



Arkansas Comprehensive Testing, Assessment, and Accountability Program

Released Item Booklet

Algebra I End-of-Course Examinations

January and April 2009 Administrations

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Arkansas Department of Education

PART II Mid-Year End-of-Course Released Algebra I Items

1. Simplify the expression below.

$$(5t)(-30t^2)$$

- * A. $-150t^3$
- B. $150t^3$
- C. $-25t^3$
- D. $-6t$

2. What is the factored form of the polynomial below?

$$6x^2 + 5x - 4$$

- A. $(x + 1)(6x - 4)$
- B. $(x - 1)(6x + 4)$
- * C. $(2x - 1)(3x + 4)$
- D. $(2x + 1)(3x - 4)$

3. Mrs. Plummer teaches third grade. At recess one day, Mrs. Plummer notices that her six tallest students are the only ones wearing hats. Which statement would be an example of Mrs. Plummer confusing correlation with causation?

- A. The taller students are wearing hats today.
- B. The shorter students are not wearing hats today.
- * C. Being tall increases the chances of wearing a hat.
- D. Some students wore hats today and some did not.

4. Angela was supposed to graph the equation $y = \frac{3}{5}x + 12$, but she misread the problem and graphed $y = \frac{3}{5}x + 2$. How will her graph compare to the **correct** graph?

- A. It will be flatter.
- B. It will be steeper.
- * C. It will be 10 units lower.
- D. It will go down instead of up.

5. What is the simplified form of the expression below?

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

- * A. $2\sqrt{3}$
- B. $2\sqrt{7}$
- C. $\sqrt{4} + 2\sqrt{3}$
- D. $2\sqrt{4} + 2\sqrt{3}$

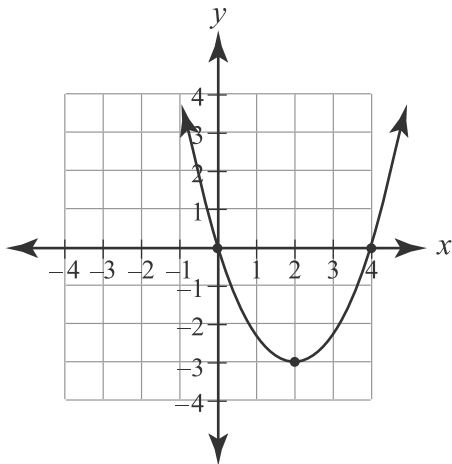
6. If a family tree is traced back n generations, 2^n ancestors, at most, will be found in that generation. At **most**, how many ancestors would be found when tracing back 8 generations?

- A. 8
- B. 16
- C. 64
- * D. 256

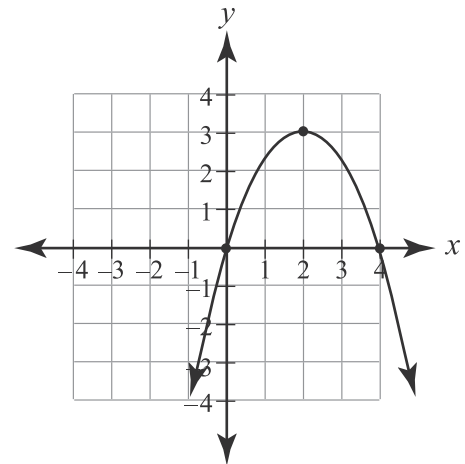
PART II Mid-Year End-of-Course Released Algebra I Items

7. Which graph has a minimum and vertex at $(2, -3)$ and zeros of $(0, 0)$ and $(4, 0)$?

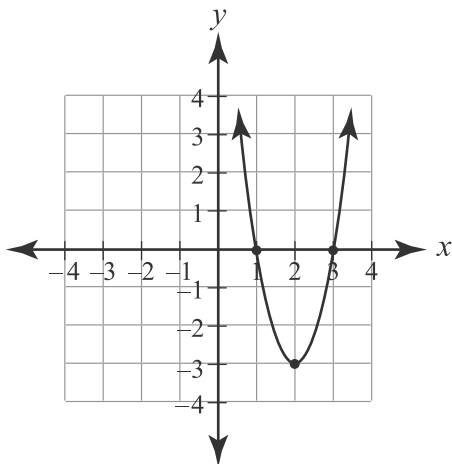
* A.



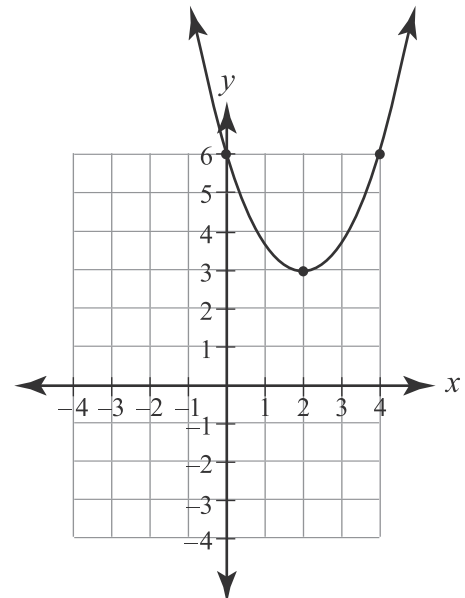
B.



C.



D.



8. What are the next two terms of the pattern shown below?

55, 42, 31, 22, 15, ____, ____

- A. 7, 6
- B. 8, 3
- C. 10, 6
- * D. 10, 7

9. Beau charges a \$10 base fee plus \$5 per hour to mow yards. Jaime charges a \$12 base fee plus \$4.50 per hour. At what time will Beau and Jaime be charging the same total fee?

- A. 0.2 hours
- B. 1 hour
- * C. 4 hours
- D. never

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10. Billy has 20 pennies in his pocket. Billy does not realize that there is a hole in his pocket and 2 pennies fall out for every block he walks. A graph is made showing the number of pennies, y , that are left after Billy has walked x blocks. What is the slope of the graph?

- A. $-\frac{1}{10}$
- * B. -2
- C. -10
- D. -20

11. It took Frances 10 minutes to read the first 14 pages of her English assignment. If she continues to read at the same rate, how long will it take her to read the remaining 22 pages, to the nearest minute?

- A. 15 minutes
- * B. 16 minutes
- C. 18 minutes
- D. 31 minutes

12. Given the function $f(x) = 2 - 4x$, what is $f(-2)$?

- A. -6
- B. 1
- C. 4
- * D. 10

13. There are three brands of fertilizers that provide different levels of three minerals that a gardener might need.

- Brand X has 6 parts Mineral A, 2 parts Mineral B, and 1 part Mineral C.
- Brand Y has 2 parts Mineral A, 1 part Mineral B, and 2 parts Mineral C.
- Brand Z has 1 part Mineral A, 3 parts Mineral B, and 6 parts Mineral C.

Which matrix shows how much of each mineral is provided by each brand?

A.
$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{matrix} X \\ Y \\ Z \end{matrix} & \begin{bmatrix} 6 & 2 & 1 \\ 2 & 1 & 3 \\ 1 & 2 & 6 \end{bmatrix} \end{matrix}$$

* B.
$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{matrix} X \\ Y \\ Z \end{matrix} & \begin{bmatrix} 6 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 3 & 6 \end{bmatrix} \end{matrix}$$

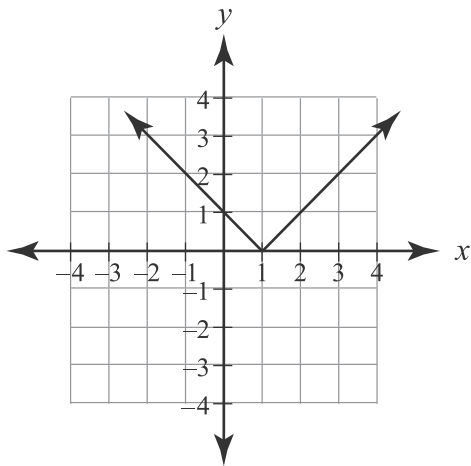
C.
$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{matrix} X \\ Y \\ Z \end{matrix} & \begin{bmatrix} 6 & 2 & 1 \\ 1 & 3 & 6 \\ 2 & 1 & 2 \end{bmatrix} \end{matrix}$$

D.
$$\begin{matrix} & \begin{matrix} A & B & C \end{matrix} \\ \begin{matrix} X \\ Y \\ Z \end{matrix} & \begin{bmatrix} 1 & 3 & 6 \\ 6 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix} \end{matrix}$$

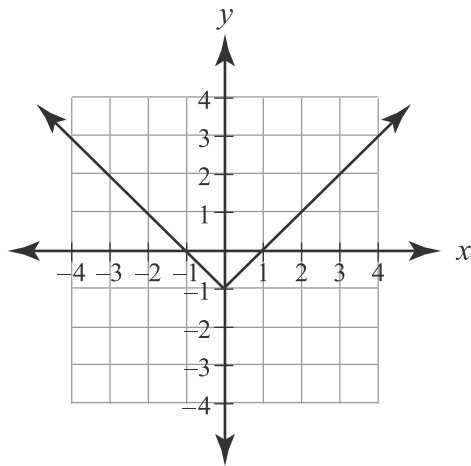
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14. Which is the graph of $f(x) = |x| - 1$ shifted up 2 units?

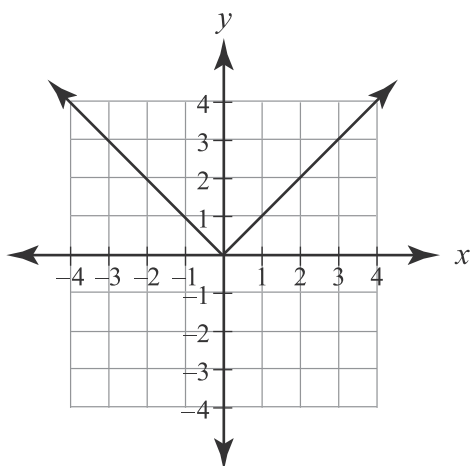
A.



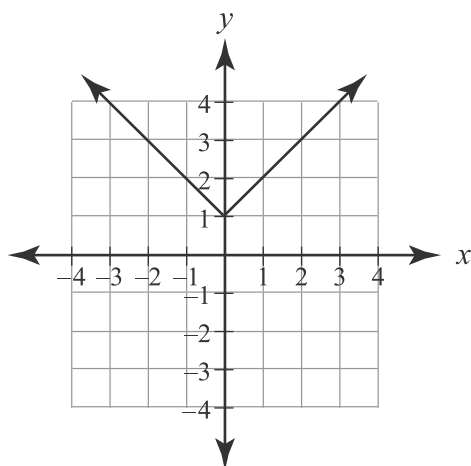
B.



C.



* D.



15. Brad has \$80 and is paid \$20 for every lawn he mows. His friend Trevor has \$200 but is not earning or losing any money. Which inequality can be solved for the number of lawns, x , that Brad must mow in order to have more money than Trevor?

- A. $80x + 20 < 200$
- B. $80x + 20 > 200$
- C. $80 + 20x < 200$
- * D. $80 + 20x > 200$

16. If the equations $y = 3x + 6$ and $y = 3x - 6$ were graphed on the same coordinate grid, how would the two lines relate to one another?

- * A. They would be parallel.
- B. They would be vertical.
- C. They would be intersecting.
- D. They would be perpendicular.

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17. Which table relates to a linear function?

- * A.

x	y
1	-2
2	-4
3	-6
4	-8

 B.

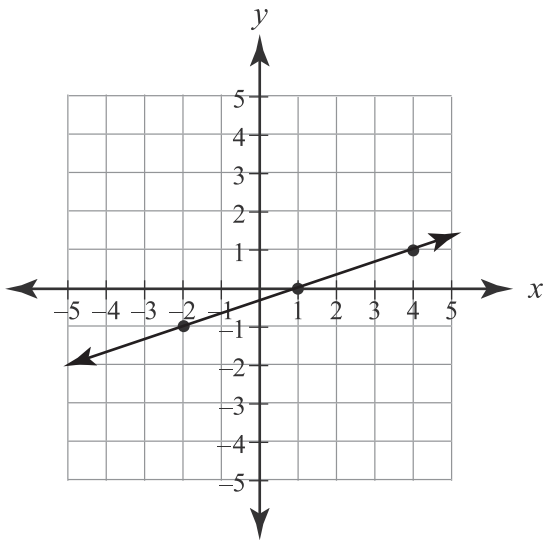
x	y
1	-2
2	0
3	4
4	12
- C.

x	y
1	2
2	3
3	4
4	7

 D.

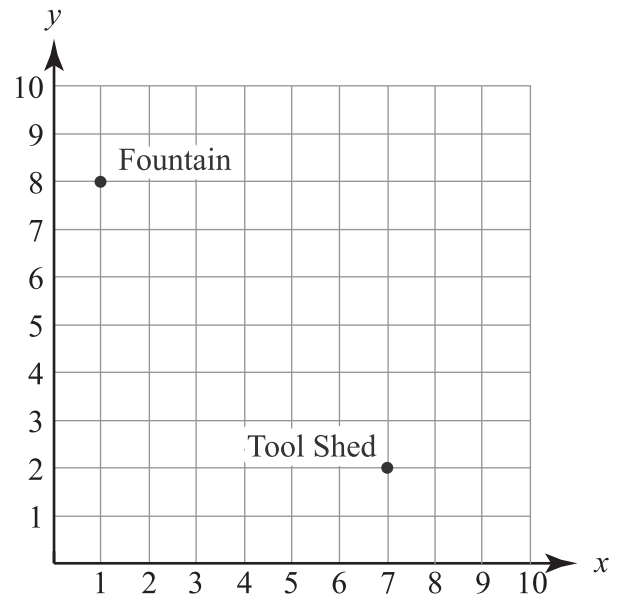
x	y
1	3
2	6
3	8
4	12

18. What is the slope of the line given in the graph below?



- A. -3
 B. $\frac{1}{4}$
 * C. $\frac{1}{3}$
 D. 3

19. Christa is landscaping her backyard. She makes a map of it on a coordinate grid to help plan her design, as shown below.



The fountain is located at (1, 8), and the tool shed is at (7, 2). Christa wants to put a bird feeder halfway between the fountain and the tool shed. At what coordinates should Christa place the bird feeder?

- * A. (4, 5)
 B. (5, 4)
 C. (6, 6)
 D. (8, 10)

20. What is $\sqrt{\frac{64}{16}}$ expressed in simplest form?

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

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21. Jessica has a bag that contains 4 red marbles, 5 blue marbles, and 6 green marbles. If Jessica picks a marble at random, what is the probability that it is green?

- A. $\frac{1}{6}$
- * B. $\frac{2}{5}$
- C. $\frac{2}{3}$
- D. $\frac{5}{2}$

22. Katie heard her math teacher tell the class, "The grade you get on the next test will be directly proportional to the amount you study." Katie knows that her friend Jane studied for 5 hours and earned a 78%. Katie studied for 6 hours. If what the teacher said is true, what was Katie's test grade, to the nearest percent?

- A. 79%
- B. 84%
- * C. 94%
- D. 98%

23. What values of x will satisfy the equation below?

$$x^2 - 12x + 27 = 0$$

- A. 6 and 18
- B. 27 and 1
- C. 9 and -3
- * D. 3 and 9

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

$$\frac{10x^4 + 50x^3}{2x^3}, \text{ if } x \neq 0$$

- A. $5x^4 + 25x^3$
- * B. $5x + 25$
- C. $8x + 48$
- D. $5x$

25. The senior class is ordering T-shirts. The printing company charges a \$45 design fee plus \$7.50 per shirt. Which equation represents the total cost, C , for ordering s shirts?

- A. $s = \$45.00C + \7.50
- B. $s = \$7.50C + \45.00
- C. $C = \$45.00s + \7.50
- * D. $C = \$7.50s + \45.00

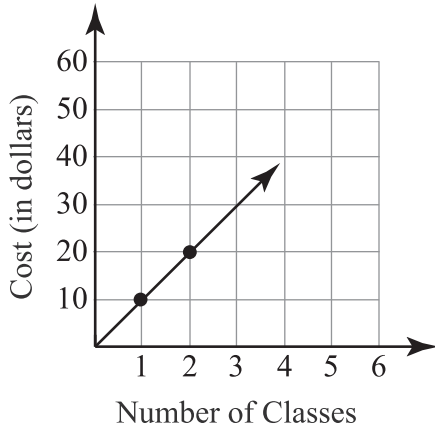
26. A survey is taken to find the attitudes of people toward a tax increase that would pay for street repairs. Which should be included as a question on the survey?

- A. How big of a tax increase should we pass to pay for street repairs?
- * B. Do you support a tax increase that will provide money for street repairs?
- C. Are you willing to increase taxes to pay for repairs on our terribly run down streets?
- D. Considering how high taxes already are, would you put up with another tax increase to pay for street repairs?

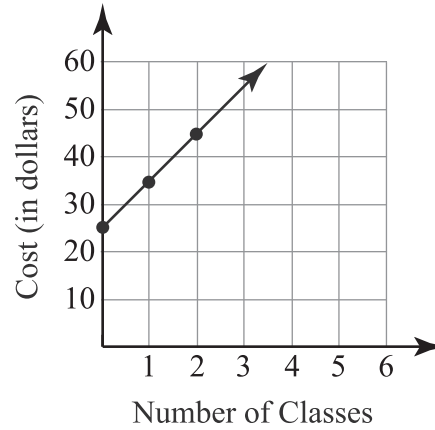
PART II Mid-Year End-of-Course Released Algebra I Items

27. It costs \$25 to attend a dance school plus \$10 for each different type of dance class taken. Which graph represents the cost of taking classes at the school?

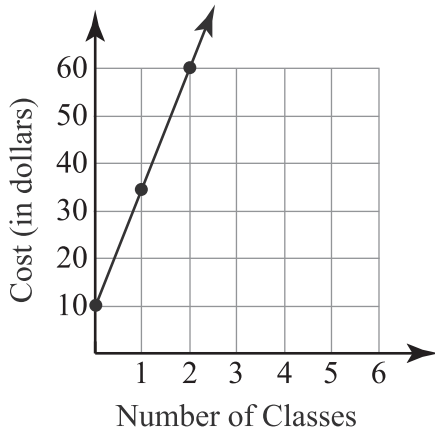
A.



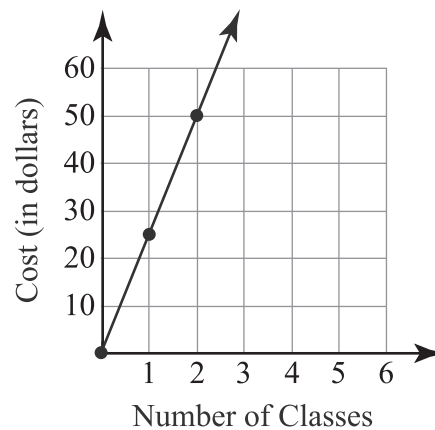
* B.



C.



D.



28. What values of d are solutions of the equation below?

$$|3d| - 6 = 24$$

- A. $d = 2, d = -2$
- B. $d = 6, d = -6$
- * C. $d = 10, d = -10$
- D. $d = 14, d = -14$

29. Bob budgets enough money to build a rectangular deck that is 450 square feet. He wants the deck's length to be twice its width. What will be the dimensions of the deck, rounded to the nearest foot?

- * A. 15 ft \times 30 ft
- B. 18 ft \times 25 ft
- C. 20 ft \times 40 ft
- D. 21 ft \times 22 ft

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30. Andy can maintain a speed of 15 miles per hour on his bicycle. How long will it take him to finish a 60-mile bicycle race?

- A. $\frac{1}{4}$ hours
- * B. 4 hours
- C. 45 hours
- D. 900 hours

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

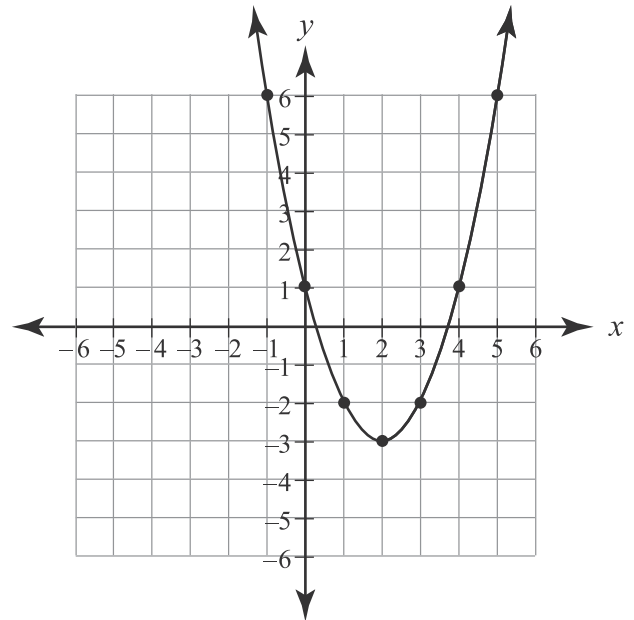
$$-2x(x^2 + 2x)$$

- * A. $-2x^3 - 4x^2$
- B. $-2x^2 - 4x$
- C. $2x^3 + 4x^2$
- D. x^2

32. What is the value of the expression $\frac{4x^2 + 2x}{x - 3}$ when $x = 3$?

- A. 0
- B. 4
- C. 12
- * D. undefined

33. Below is the graph of $y = x^2 - 4x + 1$.

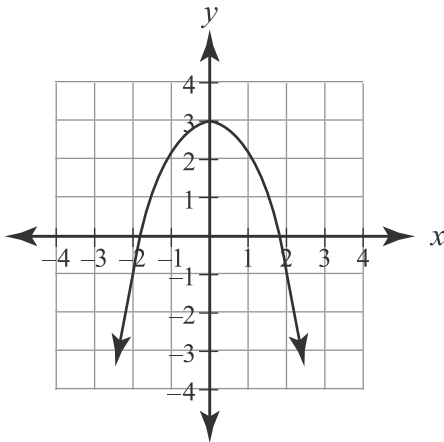


What is the vertex?

- A. (0, 1)
- * B. (2, -3)
- C. (3.75, 0)
- D. (0.25, 0)

PART III End-of-Course Released Algebra I Items

1. What is the vertex of the graph below?



- A. (0, 1)
 * B. (0, 3)
 C. (1, 0)
 D. (3, 0)
2. Which set of ordered pairs is a function?
- * A. $\{(2, -5), (-3, -5), (-4, -5), (-5, 5)\}$
 B. $\{(4, -2), (-1, -3), (0, -6), (4, -1)\}$
 C. $\{(7, 3), (-7, -2), (7, 2), (-6, -1)\}$
 D. $\{(6, 0), (0, 6), (6, 1), (1, 6)\}$
3. What is the value of m in the equation below?

$$2m + 1 = 3m + 4(m - 1)$$

- A. $m = -\frac{3}{5}$
 B. $m = 0$
 C. $m = \frac{2}{9}$
 * D. $m = 1$

4. Eldon's Plumbing Inc. charges \$35 for a service call, plus \$20 per hour of work. An equation is written giving the cost, y , of a service call that lasts x hours. What is the slope of the line given by the equation?

- A. 15
 * B. 20
 C. 35
 D. 55

5. Which expresses the operation below in scientific notation?

0.0016 divided by 400,000

- * A. 4×10^{-9}
 B. 4×10^{-8}
 C. 4×10^{-7}
 D. 4×10^2
6. Central Heights High School requires its students to eat lunch at school. The principal wants to survey the students to find out how many are interested in an open-lunch policy that would allow the students to leave the school grounds. Which sampling method would provide the **most** accurate results?
- A. Survey students in the Honors Calculus class.
 * B. Survey every fifth student leaving the lunch room.
 C. Survey the students in the stands at the next home baseball game.
 D. Survey students at the local mall for one hour immediately after school.

PART III End-of-Course Released Algebra I Items

7. In a vacuum chamber on Earth, the equation $d = 4.9t^2$ gives the distance, d , in meters, that an object will drop in t seconds. To the nearest tenth of a second, how long will it take an object to drop 6 meters?

- * A. 1.1 seconds
- B. 1.2 seconds
- C. 4.9 seconds
- D. 176.4 seconds

8. Henry read the newspaper headline below and decided that he should start drinking coffee because he will then get a job.

Survey Shows 94% of Coffee Drinkers Are Employed

Which statement is true about Henry's reasoning?

- A. Henry is completely correct.
- * B. Henry is confusing correlation with causation.
- C. Henry has it backwards; if he gets a job, then he will drink coffee.
- D. Henry will only be likely to get a job because only 94% are employed.

9. Given the function $f(x) = 2x + 7$, what is $f(1)$?

- A. $-\frac{7}{2}$
- B. -3
- * C. 9
- D. 10

10. Which value is in the solution set of $|x| - 2 \leq 3$?

- A. $x = -9$
- B. $x = -6$
- * C. $x = 0$
- D. $x = 7$

11. Ten students were asked by their instructor to record the number of hours they spent studying for a given exam from the time the exam was announced in class. The data values, in hours, were recorded below.

12 15 8 9 14 8 17 14 8 15

The median number of hours spent studying for this sample is 13. The instructor forgot to record two other students' study time. He found out that one student studied for 11 hours and the other student studied for 16 hours. What is now the **correct** median?

- A. 11
- B. 12
- * C. 13
- D. 14

12. Evaluate the expression below, if $a = 19$, $b = 4$, and $c = 2$.

$$c + (3b)b + c(a - 6)$$

- A. 28
- * B. 76
- C. 92
- D. 676

PART III End-of-Course Released Algebra I Items

13. What is the simplified form of the fraction below?

$$\frac{5}{\sqrt{3}}$$

- A. $\frac{\sqrt{15}}{3}$
- B. $\sqrt{5}$
- C. $\frac{5}{\sqrt{15}}$
- * D. $\frac{5\sqrt{3}}{3}$

14. In an electrical transformer, the voltage is directly proportional to the number of turns on the coil. If 100 volts comes from 60 turns, what would be the voltage produced by 55 turns?

- A. 1.67 volts
- * B. 91.67 volts
- C. 95.00 volts
- D. $109.\overline{09}$ volts

15. Which recursive formula shows how to determine the next three terms in the sequence below?

3, 6, 9, 12, 15, _____, _____, _____

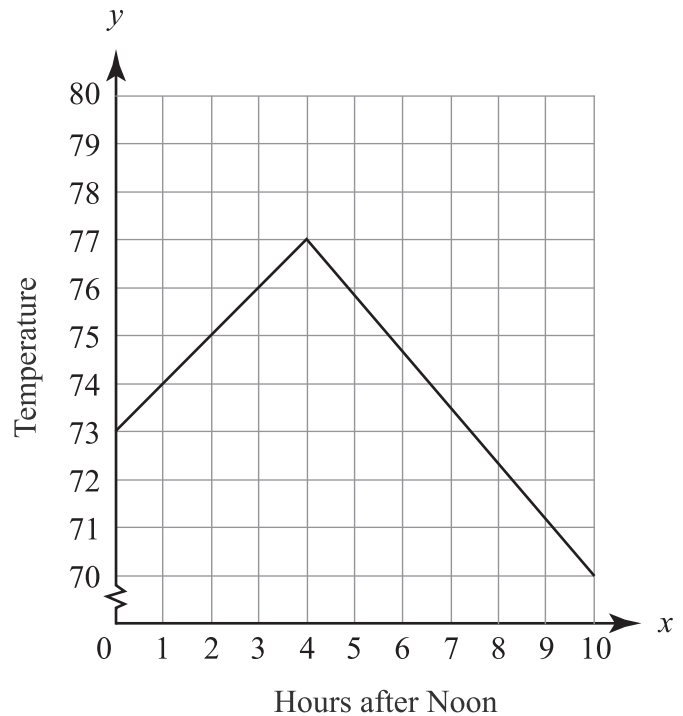
- * A. $a_1 = 3, a_n = a_{n-1} + 3$
- B. $a_1 = 6, a_n = a_{n-1} + 6$
- C. $a_1 = 9, a_n = a_{n-1} + 9$
- D. $a_1 = 12, a_n = a_{n-1} + 12$

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

$$(4\sqrt{6})(\sqrt{3})$$

- A. 12
- B. 27
- C. $7\sqrt{2}$
- * D. $12\sqrt{2}$

17. Which statement is true for the graph below?



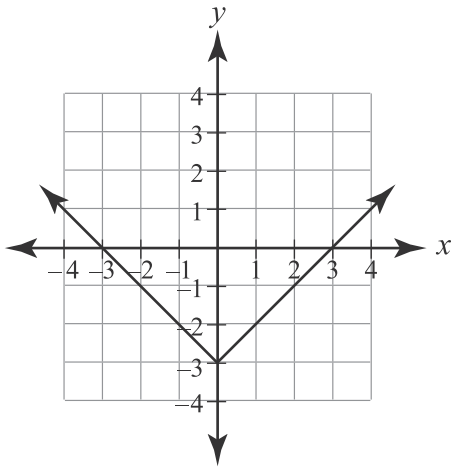
- A. The hours are the dependent variable.
- * B. The hours are the independent variable.
- C. The temperature is the independent variable.
- D. Either temperature or hours can be the dependent variable.

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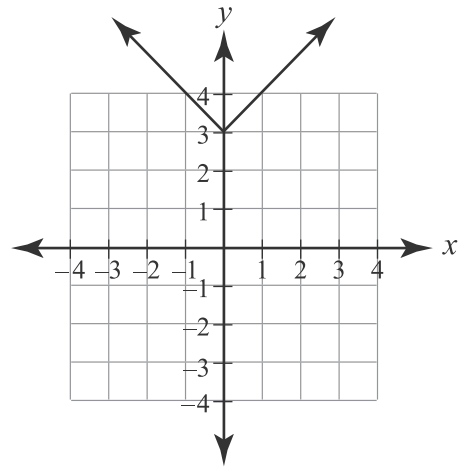
18. Which is the graph of the equation below?

$$y = |x| - 3$$

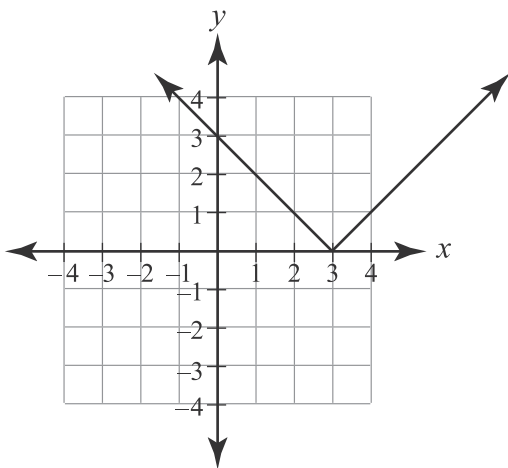
* A.



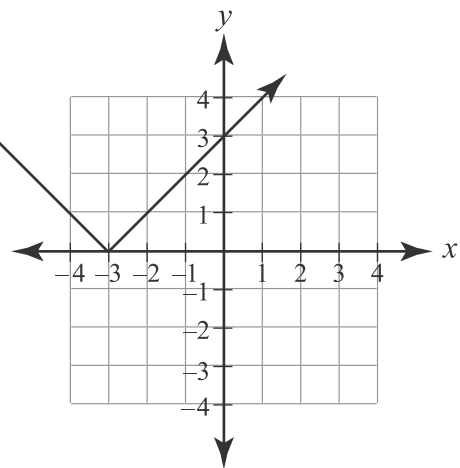
B.



C.



D.



19. What is the solution to the system of equations below?

$$\begin{aligned} 3x + 2y &= 6 \\ 3x + 6y &= 18 \end{aligned}$$

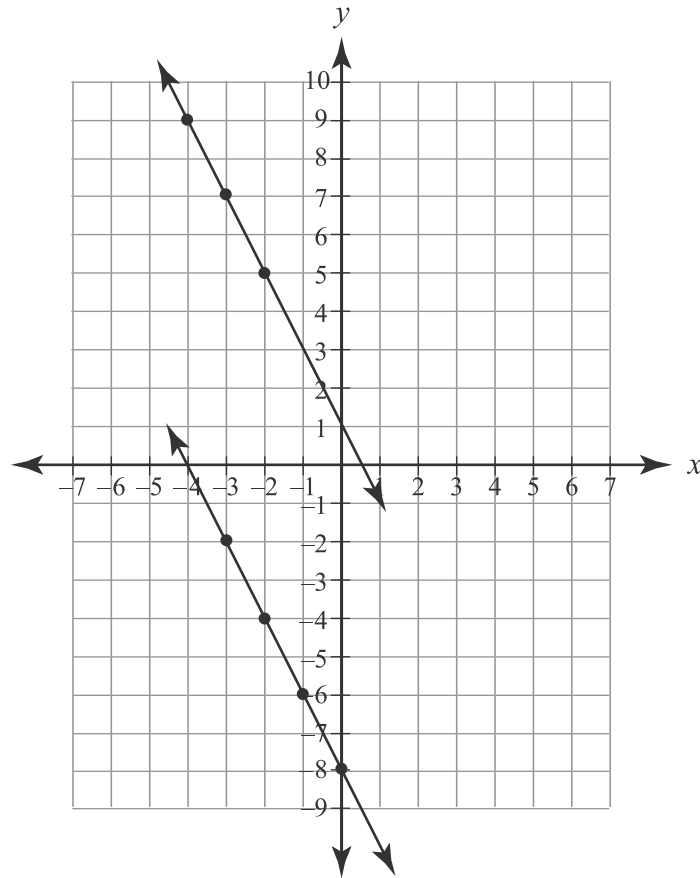
- * A. (0, 3)
- B. (0, 6)
- C. (1, 2)
- D. (3, 0)

20. Which expression is undefined?

- A. 4^0
- B. $\frac{x}{4}$
- C. $\frac{0}{4}$
- * D. $\frac{4}{0}$

PART III End-of-Course Released Algebra I Items

21. What do the two lines in the graph below have in common?



- * A. the same slope
- B. the same y -intercepts
- C. the same solution sets
- D. the same tables of data

22. What is the factored form of the expression below?

$$9x^2 - 16$$

- A. $(9x - 4)(x + 4)$
- B. $(3x - 4)(3x - 4)$
- * C. $(3x + 4)(3x - 4)$
- D. $(3x - 16)(3x + 1)$

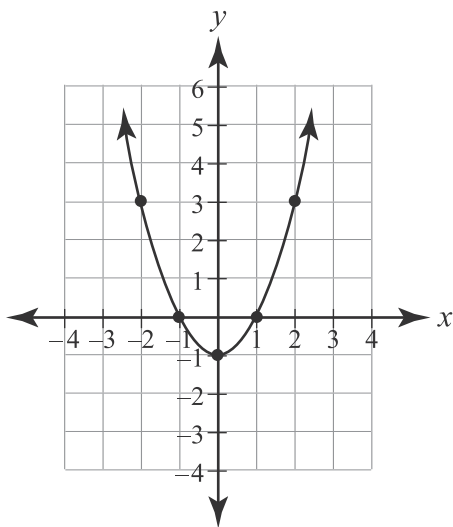
23. Which **correctly** solves the equation $ab + c = d$ for b ?

- A. $b = d - a - c$
- B. $b = a(d - c)$
- C. $b = \frac{d}{a} - c$
- * D. $b = \frac{d - c}{a}$

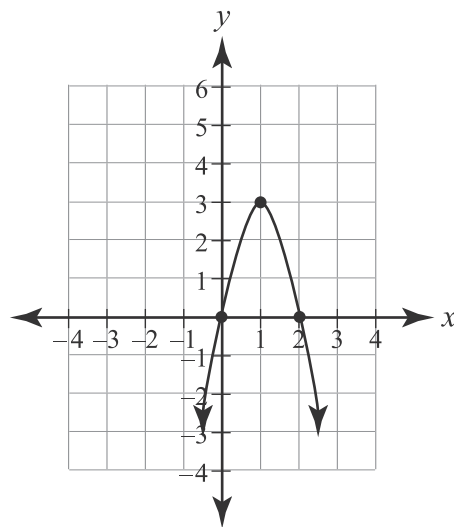
PART III End-of-Course Released Algebra I Items

24. Which graph has a vertex of (0, 1) and no zeros?

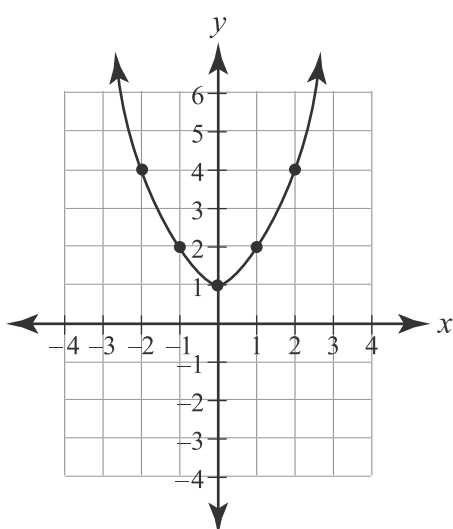
A.



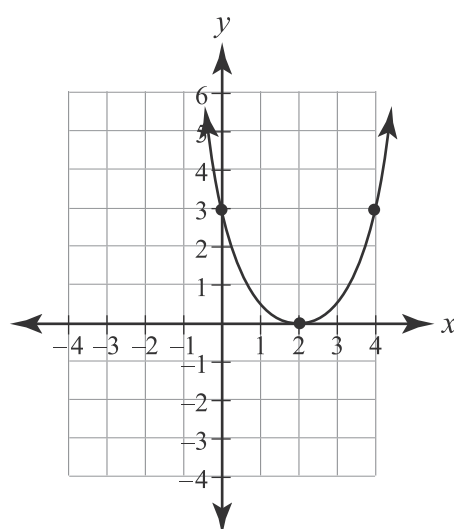
B.



*C.



D.



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

$$\frac{14x^2(x+3x^5)}{7x^2}, \text{ if } x \neq 0$$

- A. $x + 3x^5$
- *B. $2x + 6x^5$
- C. $7x + 21x^5$
- D. $2x^3 + 42x^7$

26. What is the domain of the relation below?

$$\{(3, 8), (4, 10), (5, 12), (6, 14)\}$$

- A. {3}
- B. {6}
- *C. {3, 4, 5, 6}
- D. {8, 10, 12, 14}

PART III End-of-Course Released Algebra I Items

27. The management of a company was examining the salaries of their employees. Below is a cumulative frequency histogram of the salaries of all 25 employees.



Which statement **best** represents the information in the histogram?

- A. The salaries are evenly distributed.
- B. All employees make \$70,000 or less.
- C. Everyone makes pretty much the same salary.
- * D. Most of the salaries fall between \$40,000 and \$59,000.

28. Mrs. Walker earned \$212 for working $8\frac{1}{2}$ hours. At this rate, how much should she expect to earn for working 16 hours? Round your answer to the nearest whole dollar.

- A. \$120
- B. \$136
- * C. \$399
- D. \$424

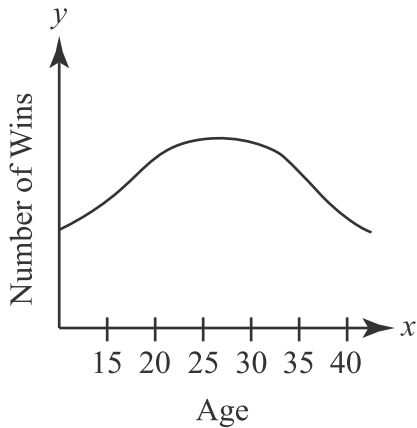
29. Drew has \$72 for new school clothes. He spends \$28 on a pair of jeans. Which inequality indicates how much more Drew can spend on school clothes and stay within his limit?

- A. $28 + 72 \leq s$
- * B. $28 + s \leq 72$
- C. $28 + 72 \geq s$
- D. $s \leq 72$

PART III End-of-Course Released Algebra I Items

30. What can be determined from the graph below?

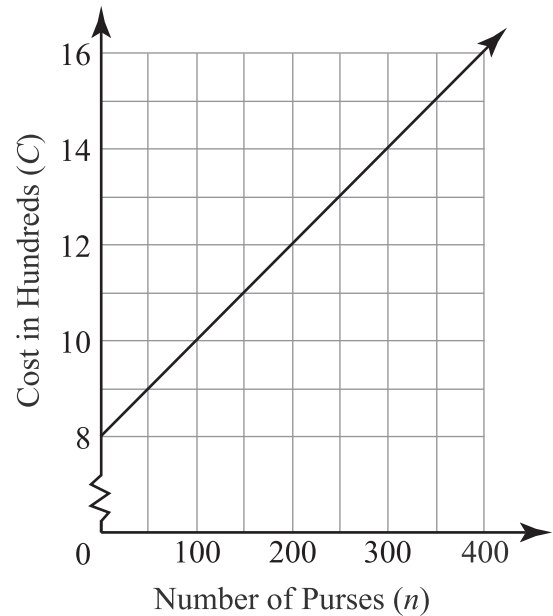
Number of Wins vs Player Age



- A. All players aged 35 will win the most matches.
 - B. The older a player is, the more likely he is to win.
 - C. Players in their early 20s win more than players in their early 30s.
 - * D. Players in their late 20s win more than players in their late teens.
31. A bag of marbles contains 6 red, 6 white, and 3 blue marbles. The first marble that is drawn out of the bag is white. Without replacing it, a second marble is drawn and it is blue. Neither marble is replaced. What is the probability that the third marble drawn will be red?

- A. $\frac{4}{125}$
- B. $\frac{1}{6}$
- C. $\frac{6}{15}$
- * D. $\frac{6}{13}$

32. The cost, C , per week of producing n purses for the Chic Girl Purse Company is graphed below.



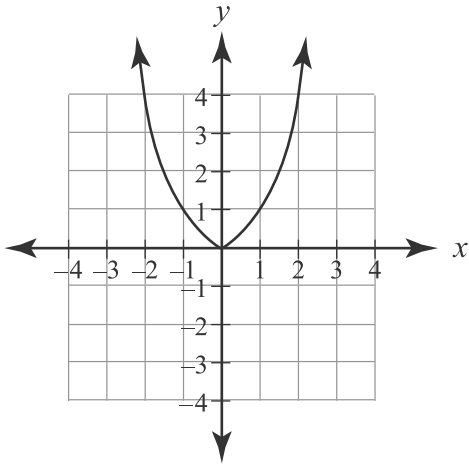
What is the cost of producing 275 purses?

- A. \$1,200
- B. \$1,300
- * C. \$1,350
- D. \$1,400

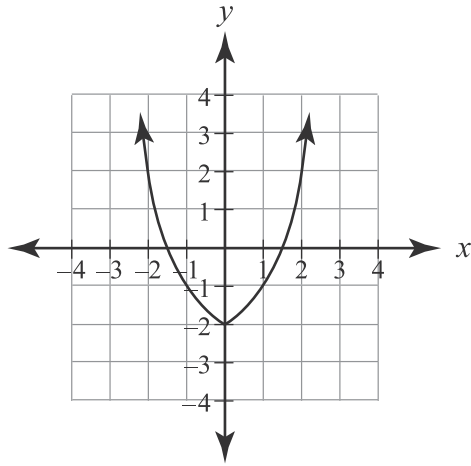
PART III End-of-Course Released Algebra I Items

33. Which is the graph of $f(x) = x^2 - 2$ with an upward vertical shift of 2 units?

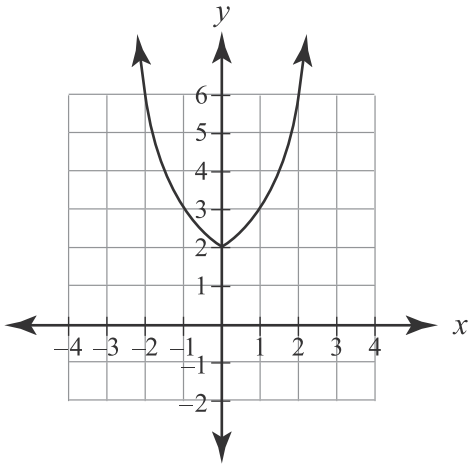
* A.



B.



C.



D.

