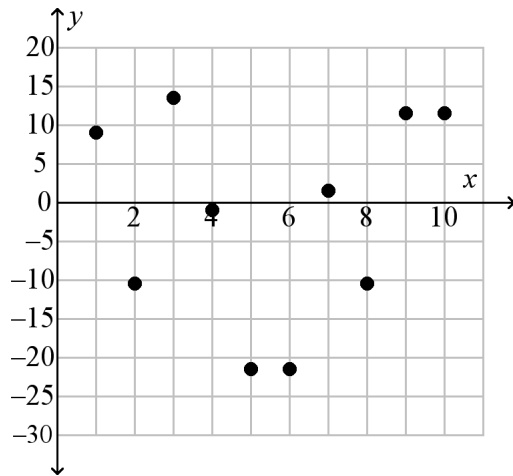
a. A linear function is a good fit for the data.

b. A quadratic function is the best fit for the data.

c. An exponential function is the best fit for the data.

d. A linear function is not a good fit for the data.

EA-15

____ 16. Which equation could be used to approximate the data in the scatter plot below?
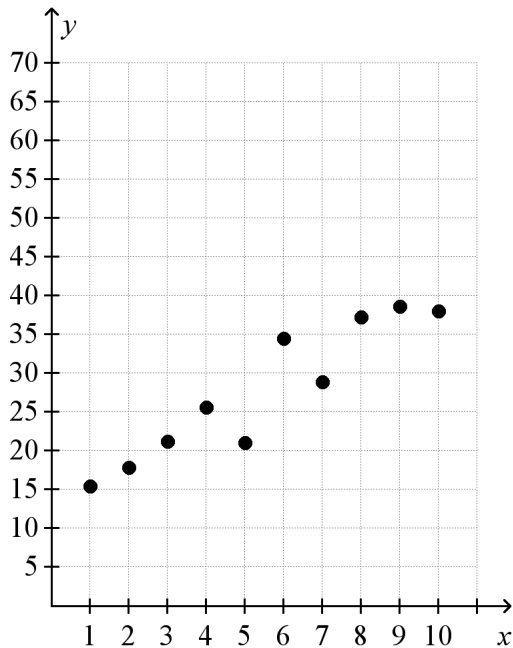

a. $y = 3.4x + 9$
b. $y = (-3.4)^x + 9$
c. $y = 3.4^x + 9$
d. $y = -3.4x + 9$

____ 17. Sam is flying his model airplane when he begins doing a downward corkscrew trick with the plane. He determines that the equation $y = -3.5x + 140$ can be used to estimate the plane's height (in feet) after x seconds of doing the trick. Which statement is true based on Sam's equation?

a. The starting height of the model airplane is approximately 3.5 feet.
b. The height of the model airplane decreases by 140 feet each second during the trick.
c. The height of the model airplane does not change during the trick.
d. The height of the model airplane decreases by 3.5 feet each second during the trick.

_____ 18. The drama club has been raising money for the fall play. To add to their savings, the club members will have a car wash. Isabella finds that the equation $y = 10x + 285$ can be used to estimate the club's savings after washing x cars. Which statement is true based on Isabella's equation?

    a.   The amount of money in the club's savings increases by approximately $285 per car.
    b.   The amount of money in the club's savings increases by approximately $10 per car.
    c.   It will cost the club $285 in supplies to hold the car wash.
    d.   The drama club had approximately $10 saved before the car wash.

_____ 19. Which equation could be used to approximate the data in the scatter plot below?
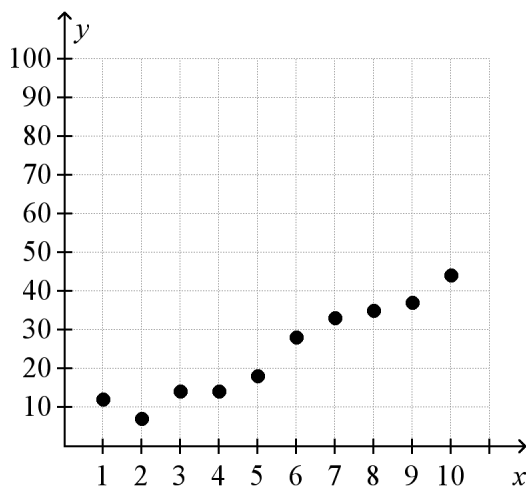
    a. $y = -4x + 3$ c. $y = (-4)^x + 3$
    b. $y = 4x + 3$ d. $y = 4^x + 3$

_____ 20. Event x and event y have a strong negative linear correlation. Which statement do you know is true about events x and y?

    a.   Event x is responsible for the change in y.
    b.   If x increases, y increases.
    c.   If x increases, y decreases.
    d.   If x increases, it is unknown how y will change.

EA-17