

Student Name:

Algebra I

Practice Test Booklet



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Algebra I

DIRECTIONS

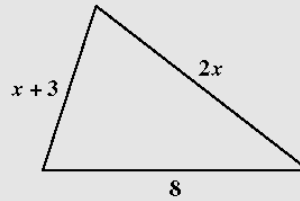
Read each problem carefully. Then work the problem and find your answer among the answer choices.

SAMPLE A

What value of x makes the equation $2x + 1 = 7$ true?

- A 2
- B 3
- C 4
- D 5

SAMPLE B



Which of these is equivalent to the perimeter of this triangle?

- F $2x^2 + 8$
- G $2x^2 + 11$
- H $3x + 8$
- J $3x + 11$

1 Which of the following is equivalent to the algebraic expression below?

$$(8xy^2 + 6x^2y + 17y^2) - (3x^2y - 6y + 3y^2)$$

- A $3x^2y + 8xy^2 + 14y^2 + 6y$
- B $5x^2y^2 + 6x^2y - 14y^2 + 6y$
- C $11xy^2 + 20y^2 - 6y$
- D $17xy^2 + 20y^2 - 6y$

2 Which of the following linear equations when graphed on a coordinate grid has the steepest slope?

- A $y = \frac{1}{3}x - 2$
- B $y = \frac{5}{2}x - 1$
- C $y = 3x + \frac{1}{4}$
- D $y = 4x + \frac{3}{5}$

-
- 3 The matrices below show the different numbers of students who participated in three of the sports at two high schools.

North Brook High School			Memorial High School		
	Boys	Girls		Boys	Girls
Basketball	31	28	Basketball	27	30
Soccer	23	29	Soccer	32	30
Tennis	27	15	Tennis	32	28

Which of the following correctly represents the sum of the numbers of students who participated in the three sports at these two high schools?

A

	Boys	Girls
Basketball	59	57
Soccer	52	62
Tennis	42	60

C

	Boys	Girls
Basketball	58	58
Soccer	55	59
Tennis	59	43

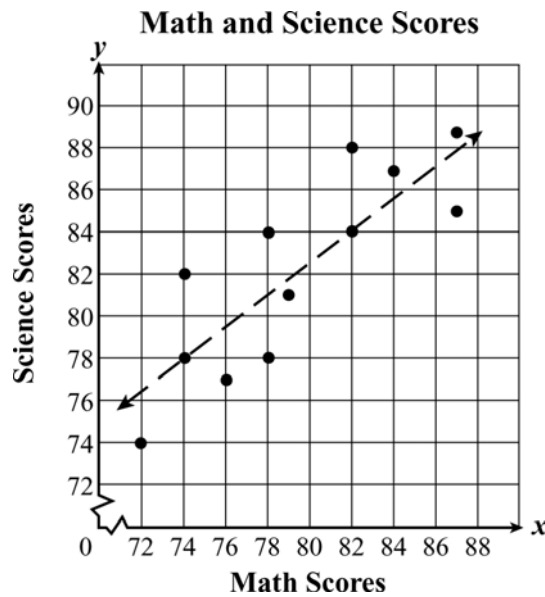
B

	Boys	Girls
Basketball	4	2
Soccer	9	1
Tennis	5	13

D

	Boys	Girls
Basketball	3	3
Soccer	6	2
Tennis	12	4

-
- 4 The scatter plot below compares the math and science scores of twelve students in one classroom.



Based on the trend shown in the line-of-best fit, which is closest to the expected grade of a student that scores an 86 in math?

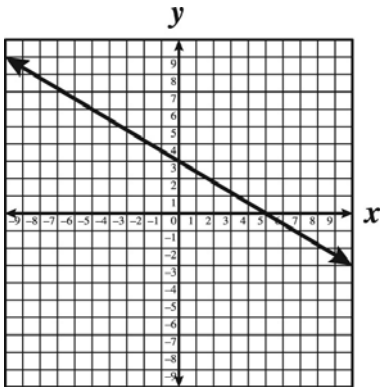
- A 82
 - B 85
 - C 87
 - D 89
-
- 5 Conner went to visit his friend in Houston. He drove at a constant rate of 55 miles per hour, and it took him 3 hours to arrive. Which is closest to the number of miles Conner drove? (Note: $d = rt$)

- A 545
- B 165
- C 58
- D 16.5

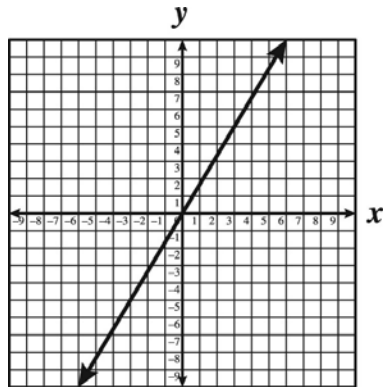
6 Which graph best represents a line perpendicular to the line with the equation

$$y = \frac{3}{5}x - 2?$$

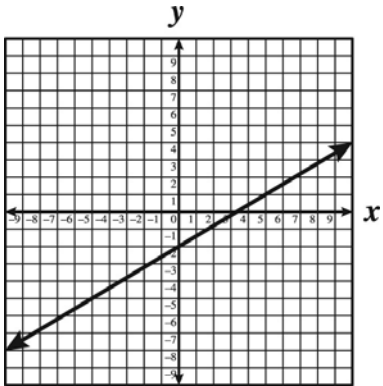
A



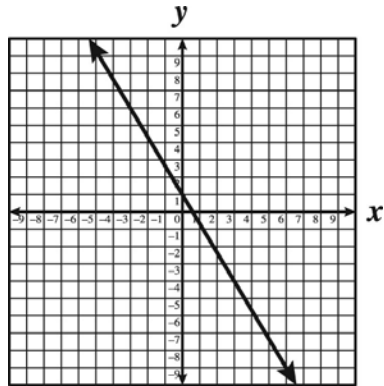
C



B



D



7 Kelly solved the equation below using the steps shown.

Given: $3(x - 4) - 4 = 1$

Step 1: $3x - 12 - 4 = 1$

Step 2: $3x - 16 = 1$

Step 3: $3x = -15$

Step 4: $x = -5$

Which step contains Kelly's first mistake?

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

8 Which of these is equivalent to the expression below when $x = -3$?

$$x^2 - 2x + 1$$

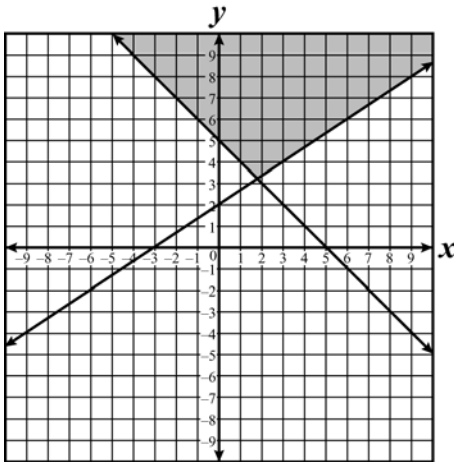
- A -14
- B -2
- C 4
- D 16

9 Which graph best represents the solution to the system of linear inequalities below?

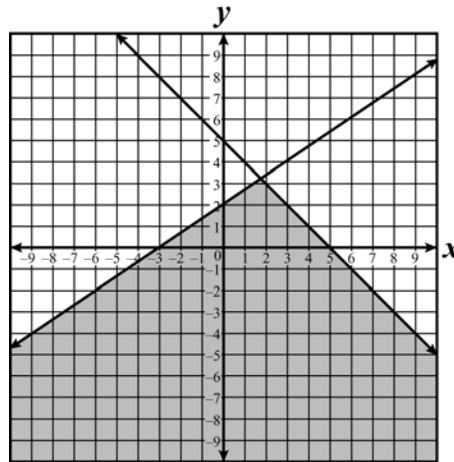
$$x + y \leq 5$$

$$-2x + 3y \geq 6$$

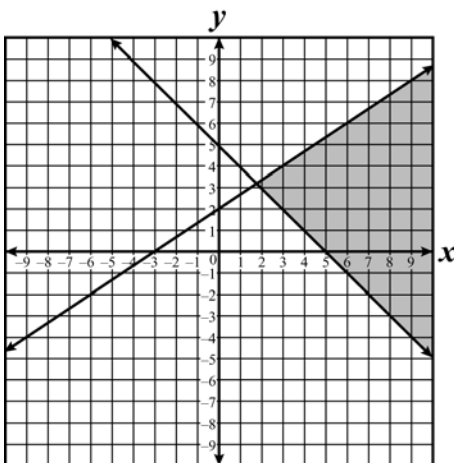
A



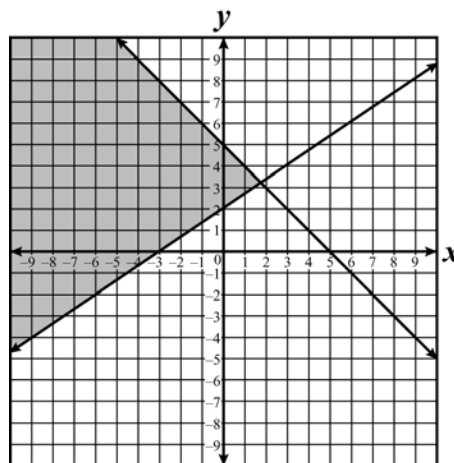
C



B



D



-
- 10** Kimberly wants to earn an average grade of at least 92 for her five algebra exams. The scores for her first four algebra exams are 88, 93, 85, and 98. Which inequality can be used to determine x , the grade Kimberly needs to earn on her fifth exam to have an average grade of at least 92?

A $\frac{88 + 93 + 85 + 98 + x}{5} < 92$

B $\frac{88 + 93 + 85 + 98 + x}{5} \geq 92$

C $\frac{88 + 93 + 85 + 98}{4} + x > 92$

D $\frac{88 + 93 + 85 + 98}{4} + x \leq 92$

-
- 11** Which of these is prime over the set of rational numbers?

A $x^2 + 7x + 10$

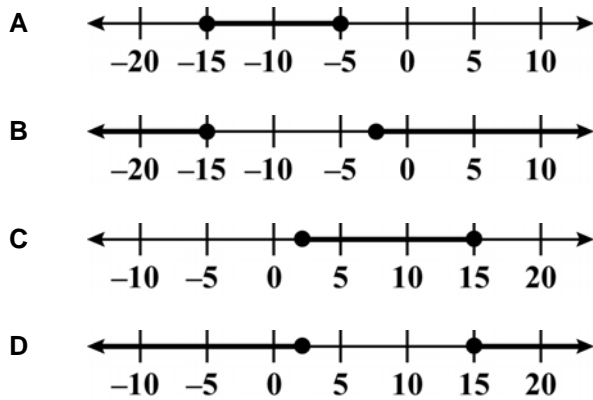
B $x^2 + 8x + 15$

C $x^2 + 9x + 14$

D $x^2 + 10x + 11$

-
- 12 Which graph best represents the solution set to the inequality shown below?

$$\left| \frac{4}{5}x + 7 \right| \geq 5$$



-
- 13 The area of a rectangular field is represented by $(2k^2 + 27k + 70)$ feet, and the width of the field is represented by $(k + 10)$ feet. Which expression represents the length, in feet, of the rectangular field?

- A $k + 60$
B $2k + 7$
C $2k + 70$
D $2k^2 + 26k + 60$

14 Which of the following is equivalent to $\frac{2x^2y + xy + 2xy^2}{xy}$?

- A 4
- B $3xy + 2x$
- C $2x + 1 + 2y$
- D $2x^3y^2 + x^2y^2 + 2x^2y^3$

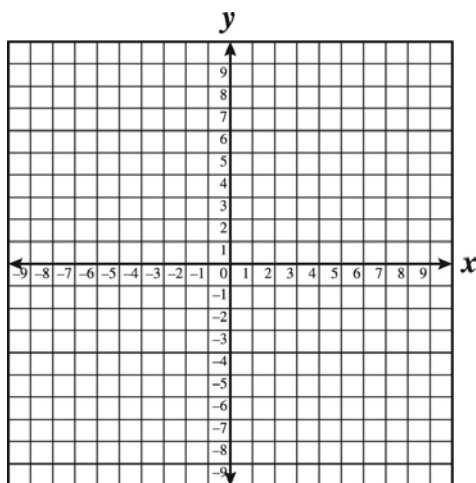
15 Matrix B is the result when matrix A is multiplied by a scalar.

$$A = \begin{bmatrix} 6 & -45 \\ 12 & -48 \end{bmatrix} \quad B = \begin{bmatrix} -4 & 30 \\ -8 & y \end{bmatrix}$$

What should be the value of y in matrix B ?

- A 32
- B 72
- C -32
- D -72

-
- 16 How does the graph of $y = x - 5$ compare to the graph of $y = \frac{4}{3}x + 1$?



- A The graph of $y = x - 5$ is steeper and intersects the x -axis at -5 .
- B The graph of $y = x - 5$ is steeper and intersects the y -axis at -5 .
- C The graph of $y = \frac{4}{3}x + 1$ is steeper and intersects the x -axis at 1 .
- D The graph of $y = \frac{4}{3}x + 1$ is steeper and intersects the y -axis at 1 .

-
- 17 Which of these pairs of equations describes lines that are perpendicular?

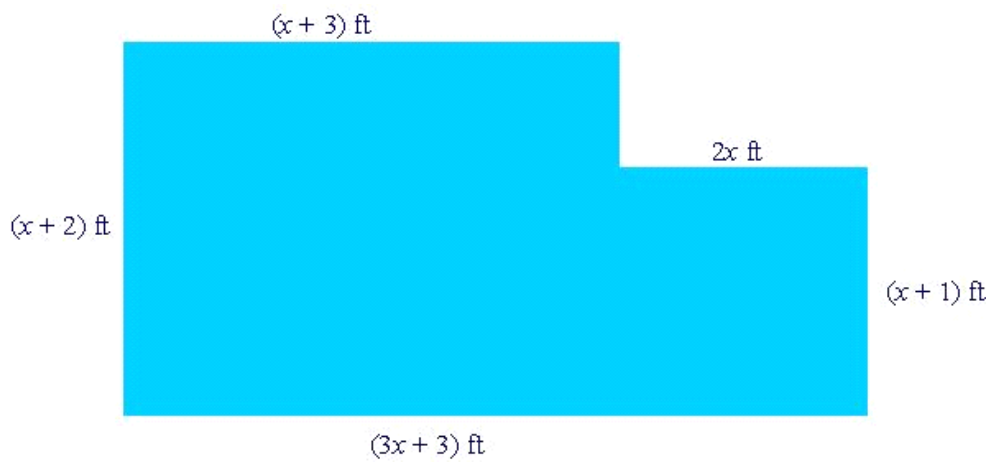
- A $y = -\frac{4}{5}x - 3$ and $y = -\frac{5}{4}x + 3$
- B $y = \frac{2}{7}x - 3$ and $y = -\frac{7}{2}x - 4$
- C $y = 3x + 9$ and $y = 3x - 15$
- D $y = \frac{5}{2}x - 4$ and $y = \frac{2}{5}x + 2$

18 Which of the following is equivalent to the expression shown below?

$$(6b + 5c - 9) - 4(2b - c - 1)$$

- A $-2b + c - 13$
- B $-2b + 9c - 5$
- C $4b + 9c - 10$
- D $4b + 6c - 8$

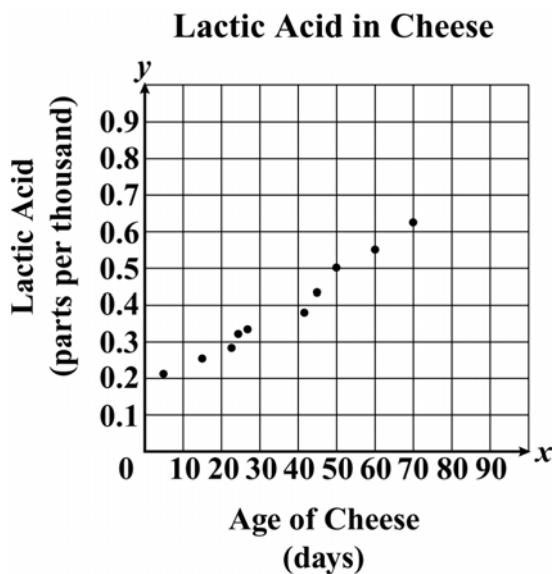
19 The figure below is made up of two rectangles.



What is the total area, in square feet, of the figure?

- A $10x + 7$
- B $3x^2 + 8x + 5$
- C $3x^2 + 7x + 6$
- D $10x^2 + 6$

-
- 20 The scatter plot below shows data from an experiment that tested the amount of lactic acid present in aging cheese.



Which best describes the relationship between the age of the cheese and the amount of lactic acid present in the cheese, as shown in the scatter plot?

- A There is no correlation.
 - B There is a positive correlation.
 - C There is a negative correlation.
 - D There is a non-linear correlation.
-
- 21 Which of these is the solution set for the equation $|x - 7| + 5 = 17$?

- A $\{-19, 5\}$
- B $\{-5, 5\}$
- C $\{-5, 15\}$
- D $\{-5, 19\}$

22 Which of the following trinomials is prime over the set of rational numbers?

- A $x^2 - 9x + 12$
- B $x^2 - x - 12$
- C $x^2 + 4x - 12$
- D $x^2 + 7x + 12$

23 Which of the following is equivalent to the expression shown below?

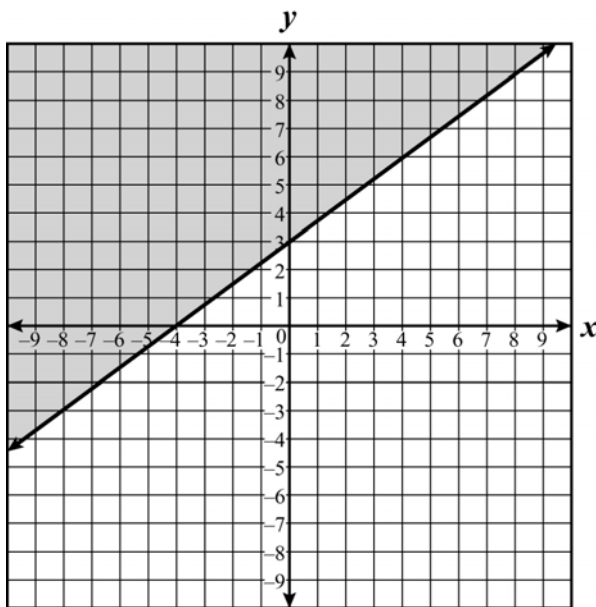
$$\frac{24x^{-3}y^4z^2}{36x^{-2}y^{-7}z^5}$$

- A $\frac{y^{11}}{12xz^7}$
- B $\frac{x^5}{12y^3z^7}$
- C $\frac{2y^{11}}{3xz^3}$
- D $\frac{2x}{3y^3z^3}$

-
- 24 If $\frac{x}{7} - \frac{y}{2} = 1$, which statement best explains how the value of y changes each time x is increased by 1 unit?

- A The value of y increases $\frac{7}{2}$ units.
- B The value of y increases $\frac{2}{7}$ units.
- C The value of y decreases $\frac{7}{2}$ units.
- D The value of y decreases $\frac{2}{7}$ units.

-
- 25 Which inequality best represents the graph shown below?

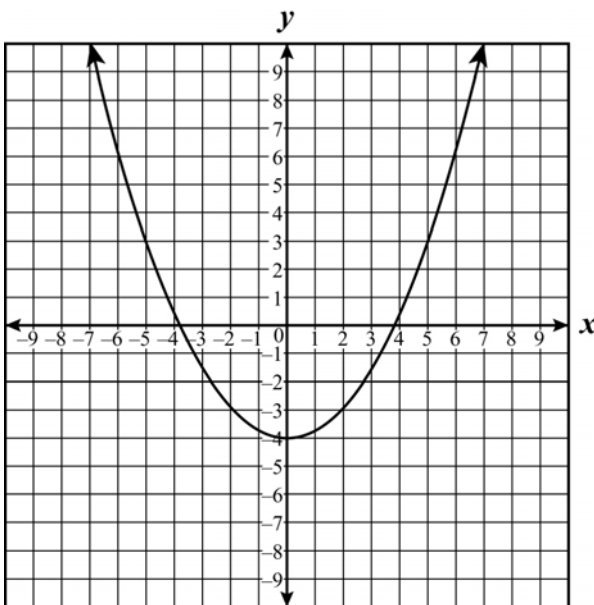


- A $3x - 4y \leq -12$
- B $3x + 4y \geq -12$
- C $4x + 3y \geq -12$
- D $4x - 3y \leq -12$

-
- 26 The endpoints of a line segment graphed on a coordinate plane are $(8, 5)$ and $(10, 1)$.
What are the coordinates of the midpoint of the line segment?

- A $(2, 4)$
- B $(9, 3)$
- C $(2, 8)$
- D $(4, 16)$

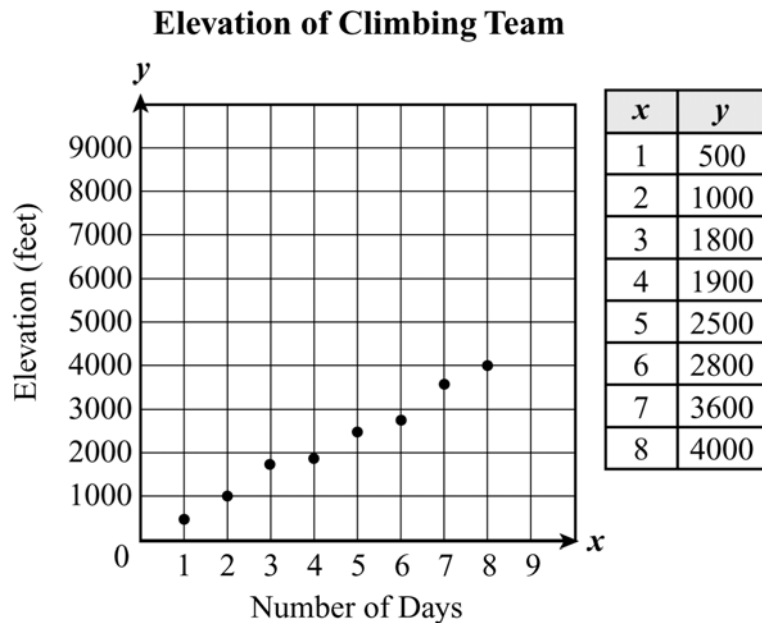
-
- 27 The vertex of the quadratic function shown on the grid below is at $(0, -4)$.



If the graph of this function is translated 2 units down, which of the following best describes the range of the resulting graph?

- A All numbers greater than or equal to -6
- B All numbers less than or equal to -6
- C All numbers greater than or equal to -2
- D All real numbers

- 28 The scatter plot below shows the elevation of a mountain-climbing team during an 8-day trip.



Which equation is closest to the line-of-best fit for this data?

- A $y = 30x + 500$
B $y = 60x + 490$
C $y = 490x + 60$
D $y = 400x + 38$
-
- 29 Which function of x contains all the points shown in the table below?

x	y
-4	5
-1	-4
0	-3
2	5

- A $y = x^2 + 2x - 3$
B $y = x^2 + x - 7$
C $y = 2x^2 + 6x - 3$
D $y = 2x^2 + 3x - 4$

30 In the equation, y is a function of x .

$$y = 4x - 3$$

If the value of x is increased by 1, how will the value of y change?

- A** The value of y will decrease by 4.
- B** The value of y will increase by 4.
- C** The value of y will decrease by 1.
- D** The value of y will increase by 1.

31 What is the range of the function

$$f(x) = \frac{1}{2}x^2 + 4$$

when the domain is $\{-2, 0, 4\}$?

- A** $\{2, 4, 10\}$
- B** $\{3, 4, 6\}$
- C** $\{4, 6, 12\}$
- D** $\{4, 6, 8\}$

32 Matrices L and M are shown below.

$$L = \begin{bmatrix} 30 & -70 \\ 20 & 60 \end{bmatrix} \qquad M = \begin{bmatrix} 90 & 20 \\ -100 & 50 \end{bmatrix}$$

Which of the following represents $L - M$?

A $\begin{bmatrix} -60 & -50 \\ -80 & 10 \end{bmatrix}$

B $\begin{bmatrix} -60 & -50 \\ 120 & 110 \end{bmatrix}$

C $\begin{bmatrix} 120 & -50 \\ -80 & 110 \end{bmatrix}$

D $\begin{bmatrix} -60 & -90 \\ 120 & 10 \end{bmatrix}$

33 What is the solution set of the equation below?

$$x^2 - 3x - 4 = 0$$

A $\{-1, 4\}$

B $\{1, 4\}$

C $\{-1, -4\}$

D $\{1, -4\}$

-
- 34 Antonio threw a ball with an upward velocity of 6 meters per second from a height of 8 meters. The formula $h = -4.9t^2 + 6t + 8$ describes this situation. Which is closest to the time it will take the ball to hit the ground ($h = 0$)?

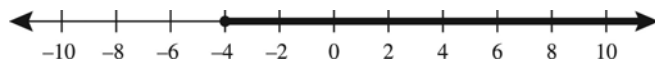
- A 0.80 seconds
- B 2.03 seconds
- C 4.06 seconds
- D 7.88 seconds

-
- 35 What is the factored form of the expression below?

$$5x^2 + 13x - 6$$

- A $(5x + 1)(x - 6)$
- B $(5x - 2)(x + 3)$
- C $(5x + 2)(x - 3)$
- D $(5x - 1)(x + 6)$

-
- 36 The solution of an inequality is graphed on the number line below.



Which inequality's solution is NOT represented by this graph?

- A $-x - 4 \leq 0$
- B $-x + 6 \leq 10$
- C $x + 4 \geq 0$
- D $x + 6 \geq -2$

37 Which of the following linear equations, when graphed on the same coordinate grid, is closest to being horizontal?

A $y = \frac{3}{8}x$

B $y = \frac{1}{2}x$

C $y = x$

D $y = 2x$

38 A boat leaves a shipping dock and travels 72 miles due west and then 99 miles due north. Which is closest to the straight-line distance between the boat and the shipping dock?

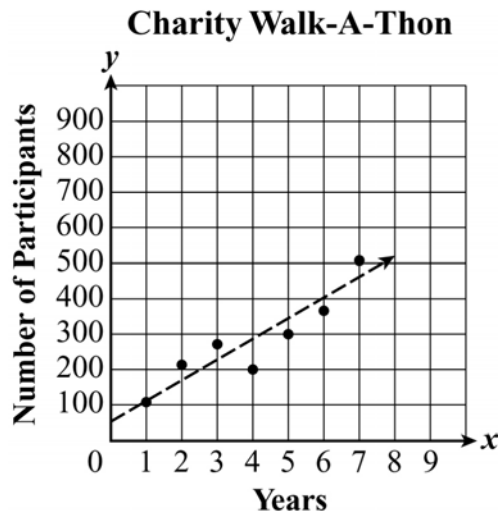
A 27 miles

B 68 miles

C 122 miles

D 170 miles

-
- 39 The number of participants in a charity walk-a-thon has increased over the past 7 years, as shown in the scatter plot below.



Based on the linear model, which is the best prediction for the number of participants during the 9th year of this charity walk-a-thon?

- A 450
 - B 500
 - C 525
 - D 600
-
- 40 Which of these is equivalent to $4x - 3(x + 2)$?

- A $x + 2$
- B $x - 2$
- C $x + 6$
- D $x - 6$

41 What is the slope of the segment with endpoints at (300, -2) and (500, 6)?

A $\frac{1}{25}$

B $\frac{1}{5}$

C 25

D 50

42 What is the equation of the line that contains the points (-5, 0) and (0, 6)?

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

B $y = \frac{6}{5}x - 5$

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

D $y = \frac{5}{6}x - 5$

43 What values of x , y , z , and w make this matrix equation true?

$$\begin{bmatrix} 4 & 3 \\ -2 & 7 \end{bmatrix} + \begin{bmatrix} x & y \\ z & w \end{bmatrix} = \begin{bmatrix} 5 & -2 \\ 7 & 3 \end{bmatrix}$$

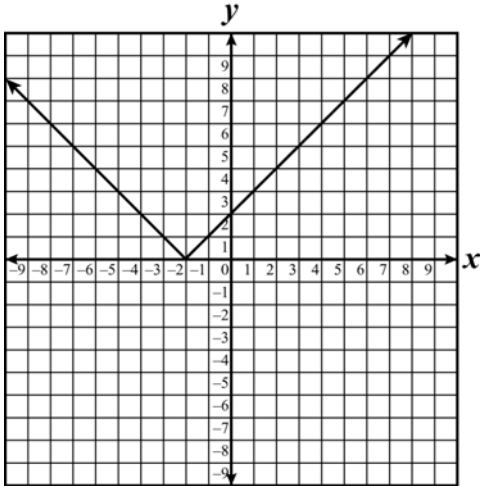
- A** $x = 1, y = -5, z = 9, w = 4$
- B** $x = 1, y = -5, z = 9, w = -4$
- C** $x = 1, y = -1, z = 9, w = -4$
- D** $x = 1, y = -5, z = 5, w = -4$

44 Which expression is equivalent to $2.5(3.1 + n)$?

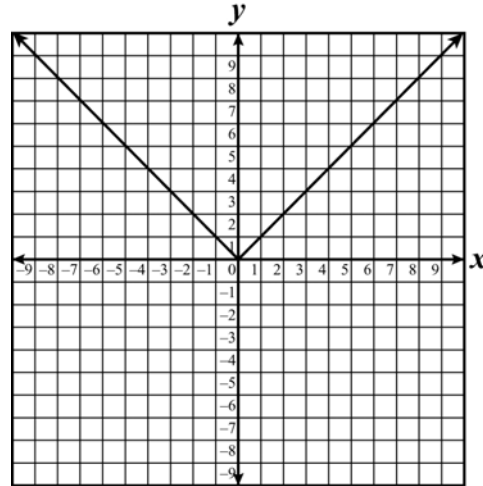
- A** $2.5 + 3.1 + n$
- B** $2.5(3.1) + n$
- C** $2.5 + 3.1 + 2.5n$
- D** $2.5(3.1) + 2.5n$

45 Which best represents the graph of the function of $y = |x| + 2$?

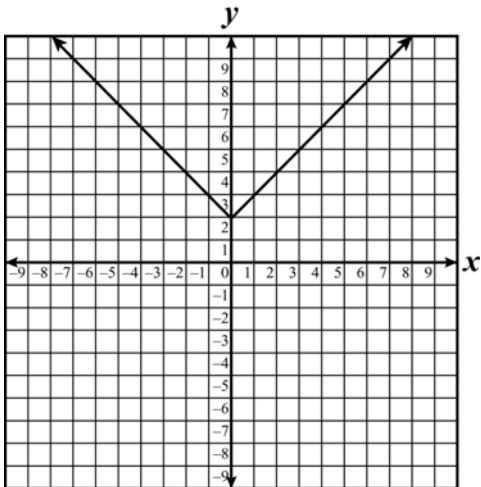
A



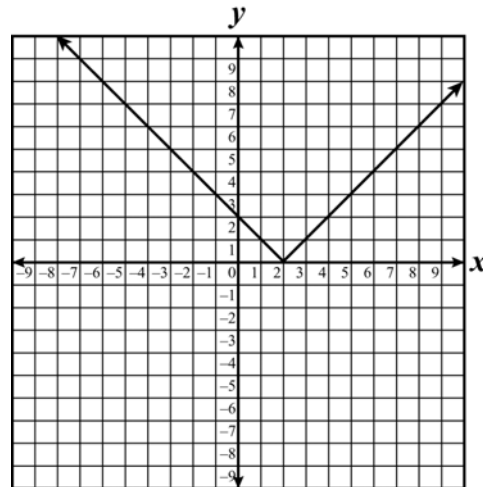
C



B



D



46 Which of these is the equation for the line parallel to $y = \frac{2}{3}x - 7$?

A $y = \frac{3}{2}x - 1$

B $y = -\frac{3}{2}x - 1$

C $y = \frac{2}{3}x - 1$

D $y = -\frac{2}{3}x - 1$

47 The table below shows the approximate melting points and the approximate boiling points, in degrees Celsius, for eight precious metals.

**Boiling and Melting Points
of Precious Metals**

Precious Metal	Melting Point (°C)	Boiling Point (°C)
Platinum	1768	3827
Rhodium	1963	3727
Gold	1064	2800
Palladium	1555	3167
Ruthenium	2250	3900
Silver	962	2210
Iridium	2446	4527
Osmium	2700	5500

Which equation is closest to the line-of-best fit for this data?

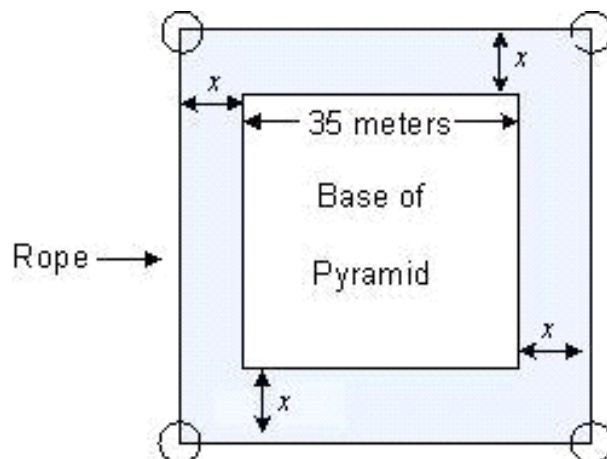
A $y = x + 1000$

B $y = 1.5x + 840$

C $y = 2x + 800$

D $y = 2.5x + 1000$

-
- 48 A museum has a model of a square pyramid. Each side of the base of the pyramid is 35 meters long. A rope is placed x meters away from the base of the model on all four sides when the display is closed, as shown in the diagram.



Which polynomial represents the perimeter, in meters, of the region enclosed by the rope?

- A $4x + 140$
B $8x + 140$
C $x^2 + 70x + 1225$
D $4x^2 + 140x + 1225$
-
- 49 Angelica has a total of 24 postage stamps. These postage stamps cost \$0.39 each or \$0.41 each. If Angelica has x stamps that cost \$0.39 each, which equation can be used to determine c , the total cost of all 24 postage stamps?

- A $c = 0.39x + 0.41(x + 24)$
B $c = 0.41x + 0.39(x + 24)$
C $c = 0.39x + 0.41(24 - x)$
D $c = 0.41x + 0.39(24 - x)$

-
- 50 Tracy graphed the following two linear equations on a coordinate grid.

$$2x + 3y = 7$$
$$4x + 6y = 14$$

Which of these best describes the graph of the two linear equations?

- A The two lines are parallel.
- B The two lines are perpendicular.
- C The two lines have the same graph.
- D The two lines intersect at only one point.

-
- 51 After Zach made a bicycle trip in Colorado, he used the equation $y = \frac{1}{20}x + 5000$ to model y , his altitude in feet, in terms of x , the number of feet he bicycled. Which best describes the rate of change in altitude as he traveled?

- A For every 20 feet he traveled, the altitude increased 1 foot.
- B For every 5000 feet he traveled, the altitude increased $\frac{1}{20}$ foot.
- C For every 20 feet he traveled, the altitude increased 250 feet.
- D For every foot he traveled, the altitude increased 20 feet.

52 The area of a circular garden is approximately 804 square feet. Which is closest to the radius of the garden?

- A 16 feet
- B 32 feet
- C 28 feet
- D 128 feet

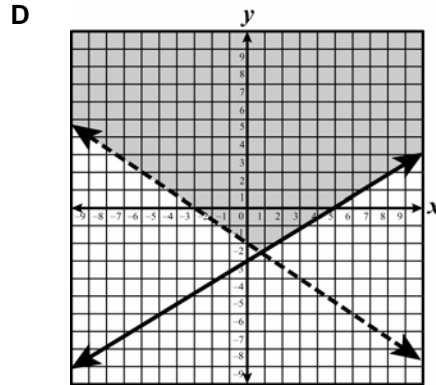
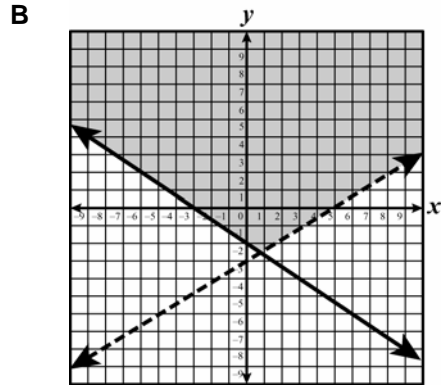
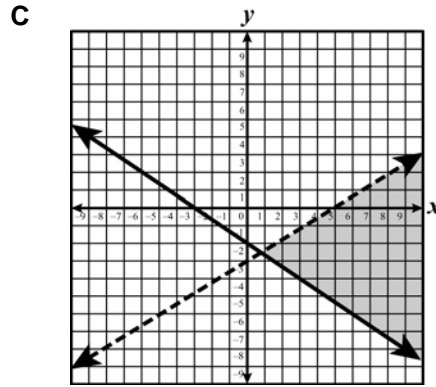
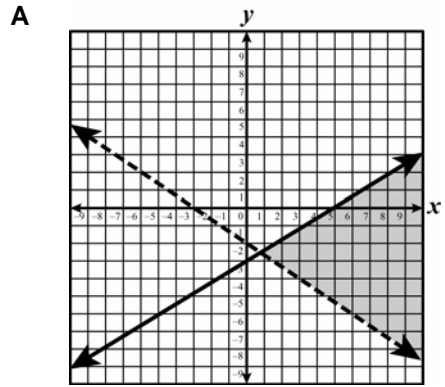
53 Lucinda knew that the area of a circular table was about 19.625 square feet. When she made a circular cloth for the table, she decided to double the radius to allow for overhang. Which is closest to the area of the tablecloth?

- A 39.25 square feet
- B 49.06 square feet
- C 78.50 square feet
- D 196.25 square feet

54 Which of the following graphs best represents the solution set to the system of linear inequalities shown below?

$$3x - 5y \leq 15$$

$$2x + 3y > -6$$



-
- 55 The amount of fat and the percent of calories from fat for several hamburgers is shown in the table below.

**Fat in Fast-Food
Hamburgers**

Fat	Percent of Calories From Fat
39	52
32	49
33	53
34	52
21	44
19	42
32	53
23	52

Which equation is closest to the line-of-best fit for this data?

- A $y = 0.5x + 36$
- B $y = 0.5x - 36$
- C $y = 5x + 42$
- D $y = 5x - 42$

-
- 56 Which is equivalent to the algebraic expression shown below?

$$(9r^2s - 3r + 11s^2) - (2r^2s + 2r - 5s^2)$$

- A $11r^2s - 5r + 16s^2$
- B $11r^2s - r + 6s^2$
- C $7r^2s - r + 6s^2$
- D $7r^2s - 5r + 16s^2$

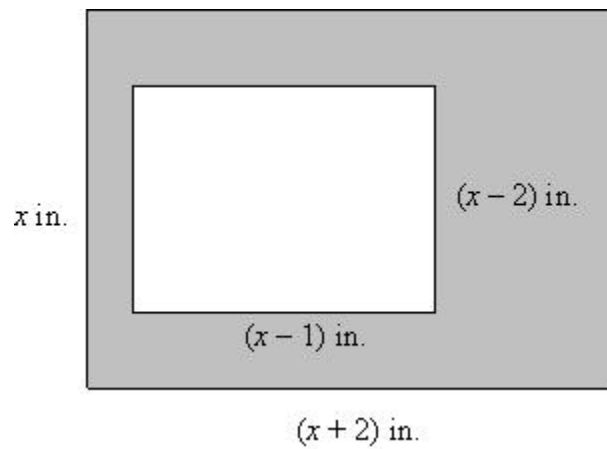
57 At the Burger Palace, 2 hamburgers and 1 small order of fries cost \$6.09. The Clarkes ordered 5 hamburgers and 5 small orders of fries and paid \$17.95. What was the cost of 1 small order of fries?

- A \$2.50
- B \$1.49
- C \$1.09
- D \$0.95

58 A graph of a linear function has a slope of $-\frac{1}{3}$ and contains the point (0, 2). Which of these represents the equation of this function?

- A $y = -\frac{1}{3}x - 2$
- B $y = -\frac{1}{3}x + 2$
- C $y = \frac{1}{3}x + 2$
- D $y = \frac{1}{3}x$

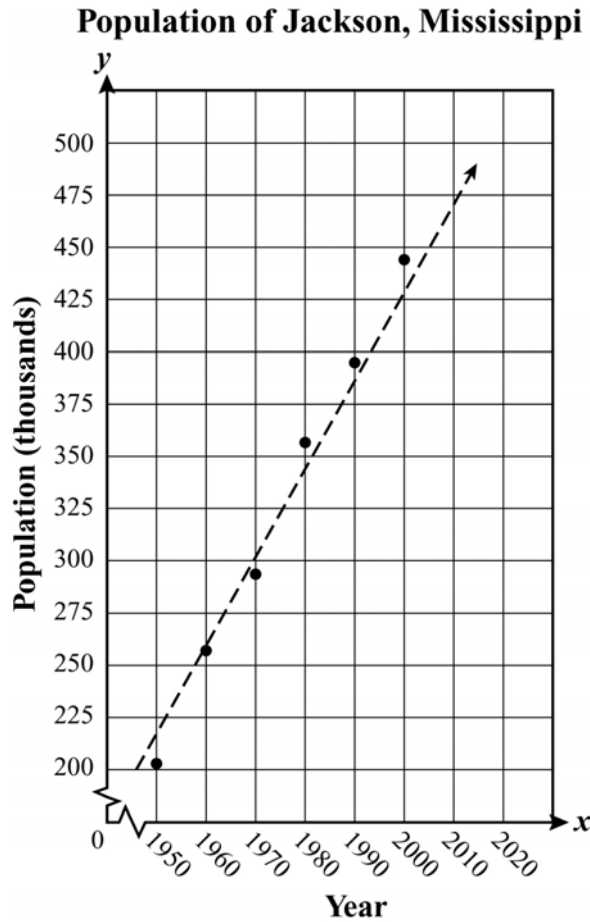
59 Jorge drew a rectangle inside a larger rectangle, as shown below.



If x represents any number greater than 2, which of the following expressions represents the area, in square inches, of the shaded region?

- A $8x - 2$
- B $5x - 2$
- C $4x - 1$
- D $3x + 4$

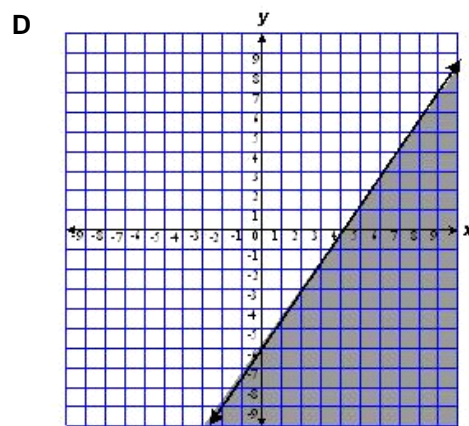
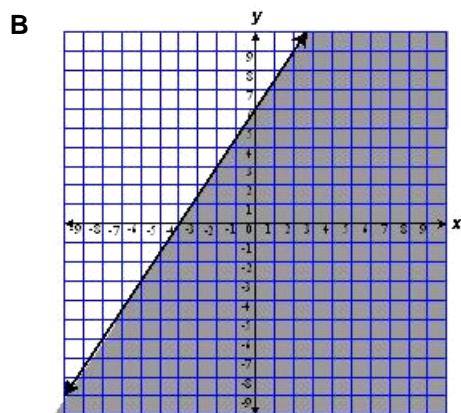
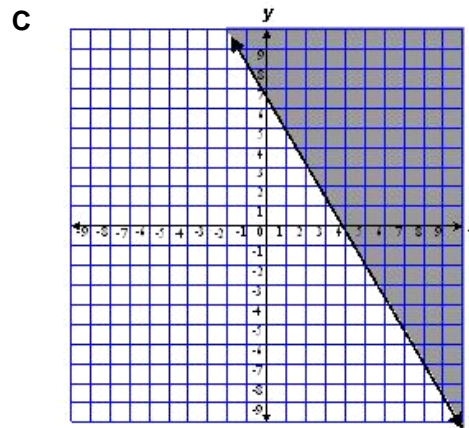
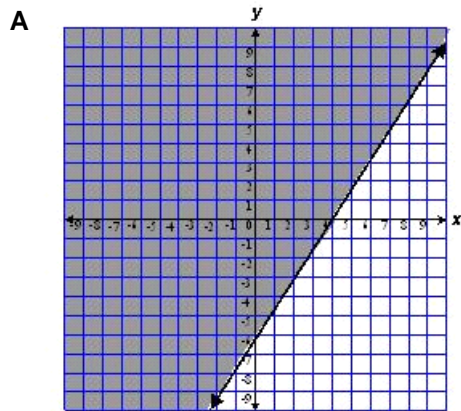
- 60 The scatter plot below shows the population of Jackson, Mississippi, every ten years since 1950.



Based on the trend line, which is the expected population of Jackson, Mississippi, for the year 2020?

- A 450,000
- B 468,000
- C 515,000
- D 525,000

61 Which of these best represents the graph of the solution set to the inequality $3x - 2y \geq 12$?



62 Which of the following is a factor of $6x^2 + 13x - 5$?

- A $2x - 5$
- B $3x + 1$
- C $6x - 5$
- D $2x + 5$

-
- 63** The table below represents the high and low temperatures for one day for selected locations in Mississippi.

Mississippi Locations

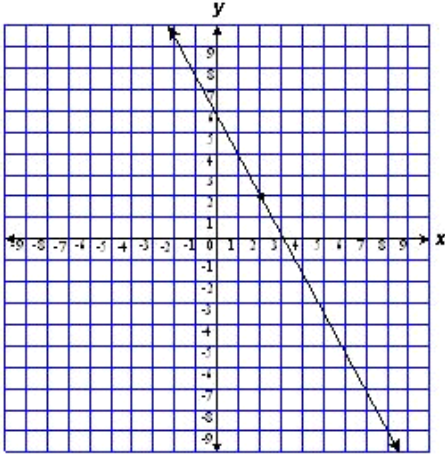
Location	High Temperature (°F)	Low Temperature (°F)
Gulfport	64	58
Jackson	78	59
Hattiesburg	70	59
Meridian	74	61
Pascagoula	66	54
Kessler AFB	62	58

Which is closest to the equation for the line-of-best fit for the data in this table?

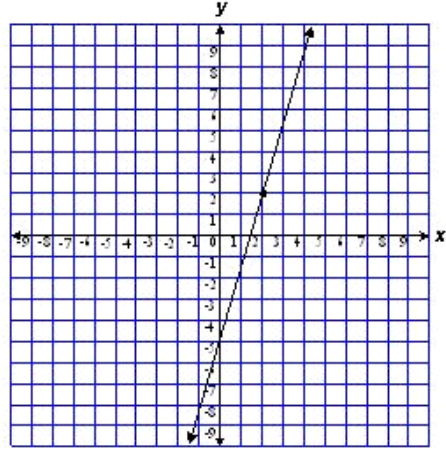
- A** $y = 0.2x + 45$
- B** $y = 0.2x + 35$
- C** $y = 2x + 30$
- D** $y = 2x + 40$

64 Which graph best represents the line containing the point $(2, 2)$ and having a slope of 3?

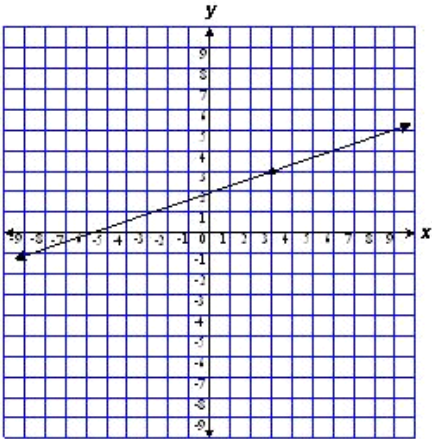
A



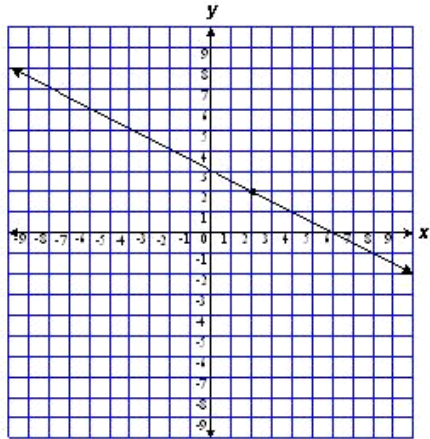
C



B



D



65 Two lines in a coordinate plane have no points of intersection. Which of these could be the equations of the lines?

A $4x + 2y = 6$
 $10x + 5y = 7$

B $4x + 2y = 6$
 $10x + 5y = 15$

C $4x + 2y = 6$
 $5x - 10y = 6$

D $5x + 10y = 6$
 $5x - 10y = 6$

1 2 3 4 5 6 7 8 9 10 11 12 A B C D E

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