Domain Assessment • **Functions**

1. Which of the following statements must be true of a function?

A. Every output value corresponds to only one input value.

B. Every input value corresponds to only one output value.

C. No input values are repeated.

D. No output values are repeated.

2. Each of the tables below shows a relation. Which relation is a function?

A.

Input (x)	1	5	5	7	9
Output (y)	2	8	9	13	21

B.

Input (x)	7	8	9	8	11
Output (y)	3	5	7	6	9

C.

Input (x)	3	7	6	10	15
Output (y)	0	0	0	0	0

D.

Input (x)	1	1	1	1	1
Output (y)	2	3	4	5	6

3. Pia registered for an account on the Web site of a national magazine. The magazine charges $5 as a setup fee and $17 per month for access to the Web site. What is the initial value of the function that represents Pia's cost for access to the magazine's Web site over time?

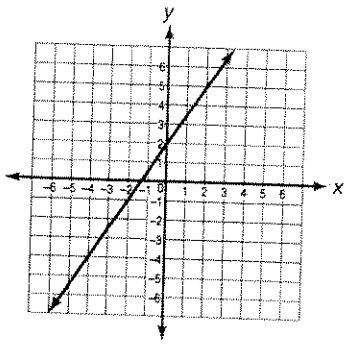
A. $0

B. $5

C. $17

D. $22

4. Ibrahim drew the graph below.



Which of the following statements best describes the graph?

A. The graph represents a relation but not a function.

B. The graph represents both a relation and a function.

C. The graph represents neither a relation nor a function.

D. There is no relationship between the x- and y-values in the graph.

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5. André paid a $65 annual fee to register with a car rental company. The company charges $8.50 for each hour a car is rented. What is the rate of change of the function that represents André's cost for renting a car over the course of a year?

A. $8.50 per hour

B. $65 per year

C. $73.50 per hour

D. $73.50 per year

6. Which of the following is the equation of a nonlinear function?

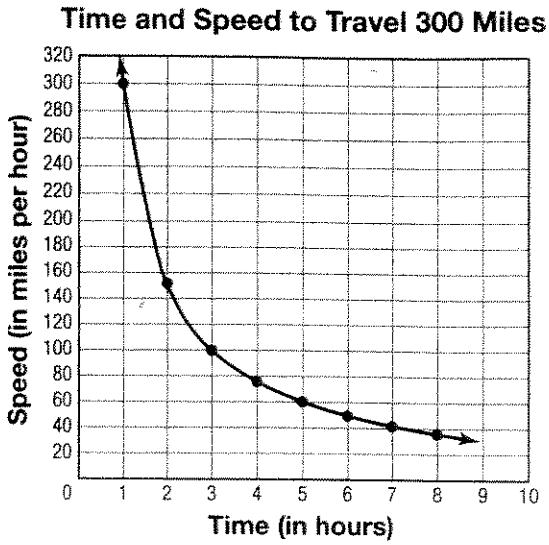
A. $y = 25$

B. $y = x - \frac{3}{4}$

C. $y = 10x$

D. $y = x^2 + 15$

7. The graph below shows the relationship between time and speed for a 300-mile journey.



Which of the following statements is the best description of the functional relationship between the two quantities in the graph?

A. The graph shows a decreasing, nonlinear function. As the time of the journey increases, the speed decreases.

B. The graph shows an increasing, nonlinear function. As the speed increases, the time of the journey increases.

C. The graph shows a decreasing, linear function. As the time of the journey increases, the speed decreases.

D. The graph shows an increasing, linear function. As the speed increases, the time of the journey increases.

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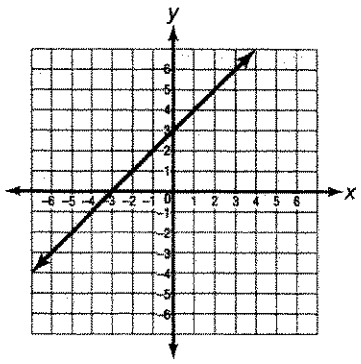
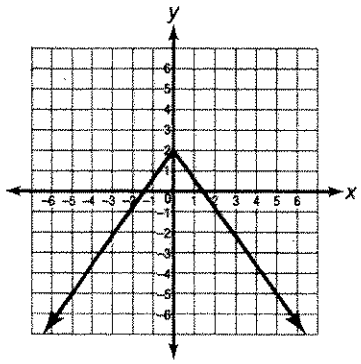
8. Which of these graphs does **not** represent a function?

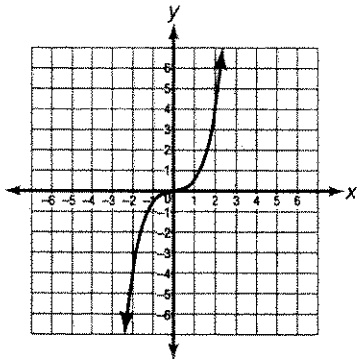
A.



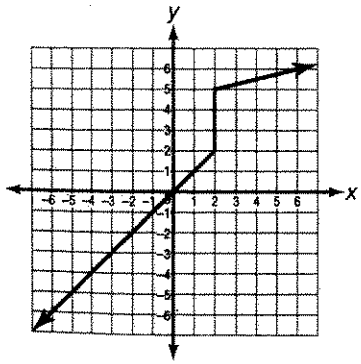
B.



C.

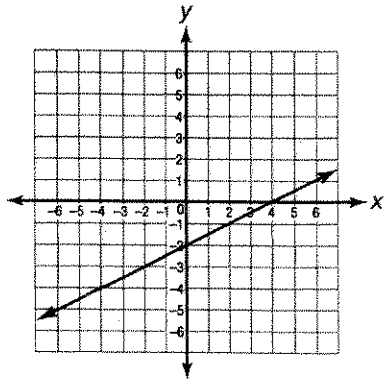


D.



9. The table and graph below represent two functions.

Function A



Function B

x	y
−5	1.75
−2	2.5
0	3
4	4
10	5.5

Which of the following statements is true?

A. The rate of change for Function A is twice the rate of change for Function B.

B. The rate of change for Function A is four times the rate of change for Function B.

C. The rate of change for Function B is twice the rate of change for Function A.

D. The rate of change for Function B is one-tenth the rate of change for Function A.

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10. Orhan studied the relationship between temperature and sales of refreshments at the concession stands inside the football stadium. He wrote an equation for the linear function that relates temperature (x) and refreshment sales (y). Which of the following could be Orhan's equation?

A. $y = 3x^2 + 25$

B. $y^2 = 15x + 40$

C. $y = 11x - 55$

D. $y = x^3 - 135$

11. A membership at a classic film center costs \$75 per year. Tickets to films cost members \$5.50. Which of the following statements is true of the annual cost of membership at the film center? Let y = total cost and x = number of films seen.

A. The annual cost is shown by the linear function $y = x + 5.50$. The rate of change is 1, and the initial value is 5.50.

B. The annual cost is shown by the linear function $y = 75x + 5.50$. The rate of change is 75, and the initial value is 5.50.

C. The annual cost is shown by the linear function $y = 80.50x$. The rate of change is 80.50, and the initial value is 0.

D. The annual cost is shown by the linear function $y = 5.50x + 75$. The rate of change is 5.50, and the initial value is 75.

12. The ordered pairs shown below represent a function.

$(-2, -17.5), (5, 8.75), (0, -10), (-1, -13.75), (3, 1.25)$

What is the rate of change of the function? Round to the nearest hundredth if necessary.

A. -3.75

B. -0.27

C. 0.27

D. 3.75

13. Which of the following sets of ordered pairs represents a function?

A. $(-1, 15), (0, 10), (0, 5), (2, 5), (5, -5)$

B. $(-7, -1), (-7, 0), (-7, 1), (-7, 2), (-7, 3)$

C. $(-5, 10), (-3, 6), (0, 0), (3, 6), (5, 10)$

D. $(-8, 3), (-4, 3), (0, 3), (0, 5), (4, 5)$

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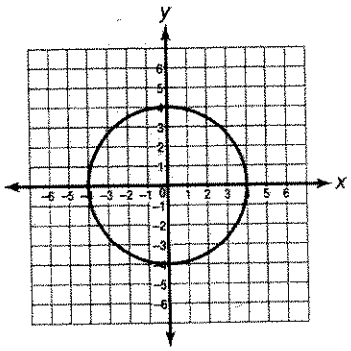
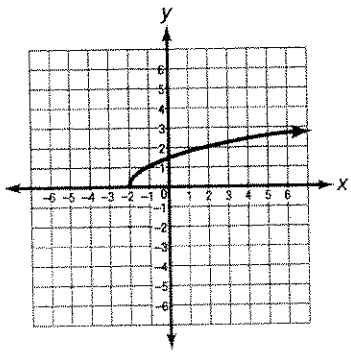
14. Which of the following graphs represents a nonlinear function?

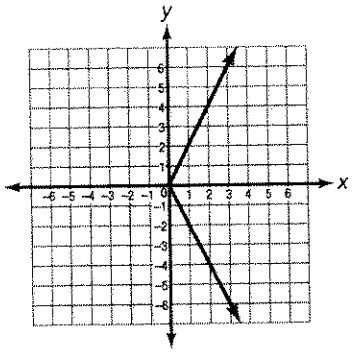
A.



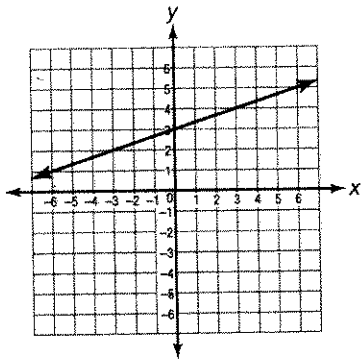
B.



C.



D.



15. Ms. Guidry wrote the equation $y = mx + b$ on the board. Lynne claimed that the equation does not represent a linear function. Amy said that $y = mx + b$ is the equation of a linear function. Which of the following statements is true?

A. Amy is correct because $y = mx + b$ relates two variables, and neither of the variables is raised to a power greater than 1.

B. Lynne is correct because $y = mx + b$ relates two variables, but one variable (x) is raised to a power (m).

C. Amy is correct because $y = mx + b$ relates two variables, and both variables have only integer values.

D. Lynne is correct because $y = mx + b$ relates four variables.

16. Which of the following sets of ordered pairs does **not** represent a function?

A. $(-6, 0), (3, 0), (-2, 0), (0, 0), (9, 0)$

B. $(3.5, -1), (3.5, -5), (3.5, 10), (3.5, 0), (3.5, -1.5)$

C. $\left(\frac{1}{2}, 1\right), \left(\frac{3}{4}, 1\frac{1}{2}\right), (0, 0), \left(2\frac{1}{4}, 4\frac{1}{2}\right), \left(3\frac{1}{10}, 6\frac{1}{5}\right)$

D. $(-9, -3), \left(\frac{4}{5}, \frac{4}{15}\right), \left(\frac{6}{7}, \frac{2}{7}\right), \left(-\frac{1}{4}, -\frac{1}{12}\right), \left(1\frac{4}{5}, \frac{3}{5}\right)$

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17. Mr. Carter asked his class to compare the rates of change for the functions shown below.

Function A

x	y
-6	$-1\frac{3}{5}$
-4	$-\frac{2}{5}$
0	2
2	$3\frac{1}{5}$
9	$7\frac{2}{5}$

Function B

$y = \frac{5}{8}x + 6$

Which of the following statements is true?

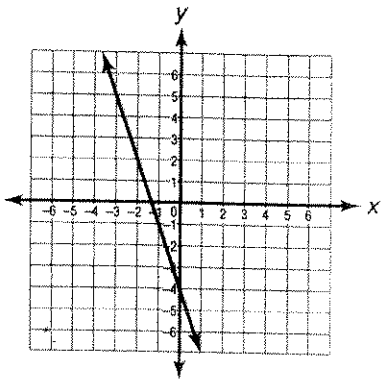
A. The rate of change for Function A is greater than the rate of change for Function B.

B. The rate of change for Function B is three times the rate of change for Function A.

C. The rate of change for Function B is greater than the rate of change for Function A.

D. The rates of change for Function A and Function B are equal.

18. Corinne drew the graph of a linear function, as shown below.



What is the rate of change of the function?

A. -3

B. $-\frac{1}{3}$

C. $\frac{1}{3}$

D. 3

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19. Lidija created the table of values shown below.

x	y
−2.75	3
7.5	−7.25
0	−7.25
−2.75	5
−3.25	3.5

Which of the following statements best explains why the table of values does **not** represent a function?

A. At least one *y*-value is repeated.

B. At least one *x*-value is repeated.

C. At least one *y*-value has more than one corresponding *x*-value.

D. At least one *x*-value has more than one corresponding *y*-value.

20. During his winter vacation, George rented skis and boots for 5 days from the Slope Slayer Ski Shop. The shop charges the same rate for each day of a rental. Including a $7.50 application fee, George paid a total of $177.25 to rent skis and boots.

What is the rate of change, in dollars per day, for the function that represents George's rental cost?

A. 7.50

B. 33.95

C. 35.45

D. 42.95

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21. Cecilia decided to start a savings plan. On January 1, she opened a bank account and made a deposit. She then made monthly deposits without ever taking money out of the account. At the end of each month, she recorded the total amount in her savings account. The table below shows her data for the first five months of the year.

Date	Account Balance
January 31	$110
February 28	$120
March 31	$130
April 30	$140
May 31	$150

What is the initial value, in dollars, for the function that represents Cecilia's total savings? Explain your answer.

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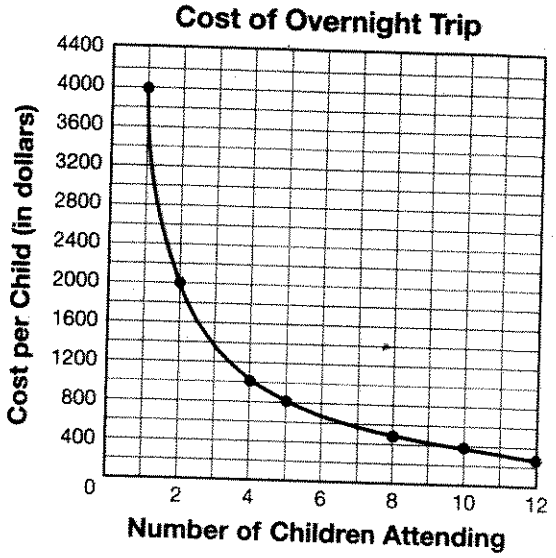
22. Mr. Posada graphed the function that relates the cost of an overnight trip to the number of children attending, as shown below.



Use the words *increasing* or *decreasing* and *linear* or *nonlinear* to describe the graph. Explain your answer.

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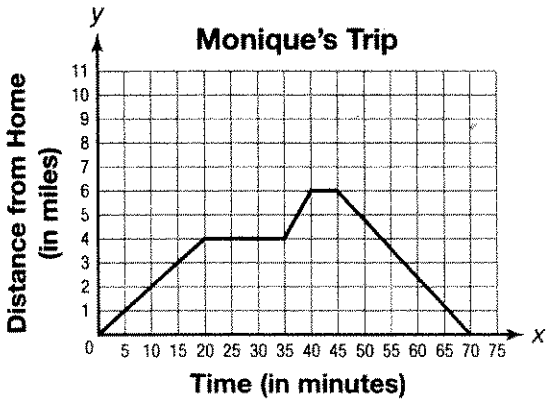
23. Ms. Dehejia asked her class to graph the following situation:

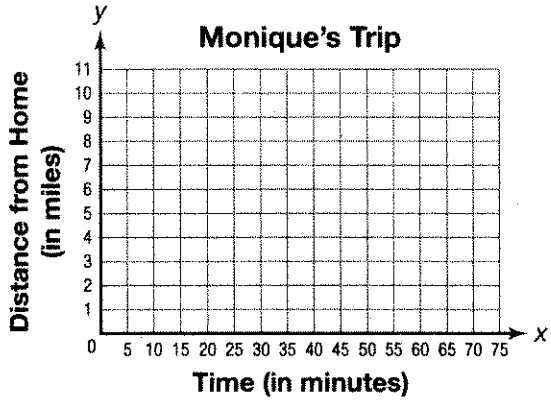
> Monique took 15 minutes to bike the 4 miles from her house to her friend Angela's house. She spent another 15 minutes talking to Angela. Then she took 10 minutes to bike the 2 miles from Angela's house to the library. She stayed at the library for 5 minutes to return a book. Finally, she took 25 minutes to bike home.

Enrique drew the graph below to represent the situation.



A. Does Enrique's graph correctly represent the situation? Explain your answer.

B. Graph the situation Ms. Dehejia presented to her class.



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24. An online movie rental service charges a one-time registration fee. The cost of downloading each movie is the same. The table below shows the total costs, including the application fee, for downloading different numbers of movies.

Cost of Downloading Movies

Total Number of Movies	Total Cost (in dollars)
5	41.25
10	57.50
15	73.75
20	90.00
25	106.25

A. Write the equation of the function that represents the total cost of downloading different numbers of movies. Identify the rate of change and the initial value of the function. Let y = total cost and x = number of movies.

B. What would be the total cost of registering for the movie rental service and renting 125 movies? Explain your answer.

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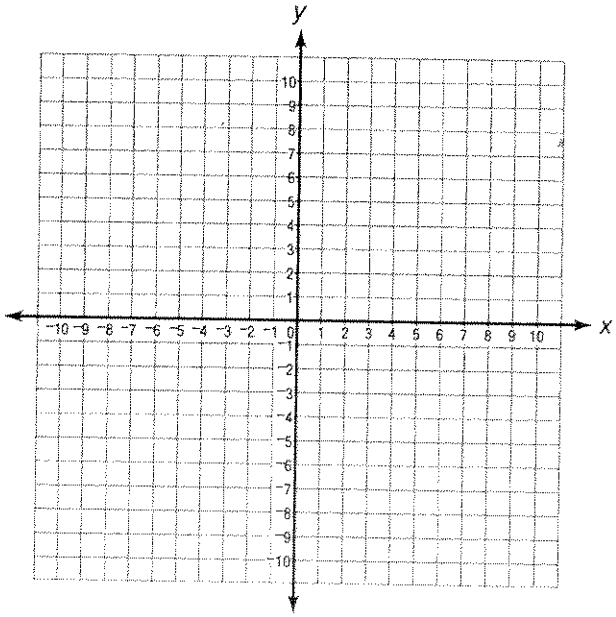
25. Harumi created the table of values shown below.

x	−3	−1	0	2	3	4
y	3	−5	−6	−2	3	10

A. Graph the ordered pairs shown in the table. Then connect the points.



B. Does Harumi's table of values represent a function? If so, is the function linear or nonlinear? Explain your answers.