



Arkansas Comprehensive Testing, Assessment, and Accountability Program

# Released Item Booklet

## Algebra I Mid-Year End-of-Course Examination

### January 2010 Administration

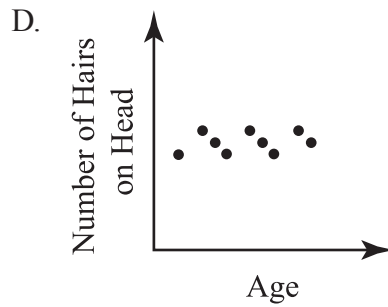
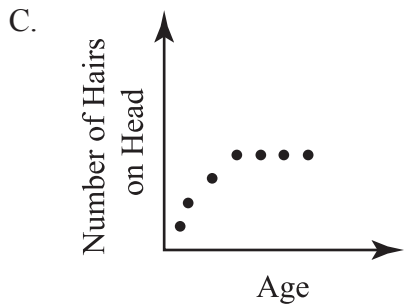
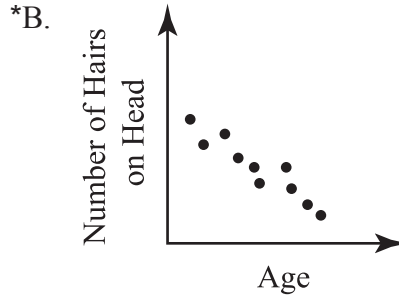
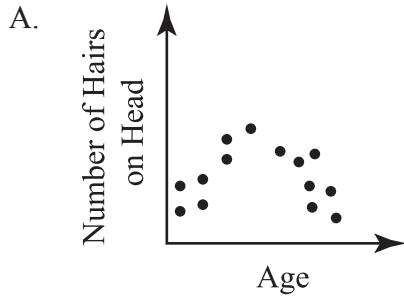
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**Arkansas Department of Education**

## PART II Released Algebra I Items

1. Which scatterplot shows that the number of hairs on a head constantly decreases over time?

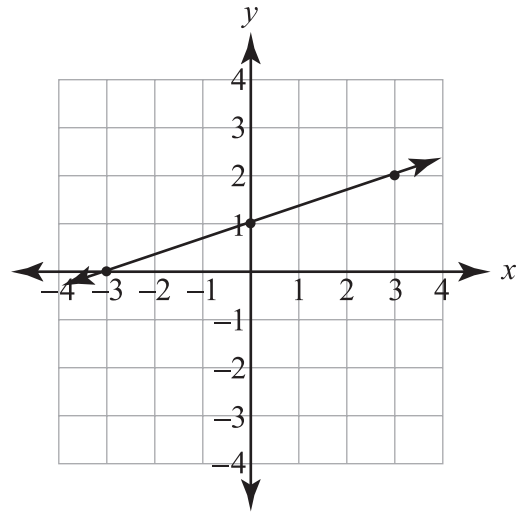


2. What is the simplest form of the expression below?

$$4\sqrt{2} + 3\sqrt{2} - 5\sqrt{2}$$

- \*A.  $2\sqrt{2}$
- B.  $2\sqrt{6}$
- C.  $7\sqrt{2}$
- D.  $12\sqrt{2}$

3. What is the equation of the line graphed below?



- \*A.  $y = \frac{1}{3}x + 1$
- B.  $y = \frac{1}{3}x - 3$
- C.  $y = 3x + 1$
- D.  $y = 3x - 3$

**PART II Released Algebra I Items**

4. What is the relationship between the lines with equations  $y = \frac{5}{2}x - 12$  and  $y = \frac{5}{2}x + 6$ ?

- \*A. They are parallel lines.
- B. They are the same line.
- C. They are perpendicular lines.
- D. They are neither parallel nor perpendicular.

5. What is the solution to the equation below?

$$3x + 1 = x + 5$$

- A. 1.0
- B. 1.5
- \*C. 2.0
- D. 3.0

6. Which table, showing the distance that four different cars traveled during a four-hour period, demonstrates a linear relationship between time and distance?

A.

Time (hours)	Distance Traveled (miles)
1	55
2	110
3	160
4	205

\*B.

Time (hours)	Distance Traveled (miles)
1	55
2	110
3	165
4	220

C.

Time (hours)	Distance Traveled (miles)
1	55
2	110
3	170
4	235

D.

Time (hours)	Distance Traveled (miles)
1	55
2	110
3	190
4	245

7. What is the greatest common factor of  $30xy$ ,  $35y^2$ , and  $50x^2y^2$ ?

- \*A.  $5y$
- B.  $30y$
- C.  $21x^2y^2$
- D.  $10x^2y^2$

**PART II Released Algebra I Items**

8. Which set of ordered pairs represents a function?

- A.  $\{(4, 3), (1, 7), (-4, 3), (1, 8)\}$
- B.  $\{(5, 4), (5, -3), (3, 7), (2, 1)\}$
- C.  $\{(-3, 1), (4, -2), (-3, 0), (7, 8)\}$
- \*D.  $\{(1, -4), (2, -3), (3, -2), (4, -1)\}$

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Use the matrices below to answer question 9.

$$\begin{array}{c} \text{Todd} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} 4 & 10 \\ 4 & 10 \\ 8 & 6 \\ 12 & 8 \end{array} \right] \end{array} \end{array}$$

$$\begin{array}{c} \text{Jim} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} 11 & 6 \\ 10 & 7 \\ 11 & 9 \\ 10 & 11 \end{array} \right] \end{array} \end{array}$$

**S = Speedyman Comics**

**Q = Quantraman Comics**

9. Todd and Jim are going to combine their comic books. Which matrix represents the total?

A. 
$$\begin{array}{c} \text{Total} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} 10 & 21 \\ 11 & 20 \\ 17 & 17 \\ 23 & 18 \end{array} \right] \end{array} \end{array}$$

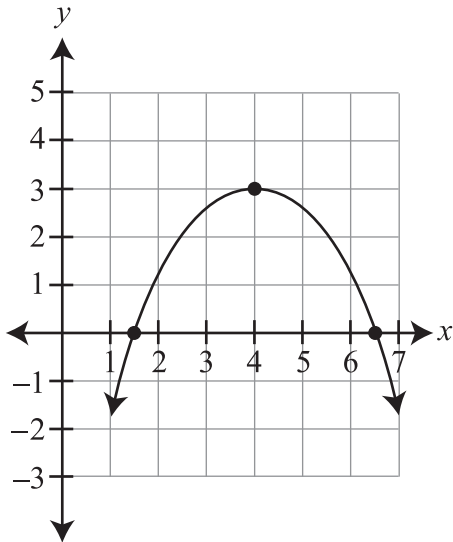
B. 
$$\begin{array}{c} \text{Total} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} -7 & 4 \\ -6 & 3 \\ 3 & -3 \\ 2 & -3 \end{array} \right] \end{array} \end{array}$$

\*C. 
$$\begin{array}{c} \text{Total} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} 15 & 16 \\ 14 & 17 \\ 19 & 15 \\ 22 & 19 \end{array} \right] \end{array} \end{array}$$

D. 
$$\begin{array}{c} \text{Total} \\ \begin{array}{cc} \mathbf{S} & \mathbf{Q} \\ \left[ \begin{array}{cc} 11 & 10 \\ 10 & 10 \\ 11 & 9 \\ 12 & 11 \end{array} \right] \end{array} \end{array}$$

**PART II Released Algebra I Items**

10. Which statement is true about the function graphed below?



- A. The maximum value occurs at the vertex with coordinates (3, 4).
  - \*B. The maximum value occurs at the vertex with coordinates (4, 3).
  - C. The minimum value occurs at the vertex with coordinates (3, 4).
  - D. The minimum value occurs at the vertex with coordinates (4, 3).
11. Simplify the expression below.

$$2^2 + 4^2 - (48 \div 2) \div (6 - 8 \div 2)$$

- A. -2
- \*B. 8
- C. 24
- D. 44

12. What is the midpoint of the segment with endpoints  $(-7, 4)$  and  $(9, 7)$ ?

- A.  $\left(1, 1\frac{1}{2}\right)$
- B.  $\left(8, 1\frac{1}{2}\right)$
- \*C.  $\left(1, 5\frac{1}{2}\right)$
- D.  $\left(-1\frac{1}{2}, 5\frac{1}{2}\right)$

13. Which is the **correct** factorization of the equation  $x^2 + 6x + 8 = 0$ ?

- \*A.  $(x + 4)(x + 2) = 0$
- B.  $(x + 8)(x + 1) = 0$
- C.  $(x + 5)(x + 3) = 0$
- D.  $(x - 4)(x - 2) = 0$

**PART II Released Algebra I Items**

14. Mr. Dewey, Mr. Smith, and Mr. Howe manage three different used-car lots. The inventory of each brand of trucks, vans, and cars is shown in the matrices below.

Dewey				Smith				Howe			
	Trucks	Vans	Cars		Trucks	Vans	Cars		Trucks	Vans	Cars
Brand A	10	12	14	Brand A	6	7	10	Brand A	6	12	14
Brand B	5	10	15	Brand B	10	12	14	Brand B	12	12	12
Brand C	3	6	9	Brand C	6	5	4	Brand C	10	8	6

If they combined their businesses, how many Brand A vans would they have altogether?

- A. 12
- B. 28
- \*C. 31
- D. 84

15. What is the value of  $x$ , if  $\frac{3}{4}x - 3 = -2x + 8$ ?

- \*A.  $x = 4$
- B.  $x = -4$
- C.  $x = \frac{121}{4}$
- D.  $x = -\frac{25}{4}$

16. Assuming no denominator equals 0, which is the completely simplified form of the expression below?

$$\frac{8a^3 + 2a^2 + 4a}{2a}$$

- A.  $8a + 1 + \frac{2}{a}$
- \*B.  $4a^2 + a + 2$
- C.  $4a^2 + 2a + 1$
- D.  $8a^2 + 2a + 4$

17. What is  $4.5 \times 10^7$  multiplied by  $5.4 \times 10^3$ , in scientific notation?

- A.  $2.4 \times 10^4$
- B.  $2.4 \times 10^{10}$
- \*C.  $2.4 \times 10^{11}$
- D.  $2.4 \times 10^{21}$

**PART II Released Algebra I Items**

18. The table below shows a relationship between the total cost of purchasing books through a book club and the number of books purchased.

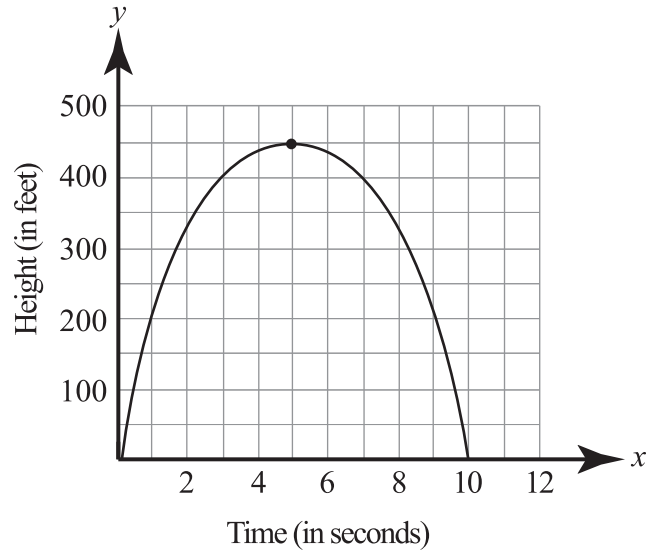
**Total Cost in Terms of Books Purchased**

<b>Books Purchased, <math>x</math></b>	0	1	2
<b>Cost, <math>y</math></b>	\$10	\$25	\$40

What is the function's independent variable?

- A. \$10
- B. \$15
- C. cost of the club
- \*D. number of books purchased

19. The graph below represents the relationship between the time, in seconds, an arrow is shot upward and its height, in feet.



From the time it was shot, how long does it take for the arrow to return to the ground, and what is its maximum height?

- A. 5 seconds, 450 feet
- \*B. 10 seconds, 450 feet
- C. 10 seconds, 500 feet
- D. 450 seconds, 10 feet

**PART II Released Algebra I Items**

20. Mary scored 13 points in the first 11 minutes of a 32-minute basketball game. If she continues to score at the same rate, **approximately** how many points will she score in this game?

- A. 45
- \*B. 38
- C. 27
- D. 25

21. A function is completely defined by the table below.

$x$	$y$
0	5
2	10
10	2
-3	9

What are the function's domain and range?

- \*A. Domain =  $\{-3, 0, 2, 10\}$ ;  
Range =  $\{2, 5, 9, 10\}$
- B. Domain =  $\{0, 10\}$ ; Range =  $\{2, 10\}$
- C. Domain =  $\{2, 10\}$ ; Range =  $\{-3, 10\}$
- D. Domain =  $\{-3, 9\}$ ; Range =  $\{10, 2\}$

22. Which algebraic expression corresponds to the word phrase below?

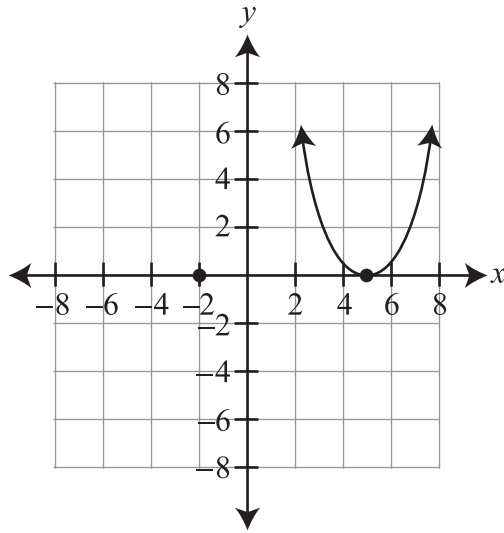
Five times the sum of twice a number and  $-5$

- A.  $5 + 2(n - 5)$
- B.  $5 + 2n - 5$
- C.  $5(2n + 5)$
- \*D.  $5(2n - 5)$



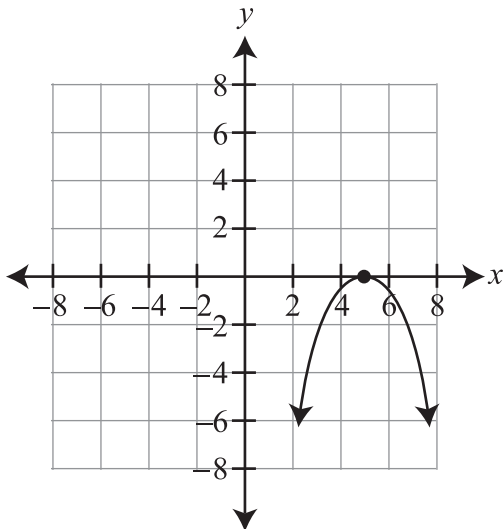
**PART II Released Algebra I Items**

23. The graph of a function is shown below.

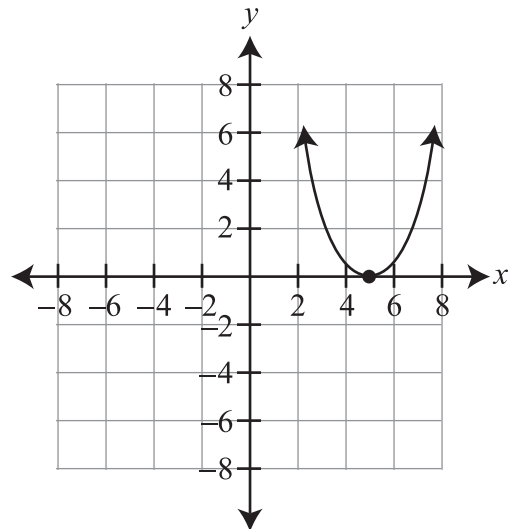


Which is the image of the graph above after a reflection over the  $x$ -axis?

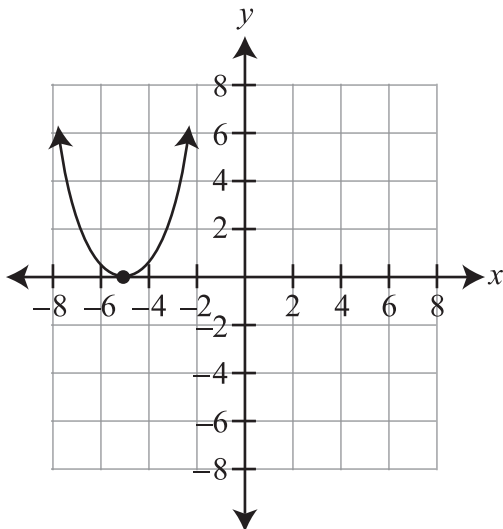
\*A.



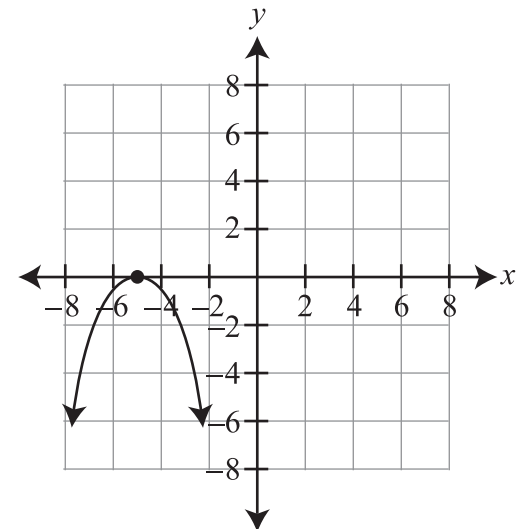
B.



C.

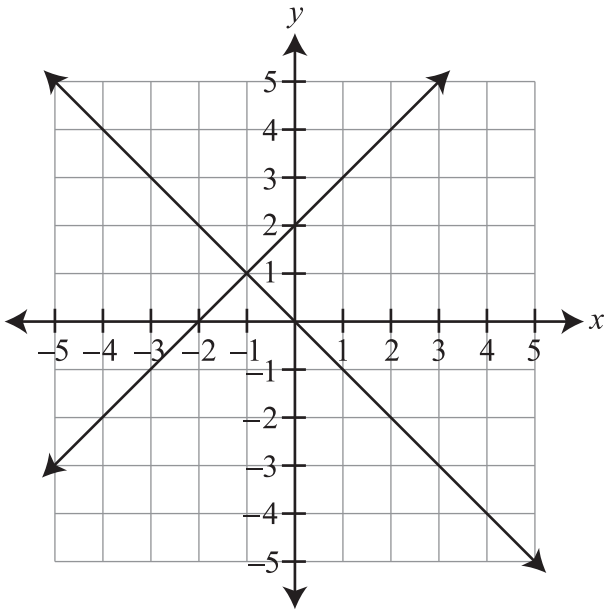


D.



PART II Released Algebra I Items

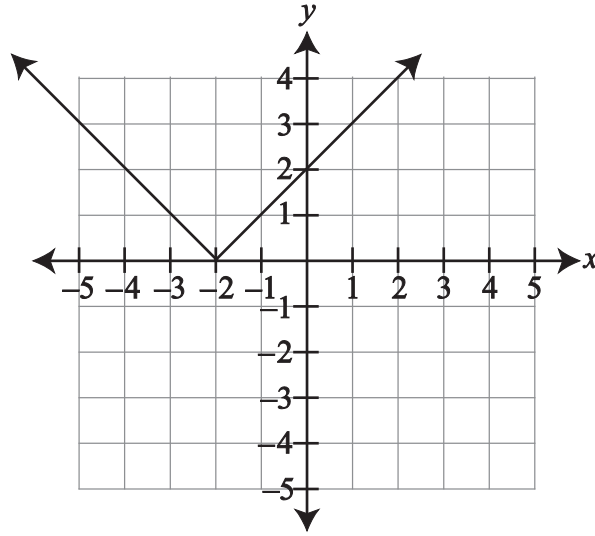
24. Which ordered pair is the solution to the system of equations graphed below?



- A. (0, 0)
- B. (0, 2)
- C. (-2, 0)
- \*D. (-1, 1)

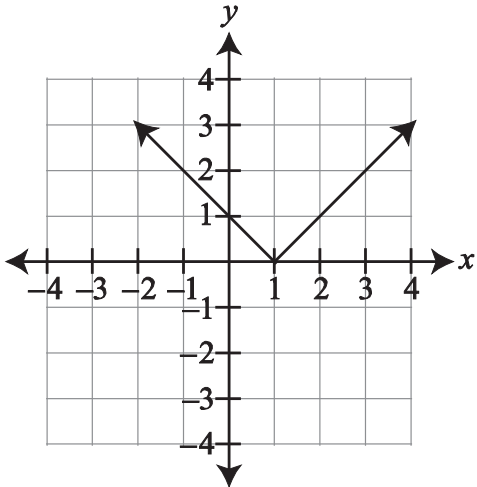
**PART II Released Algebra I Items**

25. The graph of a function is shown below.

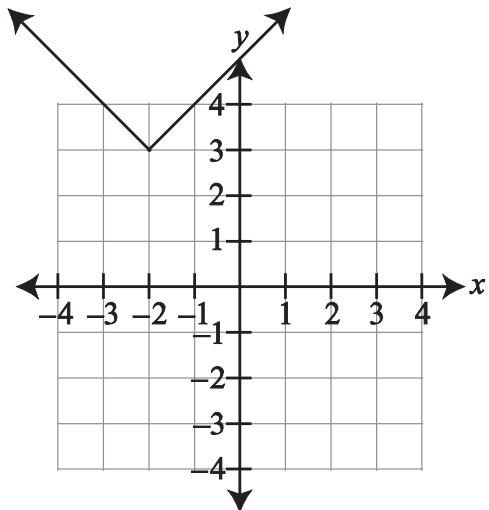


Which is the image of the graph after a vertical shift of  $-3$ ?

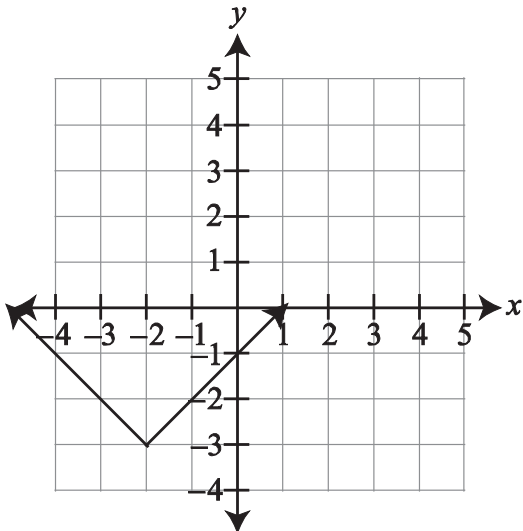
A.



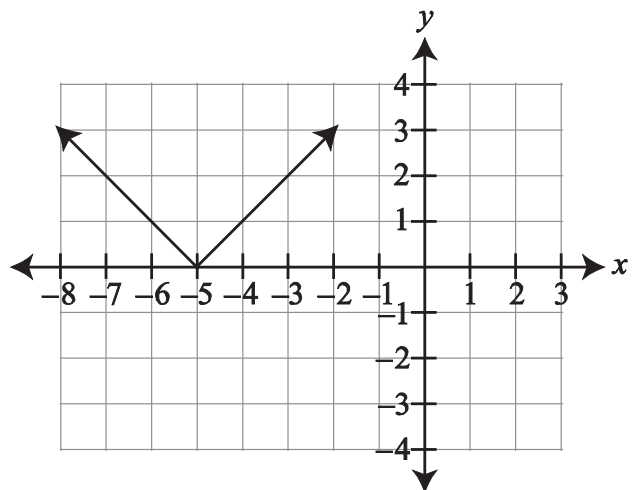
B.



\*C.

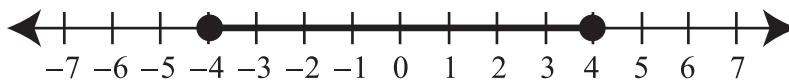


D.



**PART II Released Algebra I Items**

26. Which inequality has the solution set represented by the graph below?



- A.  $|x| < 4$
- \*B.  $|x| \leq 4$
- C.  $|x| > 4$
- D.  $|x| \geq 4$

27. At a restaurant's buffet, the price of takeout depends on the weight of the food and its container. The buffet takeout costs \$4.50 per pound. Which equation describes this function?

- A.  $f(x) = \$4.50 + x$
- B.  $f(x) = \$4.50 - x$
- C.  $f(x) = \$4.50 \div x$
- \*D.  $f(x) = \$4.50x$

28. Which is equivalent to the expression  $(8x + 5) - (2x - 5)$ ?

- A.  $6x$
- B.  $10x$
- \*C.  $6x + 10$
- D.  $-16x^2 + 30x + 25$

**PART II Released Algebra I Items**

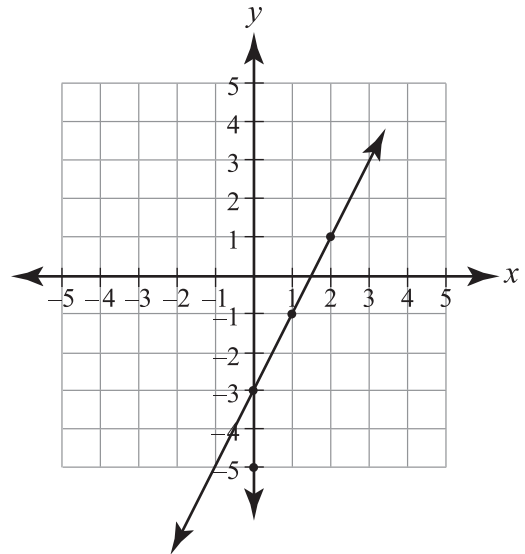
29. A lawncare company recorded the distribution of lawn sizes in a subdivision, as shown in the table below.

Size of Lawn (ft <sup>2</sup> )	Number of Lawns
1,000–1,499	2
1,500–1,999	12
2,000–2,499	27
2,500–2,999	19
3,000–3,499	6
3,500–3,999	3

If the company wanted to construct a cumulative frequency histogram for these data, what would the top of the bar read for the 2,000–2,499 group?

- A. 12
- B. 14
- C. 27
- \*D. 41

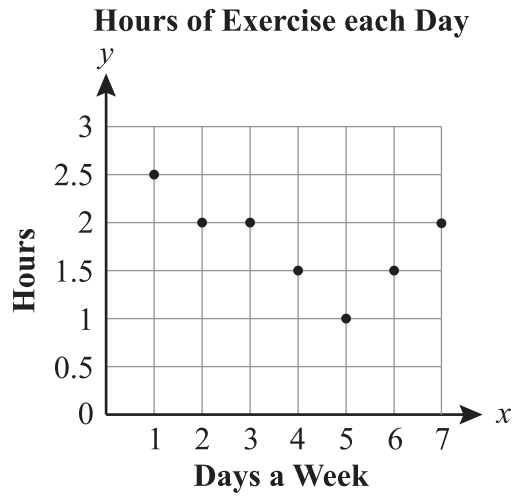
30. Michael graphed the line  $y = -2x - 3$ .



What mistake did Michael make?

- \*A. He graphed a slope of 2.
  - B. He graphed a slope of  $-2$ .
  - C. He graphed a slope of  $\frac{1}{2}$ .
  - D. He graphed the  $y$ -intercept as  $-3$ .
31. A glass jar contains 8 red, 6 green, 3 blue, and 3 yellow marbles. Zeke randomly picks a red marble. Without replacing the red marble, he randomly picks a second marble. What is the probability of Zeke choosing another red marble?
- A.  $\frac{7}{8}$
  - B.  $\frac{7}{16}$
  - \*C.  $\frac{7}{19}$
  - D.  $\frac{7}{20}$

Use the graph below to answer question 32.



32. The graph above shows the number of hours of exercise Ladonna completed each day. Which best describes the trend shown in the graph as the week progresses?
- A. The amount of exercise increases steadily.
  - B. The amount of exercise increases, then decreases.
  - C. The amount of exercise decreases steadily.
  - \*D. The amount of exercise decreases, then increases.