

Algebra 1

Homework Packet

Chapter 2:

Slopes & Linear Equations

Name _____

APPLICATIONS

4. The following table shows the number of points the Arlington girls team scored in their last basketball game where t is the time passed in minutes and $f(t)$ the total number of points scored after t minutes.

- (a) What was the average rate they were shooting in the first half of the game?
Be sure to include proper units in your answer.

t (min)	$f(t)$ (points)
0	0
8	30
16	48
24	55
32	64

- (b) What was their average rate over the whole game?

- (c) Given your answers above which half of the game do you feel they had a better rate of scoring? Explain.

REASONING

5. Consider the function given by $f(x) = 6x + 5$.

- (a) Find its average rate of change from $x = 1$ to $x = 5$.

- (b) Find its average rate of change from $x = -2$ to $x = 6$.

- (c) The average rate of change for this function is always 6 (as you should have found in the first two parts of the problem). What type of function has a constant average rate of change? What do we call this average rate of change in this case? Search the Internet if needed.

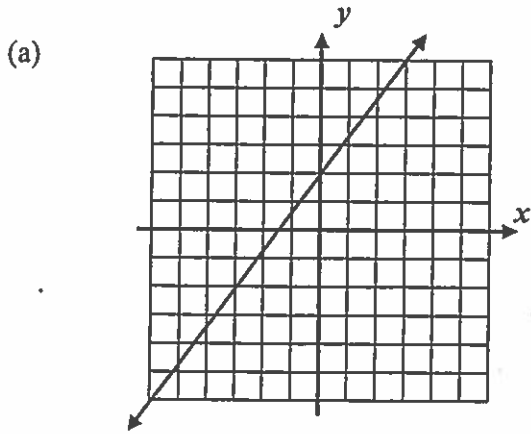
Name: _____

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WRITING EQUATIONS IN SLOPE-INTERCEPT FORM COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

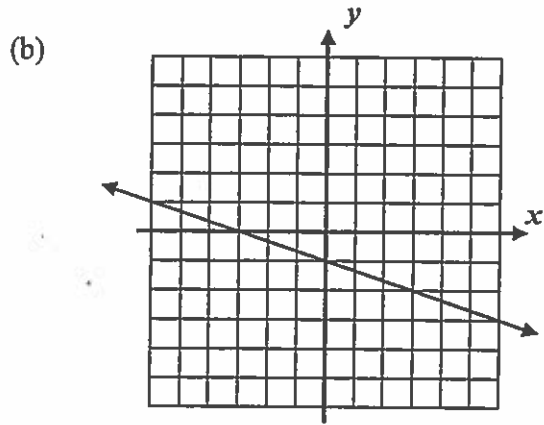
1. Each of the following lines has a slope and y -intercept that can be determined by examining the graph. For each, state the slope, the y -intercept, and then write the equation in $y = mx + b$ form (slope-intercept form).



Slope: _____

y -intercept: _____

Equation: _____

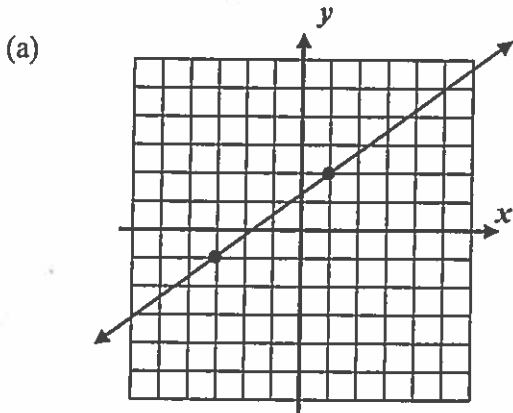


Slope: _____

y -intercept: _____

Equation: _____

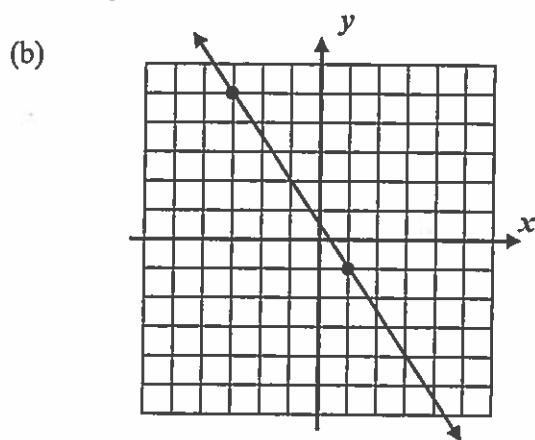
2. Each of the following lines has a slope that can be determined by examining the graph. Use another point on the line to solve for the exact y -intercept. Then, state the equation of the line.



Slope: _____

Solve for y -intercept:

Equation: _____



Slope: _____

Solve for the y -intercept:

Equation: _____

3. Find the equation of the line that passes through each of the following pairs of points in $y = mx + b$ form.

(a) $(1, 7)$ and $(4, 22)$

(b) $(-2, 13)$ and $(2, 3)$

(c) $(4, 6)$ and $(10, 0)$

(d) $(0, -10)$ and $(16, 2)$

APPLICATIONS

4. A steady snowfall is coming down outside. Prestel decides to measure the depth of the snow on the ground. After 4 hours, the snow is at a depth of 9 inches and after 8 hours it is at a depth of 14 inches.

(a) Express the information given in this problem as two coordinate pairs, (h, d) , where h is the number of hours and d is the depth of snow.

(b) Find the slope of the line that passes through these two points. What are its units?

(c) Find the equation of the line that passes through the two points in $d = mh + b$ form.

(d) What was the depth when the snowfall began ($h = 0$)? What would the depth be after 12 hours?

Identifying the Slope and Y-intercept

Name: _____

Date: _____

1. What is the slope of the line whose equation is $y = \frac{3}{4}x + 4$?

2. What is the y-intercept of the line whose equation is $3y = 6x + 12$?

- A. 1 B. 2 C. 3 D. 4

3. What is the slope of the line whose equation is $5y = 2x + 10$?

- A. $\frac{5}{2}$ B. 2 C. $\frac{2}{5}$ D. 5

4. What is the y-intercept of the line whose equation is $y - 2x = 4$?

- A. -2 B. 2 C. -4 D. 4

5. What is the slope of the line whose equation is $y + 2x = 4$?

- A. $\frac{1}{2}$ B. 2 C. -2 D. 4

6. Which equation represents a line with a slope of -2?

- A. $y = 2x - 1$ B. $y = -2x + 1$
 C. $y = x - 2$ D. $y = -x + 2$

7. The y-intercept of the graph of the equation $y = -\frac{2}{3}x + 4$ is

- A. $-\frac{2}{3}$ B. -2 C. 3 D. 4

8. What is the slope of the line whose equation is $x + 2y = 6$?

- A. 1 B. 2 C. 6 D. $-\frac{1}{2}$

9. Which is an equation of a line whose slope is equal to zero?

- A. $y = 1$ B. $x = 2$ C. $x + y = 5$ D. $x - y = 3$

10. What is the slope of the line whose equation is $3x - 4y - 16 = 0$?

- A. $\frac{3}{4}$ B. $\frac{4}{3}$ C. 3 D. -4

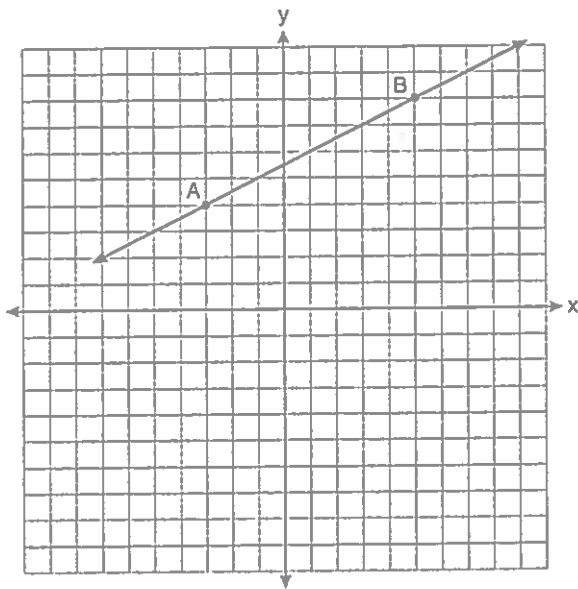
11. What is the slope of the line whose equation is $2y = 5x + 4$?

- A. 5 B. 2 C. $\frac{5}{2}$ D. $\frac{2}{5}$

12. What is the y-intercept of the line whose equation is $2x + y = -3$?

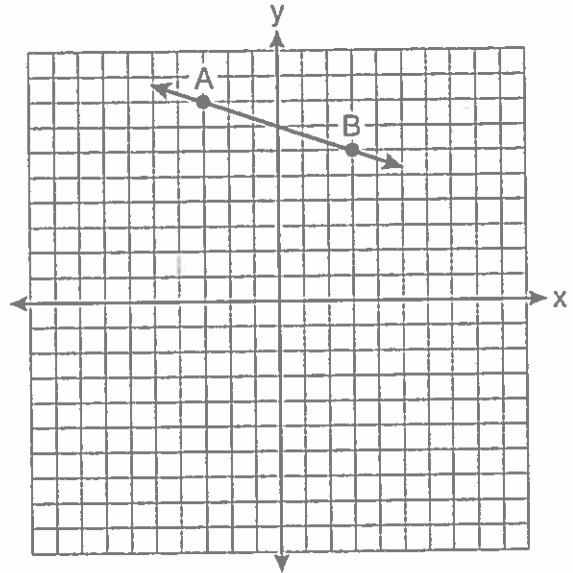
- A. -2 B. 2 C. 3 D. -3

13. In the diagram below, what is the slope of the line passing through points A and B?



- A. -2 B. 2 C. $-\frac{1}{2}$ D. $\frac{1}{2}$

14. What is the slope of the line passing through the points A and B, as shown on the graph below?



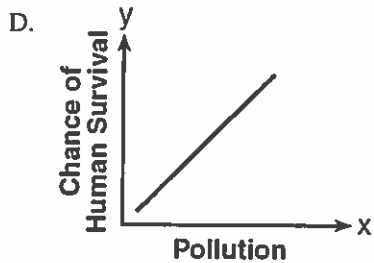
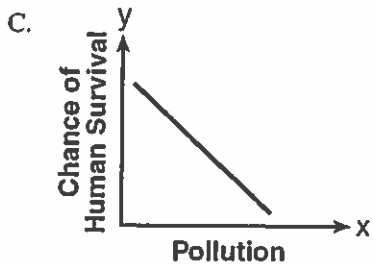
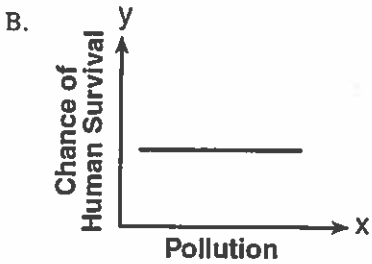
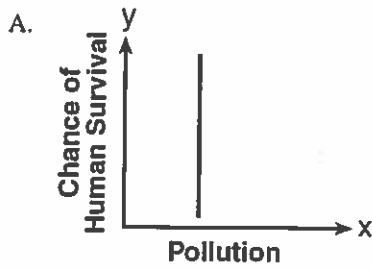
- A. -3 B. $-\frac{1}{3}$ C. 3 D. $\frac{1}{3}$

Relations and Functions

Name: _____

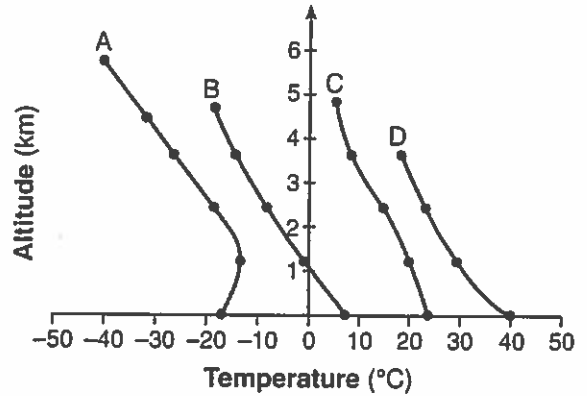
Date: _____

1. Which graph does *not* represent a function of x ?



2. The accompanying graph shows the curves of best fit for data points comparing temperature to altitude in four different regions, represented by the relations A , B , C , and D .

Which relation is *not* a function?



- A. A B. B C. C D. D

3. Which relation is a function?

- A. $\{(2, 1), (3, 1), (4, 1), (5, 1)\}$
 B. $\{(1, 2), (1, 3), (1, 4), (1, 5)\}$
 C. $\{(2, 3), (3, 2), (4, 2), (2, 4)\}$
 D. $\{(1, 6), (2, 8), (3, 9), (3, 12)\}$

4. Given the relation $\{(8, 2), (3, 6), (7, 5), (k, 4)\}$, which value of k will result in the relation *not* being a function?

- A. 1 B. 2 C. 3 D. 4

5. Given the relation $R = \{(-2, 3), (a, 4), (1, 9), (0, 7)\}$. Which replacement for a makes this relation a function

- A. 1 B. -2 C. 0 D. 4

APPLICATIONS

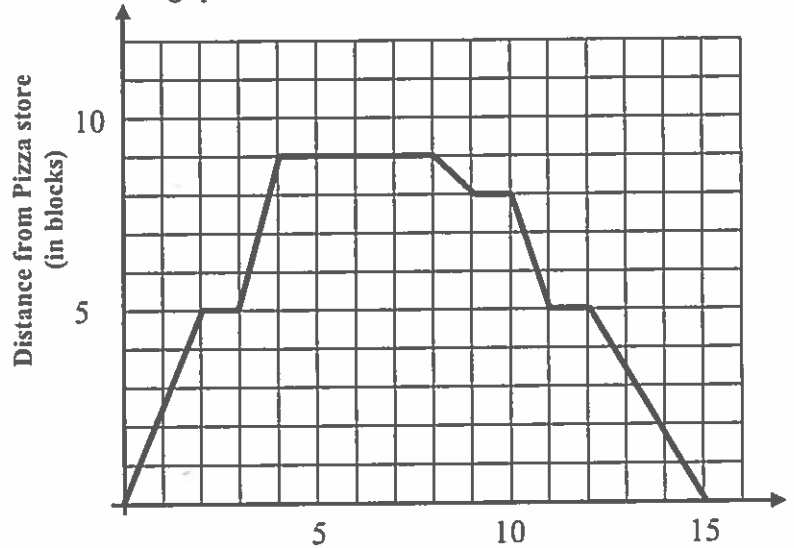
3. Andrew has a new job at the local pizza store as a delivery boy. The following graph shows one of his deliveries he made. Analyze the graph and answer the following questions.

(a) How long was the entire trip?

(b) If he arrived at the house after 4 minutes, how far away was the house from the pizza place?

(c) Why might Andrew have stopped 3 times for 1 minute?

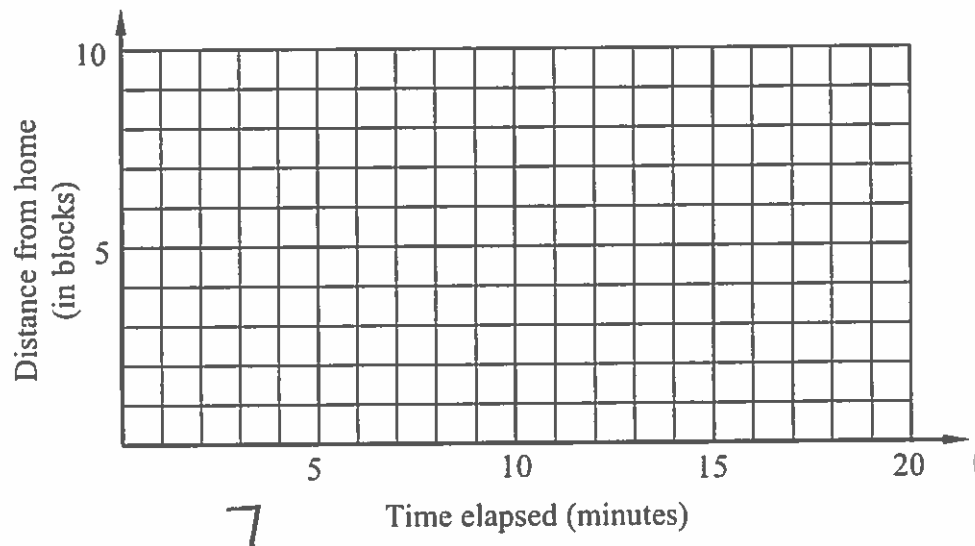
(d) Was Andrew's trip longer going to the house or coming back?



REASONING

4. Given the following scenario, graph a function that would map Liza's distance away from her house according to the time elapsed.

Liza has a few items she needs to pick up from a grocery store 8 blocks away. Liza travels as a constant rate of 2 blocks per minute when not stopped at a light. On her way to the grocery store she doesn't hit any red lights and the trip takes her 4 minutes. She spends 8 minutes in the grocery store and then starts to head home. When she's halfway home she hits a red light that lasts 3 minutes. After the light ends, she then drives the second half of the way home.



Name: _____

Date: _____

FUNCTION NOTATION
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Given the function f defined by the formula $f(x) = 2x + 1$ find the following:

(a) $f(4)$

(b) $f(-5)$

(c) $f(0)$

(d) $f\left(\frac{1}{2}\right)$

2. Given the function g defined by the formula $g(x) = \frac{x-5}{2}$ find the following:

(a) $g(9)$

(b) $g(0)$

(c) $g(3)$

(d) $g(17)$

3. Given the function f defined by the formula $f(x) = x^2 - 4$ find the following:

(a) $f(3)$

(b) $f(-4)$

(c) $f(0)$

(d) $f(-2)$

4. If the function $f(x)$ is defined by $f(x) = \frac{x}{2} - 6$ then which of the following is the value of $f(10)$?

(1) -1

(3) 14

(2) 2

(4) 7

5. If the function $f(x) = 2x - 3$ and $g(x) = \frac{3}{2}x + 1$ then which of the following is a true statement?

(1) $f(0) > g(0)$

(3) $f(8) = g(8)$

(2) $f(2) = g(2)$

(4) $g(4) < f(4)$

6. Based on the graph of the function $y = g(x)$ shown below, answer the following questions.

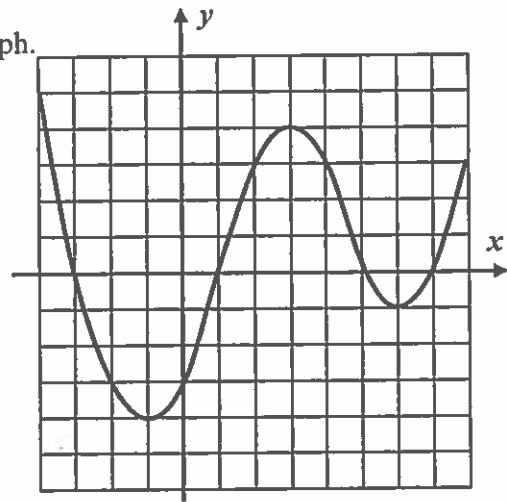
(a) Evaluate each of the following. Illustrate with a point on the graph.

$$g(-2) =$$

$$g(0) =$$

$$g(3) =$$

$$g(7) =$$



(b) What values of x solve the equation $g(x) = 0$? These are called the zeroes of the function

(c) How many values of x solve the equation $g(x) = 2$? How can you illustrate your answer on the graph? Remember, we are not looking for the exact x -values, only how many solutions.

APPLICATIONS

7. Physics students drop a ball from the top of a 100 foot high building and model its height above the ground as a function of time with the equation $h(t) = 100 - 16t^2$. The height, h , is measured in feet and time, t , is measured in seconds. Be careful with all calculations in this problems and remember to do the exponent (squaring) first.

(a) Find the value of $h(0)$. Include proper units. What does this output represent? Reread the problem if necessary.

(b) Calculate $h(2)$. Does our equation predict that the ball has hit the ground at 2 seconds? Explain.

REASONING

8. If you knew that $f(-4) = 8$, then what (x, y) coordinate point must lie on the graph of $y = f(x)$? Explain your thinking.

UNIT #3 – FUNCTIONS REVIEW QUESTIONS

Part I Questions

1. If $f(x) = -2x^2 + 3$ then $f(-3) =$

- (1) -15 (3) 39
(2) 21 (4) -18

2. Which of the following sets of coordinate pairs is *not* a relationship where y is a function of x ? _____

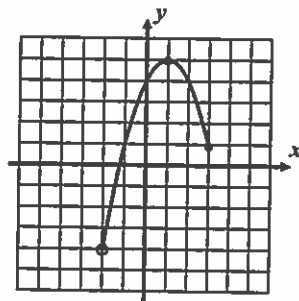
- (1) $\{(-3, 1), (0, 5), (2, 7), (5, 1)\}$
(2) $\{(-2, 4), (-1, 0), (1, 7), (-2, -4)\}$
(3) $\{(-3, 10), (-2, 5), (1, 2), (2, 5)\}$
(4) $\{(4, 16), (5, 25), (7, 49), (10, 100)\}$

3. Jenna is selling glasses of lemonade for \$1.50 per cup. She begins the day with \$4.50 in change. The amount of money, m , she has as a function of the number of cups she sells is $m = 1.50c + 4.50$. Which of the following would be an appropriate domain for this function? _____

- (1) $\{-3, -2, -1, 0, 1, 2, 3\}$
(2) $\{1, 1.5, 2, 2.5, 3, 3.5\}$
(3) $\{0, 1, 2, 3, 4, 5, 6\}$
(4) $\{4.50, 6.00, 7.50, 9.00, 10.50\}$

4. Which of the following represents the range of the function shown in the graph below? _____

- (1) $(-4, 5]$
(2) $[-4, 5]$
(3) $[-2, 3]$
(4) $(-2, 3]$

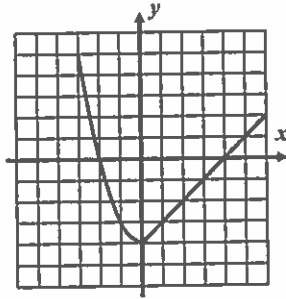


5. Which of the following represents the average rate of change for the function $f(x) = x^2$ over the interval $1 \leq x \leq 3$? _____

- (1) 8 (3) 6
(2) 2 (4) 4

6. For the function $f(x)$ shown below, which of the following represents the interval over which $f(x) < 0$?

- (1) $-2 < x < 4$
- (2) $-2 \leq x \leq 4$
- (3) $-4 < x < 0$
- (4) $-4 \leq x \leq 0$



7. For the piecewise defined function $f(x) = \begin{cases} 3x-1 & x < 3 \\ \frac{1}{2}x+7 & x \geq 3 \end{cases}$, which of the following is the value of $f(6)$?

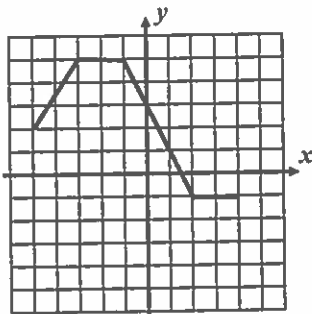
- (1) 7
- (2) 10
- (3) 17
- (4) 27

8. If $f(x) = x^2 - 2x - 11$, then which of the following values of x solves $f(x) = 4$?

- (1) $x = 0$
- (2) $x = -2$
- (3) $x = 3$
- (4) $x = 5$

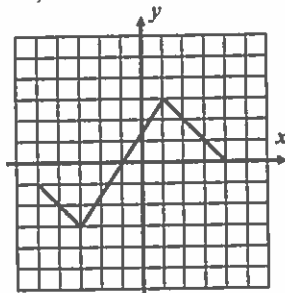
9. The function $f(x)$ is shown graphed below. The function g is defined by the formula $g(x) = 3f(x) - 2$ for all values of x in the domain of f . Which of the following is the value of $g(2)$?

- (1) -5
- (2) -1
- (3) 3
- (4) 4



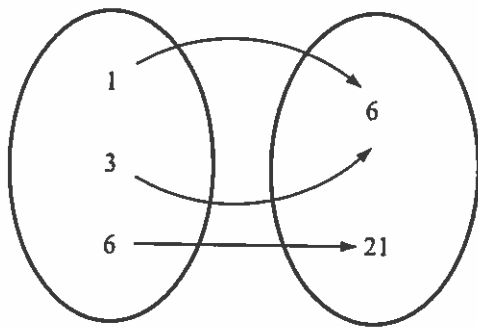
10. Given the graph of $h(x)$ shown below, over which of the following intervals is h increasing?

- (1) $-1 < x < 4$
- (2) $-3 < x < 1$
- (3) $-3 < x < 3$
- (4) $1 < x < 4$

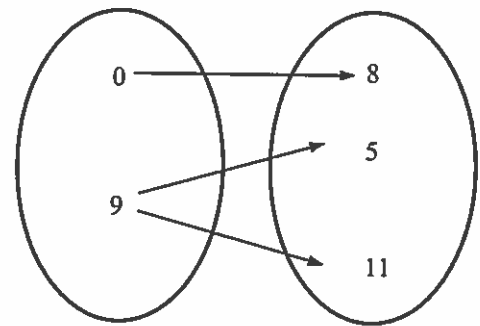


Free Response Questions

The two diagrams below show how elements of a domain get changed into elements of a range. In one case, this represents a function. In the other case, it does not. Explain which is a function and which is not. Fully explain your choices.



Case #1



Case #2

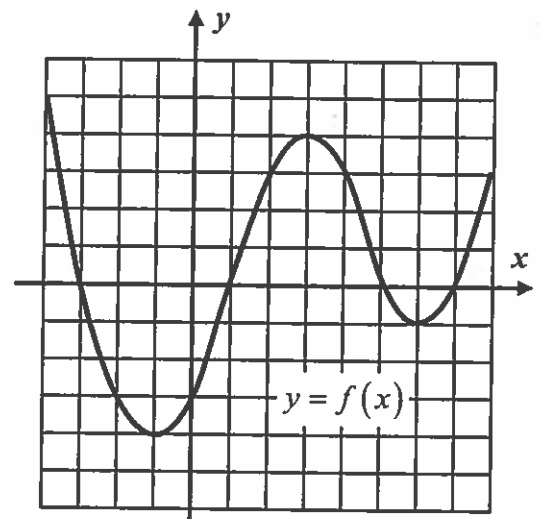
12. For the function $y = f(x)$ shown graphed below, answer the following questions.

(a) Find the value of $f(3) + f(6)$.

(b) State all intervals over which $f(x) < 0$.

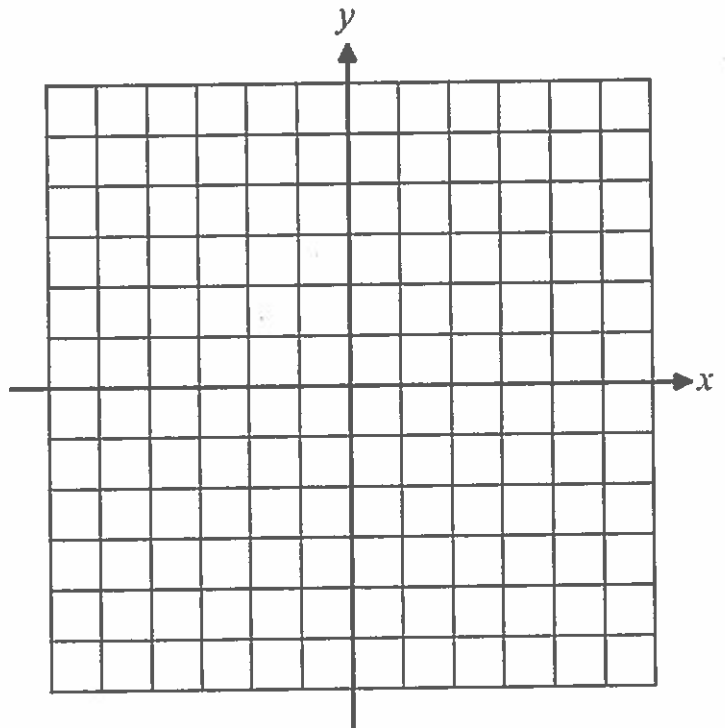
(c) Solve the equation $f(x) = 0$ for all value(s) of x . Circle the points on your graph that you use to find your solutions.

(d) Give an interval over which $f(x)$ is *only* decreasing.



13. Given the piecewise function $f(x) = \begin{cases} 3x+11 & -5 \leq x \leq -2 \\ -\frac{1}{2}x+5 & -2 < x \leq 4 \end{cases}$.

(a) Graph this function on the grid to the right. Show your table of values.



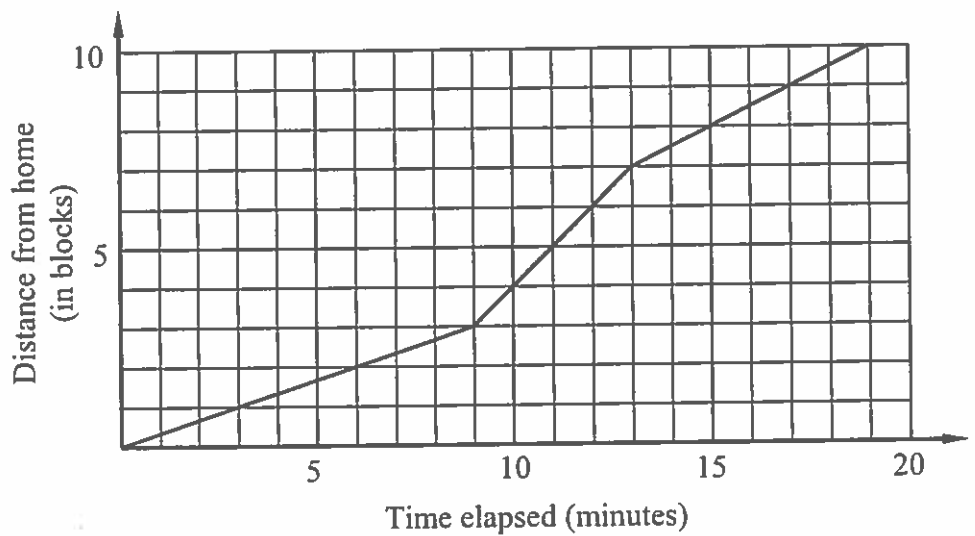
(b) State the range of this function.

14. Michael is walking from home to a subway stop that is 10 blocks away. Calculate Michael's average rate of change, in blocks per minute, for each of the following intervals:

0 to 9 minutes

9 to 13 minutes

13 to 19 minutes

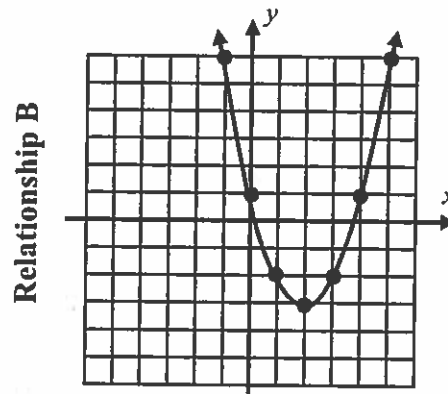
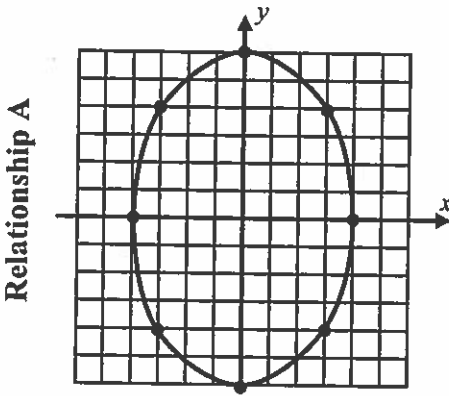


During which interval is Michael moving the slowest?

15. The classic test for whether the graph of a relationship represents a function is known as the **vertical line test**. It states:

Vertical Line Test: If a vertical line drawn on the graph of a relationship intersects that graph more than once, it does not represent the graph of a function.

Using this test, which relationship below is a function and which is not. Label.



Explain, using these graphs and a value of $x = 3$, why this test works.

16. The table below is partially filled out for the function $f(x) = x^2 - 3x - 4$.

x	-3	-2	-1	0	1	2	3	4	5
$f(x)$	14			-4		-6			6

(a) Fill out the remaining portions of the table.

(b) State the zeroes of the function.

(c) What is the maximum value of f on this interval?

