Name: _____ **Class:** _____ **Date:** _____

North Carolina Math 1 Unit 2 Mid-Unit Assessment

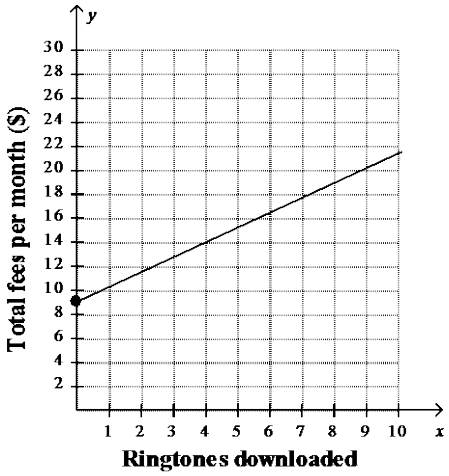
Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. It costs $125 to buy a heater and about $0.40 per minute to run it. What equation models the total cost of using a heater?

a. $y = 0.40x + 125$
b. $x + y = 125.40$
c. $y = 125x + 0.40$
d. $y = 125.40x$

____ 2. A ringtone company charges $9 a month for the service plus $1.25 for each ringtone downloaded. What is the graph of the equation that models the total fees per month?

a.



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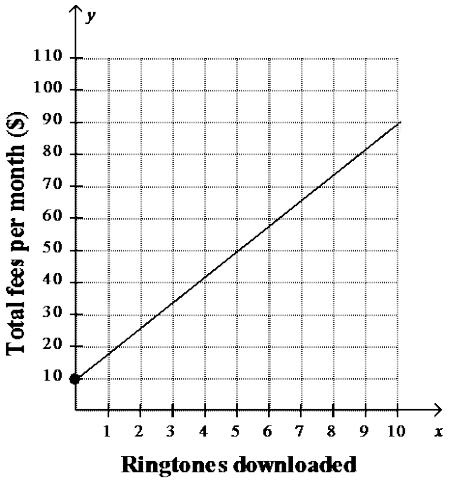

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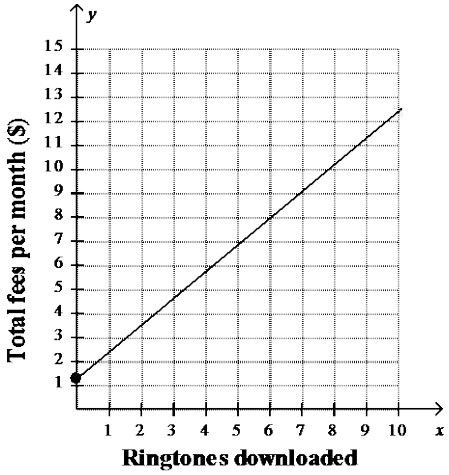

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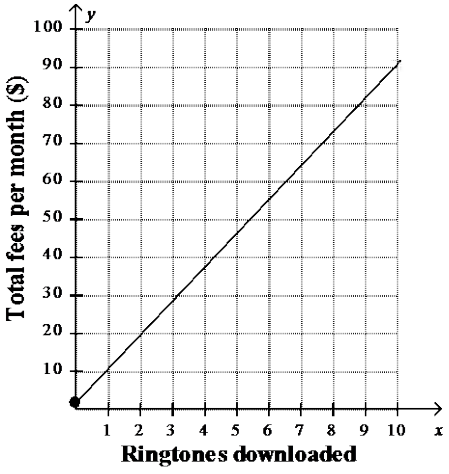

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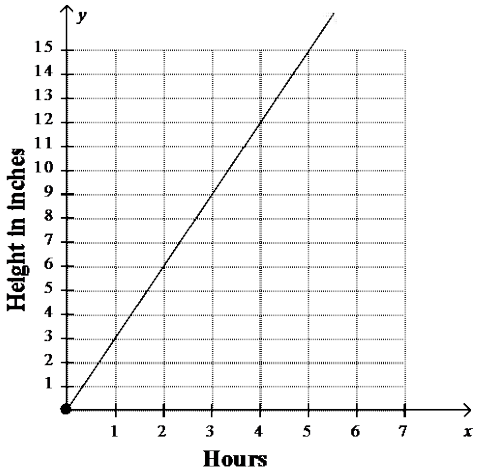
____ 3. A 10-inch candle burns at a rate of 3 inches per hour. What is the graph of the equation that models the height of the candle over time?

a.



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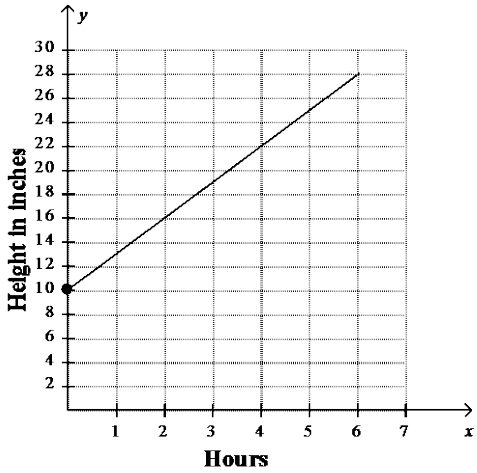

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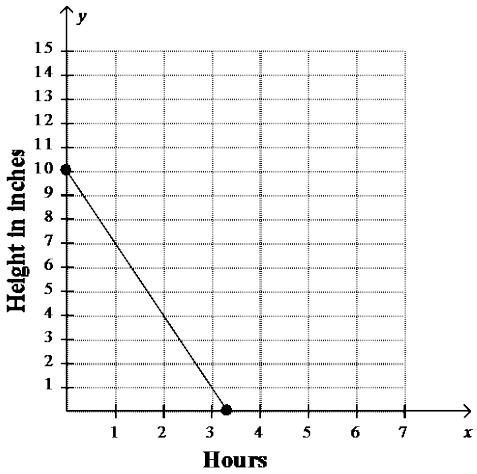

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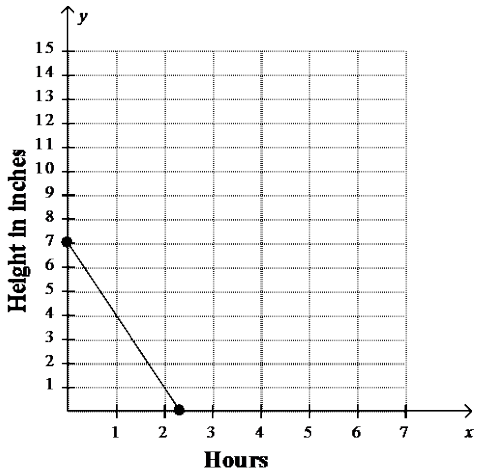

____ 4. You are participating in a fund-raiser in which you run for donations. People can donate money based on a flat fee or based on the number of miles you run. So far, you have two donors. Your grandma has agreed to donate $15 and your mom has agreed to donate $1.70 per mile. If together they donated $20.10, what equation represents this situation?

a. $(15 + 1.70)x = 20.10$
b. $1.70x + 15 = 20.10$
c. $20.10x = 15 + 1.70$
d. $15x + 1.70 = 20.10$

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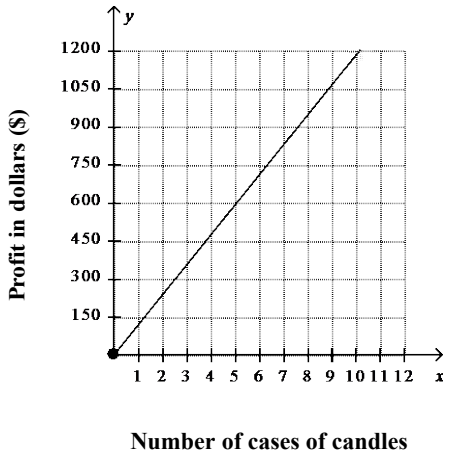
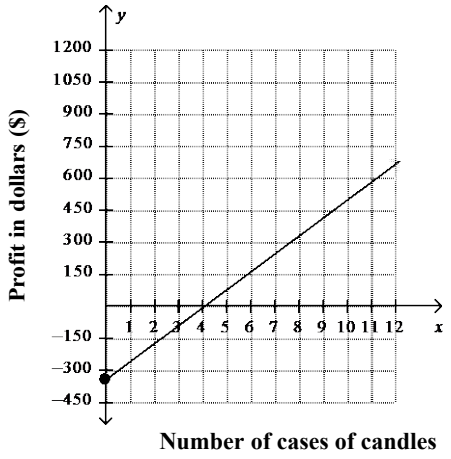
____ 5. You are starting your own business making candles. You spent $350 to get started and will charge each customer $85 for a case of candles. Which graph represents the equation of your profit?

a.



c.



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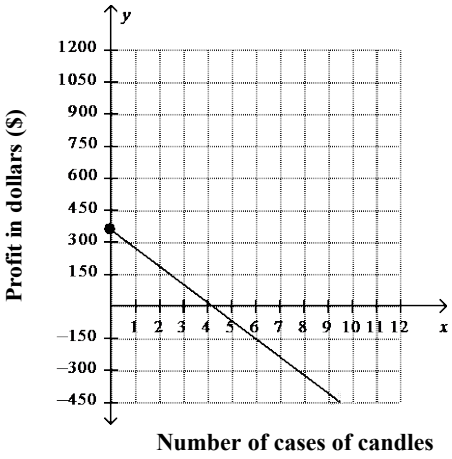

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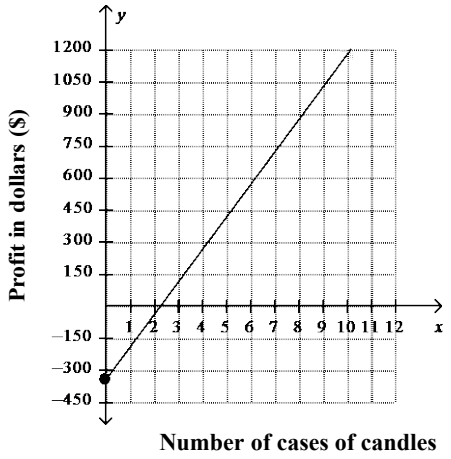

____ 6. If the domain of $f(x) = -x + 2$ is {3, 5, 7}, what is the range of $f(x)$?

a. {–2, –4, –6}
b. {–1, –3, –5}
c. {0, –2, –4}
d. all real numbers

____ 7. If $f(x) = 2x + 5$ and the domain of f is {2, 8, 14}, what is the range of $f(x)$?

a. {4, 16, 28}
b. {–1, 11, 23}
c. {14, 26, 38}
d. {9, 21, 33}

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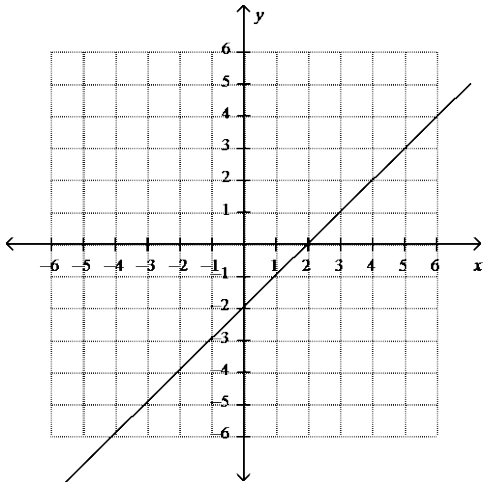
____ 8. Given the graph below, what is $f(3)$?



a. $f(3) = 4$
b. $f(3) = 1$
c. $f(3) = –2$
d. $f(3) = 2$

____ 9. A sequence is generated by $a_n = 3n + 5$. What is the value of the tenth term?

a. 32
b. 35
c. 38
d. 41

____ 10. Use the table below to determine the rate of change for the interval [2, 6].

Weeks (x)	**Amount saved in dollars ($f(x)$)**
2	39
3	56
4	73
5	90
6	107

a. $0.10 per week
b. $28.95 per week
c. $17 per week
d. $68 per week

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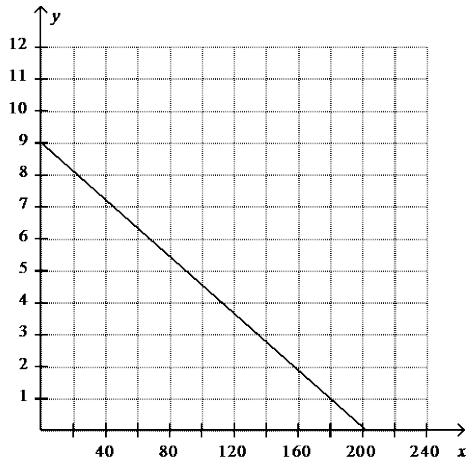
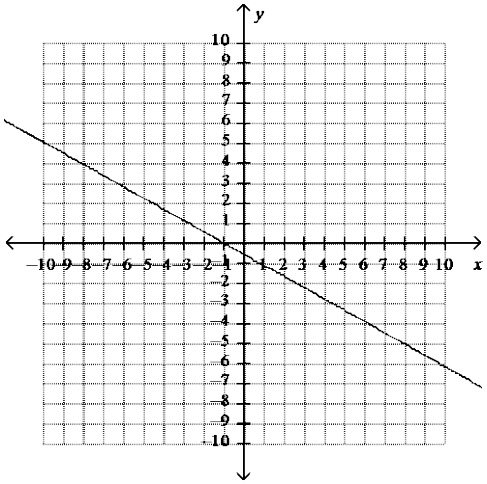
____ 11. The graph below can be described as:



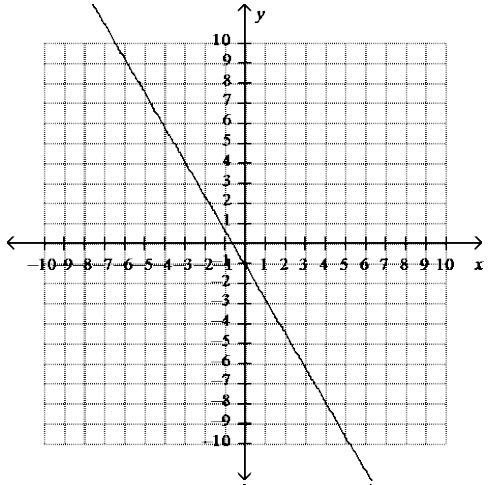
a. having a maximum of 9 and a minimum of 0
b. having no minimum
c. having no maximum
d. having a maximum of 200 and a minimum of 0

____ 12. Which graph shows a line with an *x*-intercept of (1, 0)?

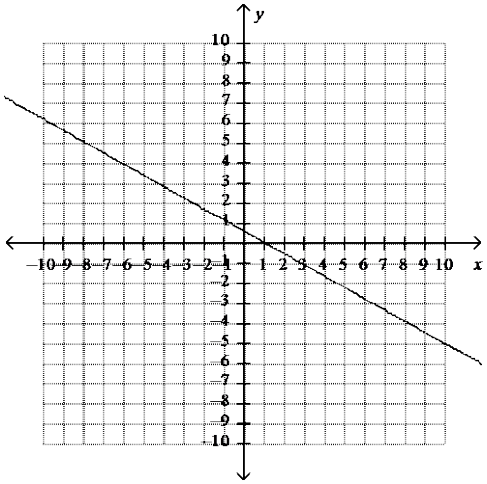
a.



c.



b.



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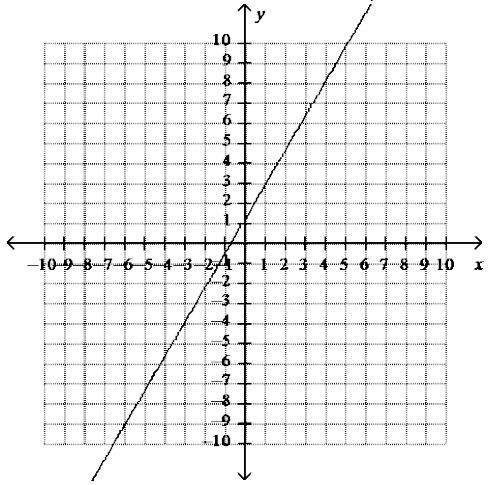

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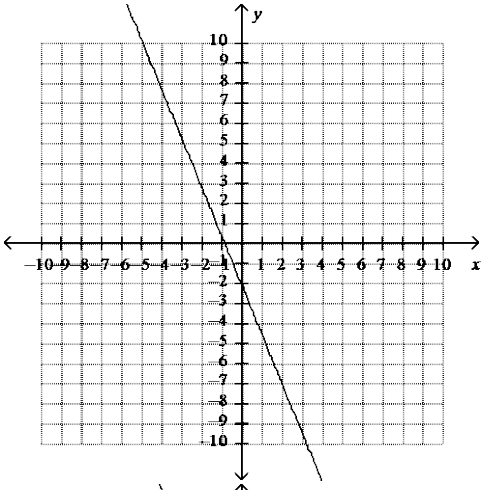
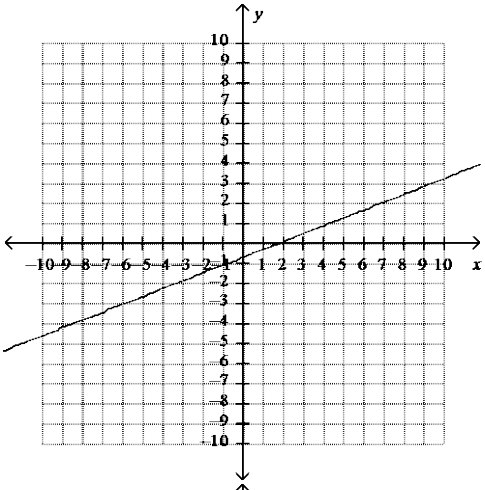
____ 13. Which graph shows a line with a *y*-intercept of (0, 2)?

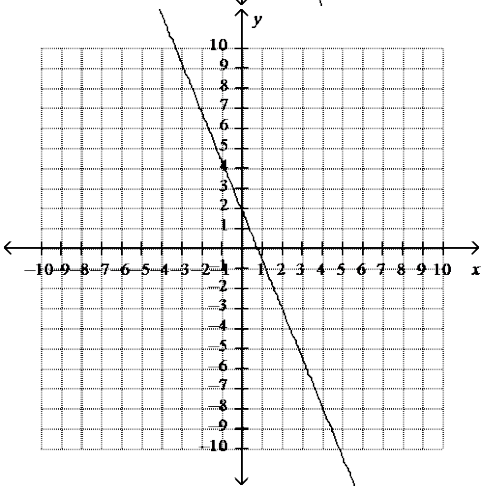
a.



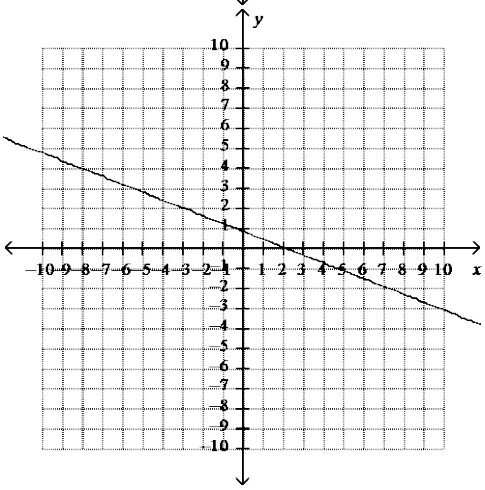
c.



b.



d.



____ 14. What are the intercepts of the graph of $f(x) = \frac{1}{6}x + 2$?

a. (0, –2) and (–12, 0)
b. (0, 2) and (12, 0)
c. (0, 2) and (–12, 0)
d. (0, –2) and (12, 0)

____ 15. The value of a house generally increases over time. Taylor buys a house for $\$400,000$. After 1 year, the house is worth $\$440,000$. After 2 years, the house is worth $\$480,000$. After 3 years, the house is worth $\$520,000$. What function describes the relationship between the year and the house value?

a. $f(x) = 40,000x + 400,000$
b. $f(x) = 400,000x + 40,000$
c. $f(x) = 440,000 \times (1.10)^x$
d. $f(x) = 400,000 \times (1.10)^x$

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____ 16. What explicit equation represents the pattern in the table below?

x	*y*
1	−25
2	−35
3	−45
4	−55
5	−65

a. $f(x) = -10x - 15$
b. $f(x) = 10x - 15$
c. $f(x) = 10x + 15$
d. $f(x) = -10x + 15$

____ 17. The rule for an arithmetic sequence is $a_n = 5n - 2$. What is the eighth term in the sequence?

a. 38
b. –2
c. 42
d. 8

____ 18. What is the next term in the sequence?

8, 4, 0, –4, ...

a. –9
b. 8
c. –8
d. –16

____ 19. What is the common difference of the sequence?

–26, –31, –36, –41, ...

a. –26
b. 5
c. –5
d. –6

____ 20. 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)*
–4	–3
–2	1
2	9
4	13

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

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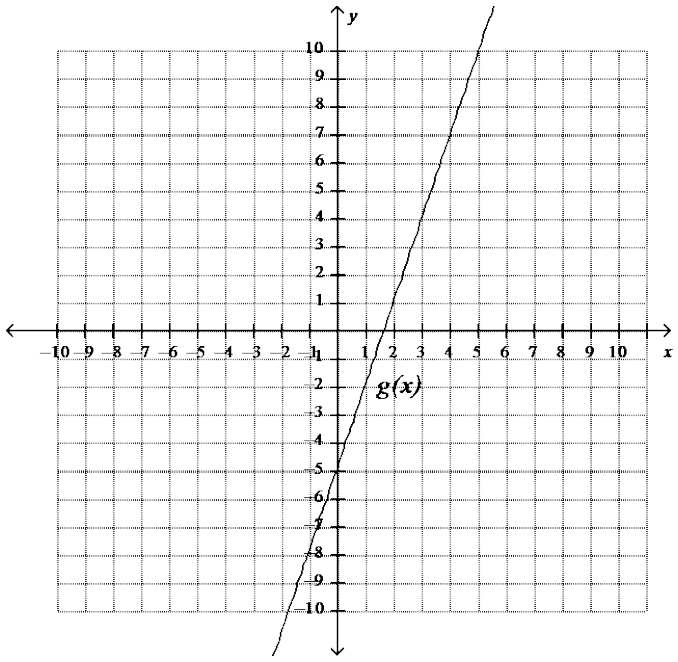
____ 21. Which of the following statements is true about the functions $f(x)$ and $g(x)$, shown in the table and graph below?

x	$f(x)$
–2	15
0	7
2	–1
4	–9



a. The rates of change for both $f(x)$ and $g(x)$ are equal.
b. The y-intercepts for both $f(x)$ and $g(x)$ are equal.
c. The function $g(x)$ has a greater y-intercept than the function $f(x)$.
d. The function $f(x)$ has a greater y-intercept than the function $g(x)$.

____ 22. The function $f(x)$ represents the total bill from a rental store that charges \$18 to rent a steamer plus an additional \$3.00 an hour. A second rental store uses the function $g(x) = 17 + 1.25x$ to represent the total bill for a similar steamer.

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

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 function $g(x)$ has a greater rate of change than the function $f(x)$.
d. The rates of change for both $f(x)$ and $g(x)$ are equal.

____ 23. Identify the parameters in the function $f(x) = 3x + 1$.

a. The slope is 1 and the y-intercept is 3.
b. The slope is 3 and the y-intercept is 1.
c. 0 and 1
d. x and $f(x)$

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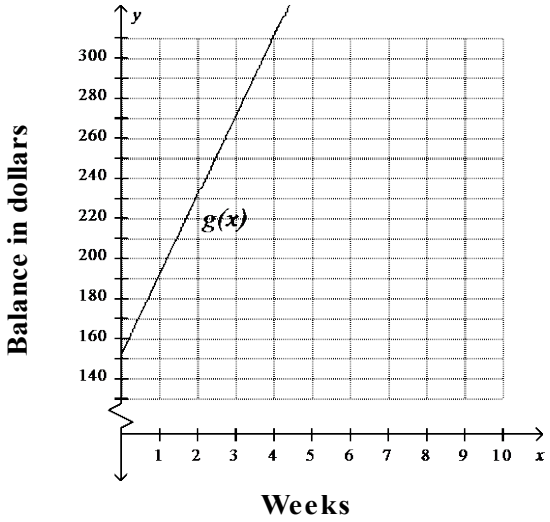
____ 24. Jim has a membership to a comic book club. He pays $9.00 per month for membership and $2.50 for each comic book he purchases. What are the parameters in this scenario?

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

____ 25. The function *f*(*x*) represents the balance of a checking account with an initial deposit of $110 and weekly deposits of $45. A different checking account follows the function *g*(*x*). The graph of function *g*(*x*) is below.



Which of the following statements is true about the functions *f*(*x*) and *g*(*x*)?

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

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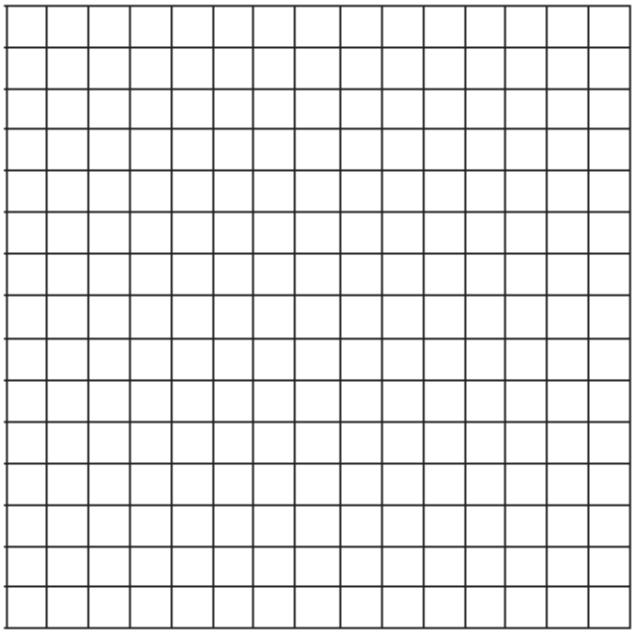
Short Answer

Read each scenario and answer the questions that follow. Write your answers below each lettered part and show your work in the space provided.

26. Min-Ji injured her elbow during a varsity softball game. Her doctor has recommended physical therapy several times a week. Min-Ji's parents want to plan for the potential cost of therapy over the course of a month. They pay $200 a month for insurance and then another $10 fee each time Min-Ji goes to physical therapy.

    a. What equation models the total fees for physical therapy?

    b. What does the graph of the equation look like? Graph the equation below. Be sure to label the axes.



27. Read the scenario and use the information to complete the problem that follows.

    Sarah is saving money to buy a new laptop computer that costs $340. She started with $130 and every month she saves $15. Her savings can be modeled by the function $s(x) = 15x + 130$.

    a. What are the domain and range of the function?

    b. Evaluate the function after 4, 8, and 12 months of saving.

    c. Interpret part b using a graph.

    d. Write a statement using function notation that shows when Sarah will reach her goal. Then use words to describe the symbolic statement.

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28. Use what you know about sequences to solve the problem.

    Shelly is on a nature hike. She starts out in a valley and climbs up a hill, stopping at regular intervals to take pictures. The elevation of the land in feet below or above sea level at each place Shelly stops follows the function $a_n = a_{n-1} + 6$. The first place Shelly stops to take a picture is 19 feet below sea level, so $a_1 = -19$. What is the elevation of the ninth place Shelly stops?

29. Read the scenario, define the parameters, write a function to represent the problem, and then solve the problem.

    Dale works as a counselor each summer at a youth camp. The job pays $14 per hour. One day, the owner of a tree removal company offers to pay Dale a flat fee to stack some wood after he finishes his shift. After working 8 hours and stacking the wood, Dale takes home $147. How much did Dale earn stacking the wood?

Read each scenario. Then write a function and graph it to solve the problem.

30. The starting balance of Paul's savings account is $400. Each month, Paul deposits $80.

    a. Write a function to model this scenario.

    b. Create a graph to show how much money Paul has in his savings account each month for the first year.

    c. Identify the key features of the function. Determine the *x*- and *y*-intercepts, the maximum, the minimum, whether the function is increasing or decreasing, and the rate of change of the function.