

Student Name:

## *Algebra I-TEST 2*



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# Algebra I

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## DIRECTIONS

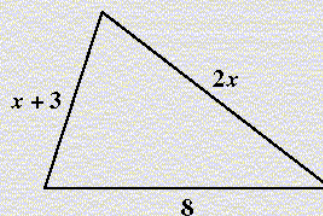
Read each problem carefully. Then work the problem, find your answer among the answer choices.

### 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?

- A  $2x^2 + 8$
- B  $2x^2 + 11$
- C  $3x + 8$
- D  $3x + 11$

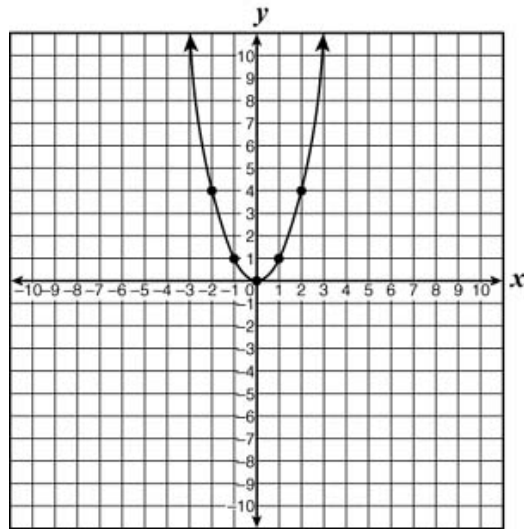
**1. Microsoft reported approximately 45 billion dollars in sales during 1998. What is that amount expressed in scientific notation?**

- A**  $4.5 \times 10^9$
  - B**  $4.5 \times 10^{10}$
  - C**  $45 \times 10^{10}$
  - D**  $45 \times 10^{11}$
- 

**2. Elijah is making muffins for his homeroom party tomorrow morning. The muffin recipe calls for 4 cups of flour and 2 cups of sugar. However, he only has  $3\frac{1}{2}$  cups of flour. Elijah needs to reduce the amount of sugar by the same proportion. How much sugar will Elijah use?**

- A**  $1\frac{1}{4}$  cups
  - B**  $1\frac{1}{2}$  cups
  - C**  $1\frac{2}{3}$  cups
  - D**  $1\frac{3}{4}$  cups
-

3. The equation of the function of  $x$  graphed below is  $y = x^2$ .



What is the range of the function?

- A {real numbers}
  - B  $\{y : y \geq 0\}$
  - C  $\{y : 0 \leq y \leq 3\}$
  - D  $\{y : -3 \leq y \leq 3\}$
- 
4. Which set or sets represent functions?

$$M = \{(1, -4), (2, 3), (4, 1), (5, 2)\}$$

$$N = \{(4, 6), (2, 6), (-1, 6), (3, 6)\}$$

$$R = \{(3, 7), (4, 9), (3, 3), (5, -1)\}$$

- A Set M only
  - B Sets M and N only
  - C Sets M and R only
  - D Sets M, N, and R
-

5. What is the degree of the polynomial  $12xy^3 - 7y^2z^5 + 5x^6y - 2x^2y^2$ ?

- A 22
  - B 11
  - C 7
  - D 4
- 

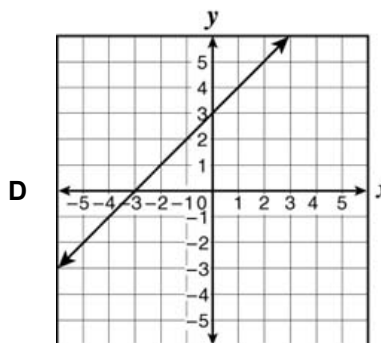
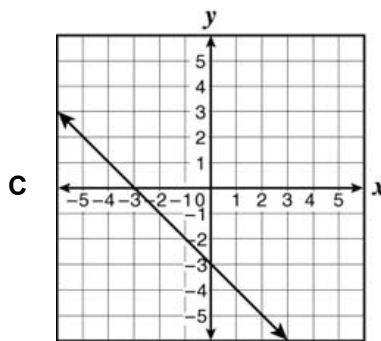
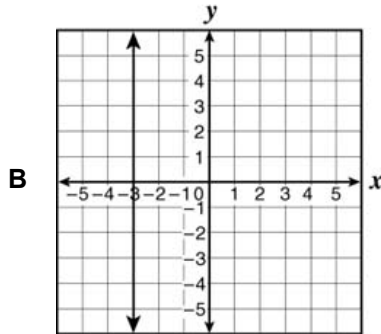
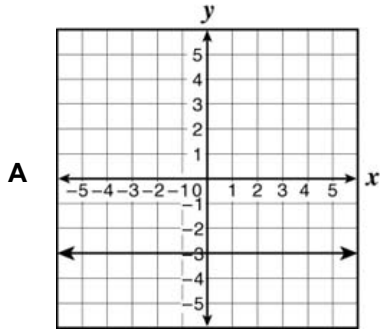
6. Dianne and Jan planned a cycling trip along the Natchez Trace. The equation below can be used to determine  $d$ , the distance in miles that they could travel for  $t$  hours at a rate of 10 miles per hour.

$$d = 10t$$

How many miles could they travel if they rode for 2 hours?

- A 5 miles
  - B 12 miles
  - C 20 miles
  - D 102 miles
-

7. Which BEST represents the graph of  $x = -3$ ?



**8. Which shows the correct use of the symbol  $\leq$  ?**

**A**  $10.3 \leq 10.1$

**B**  $6.9 \leq 9.6$

**C**  $\frac{1}{2} \leq \frac{1}{4}$

**D**  $\sqrt{4} \leq \sqrt{2}$

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**9. What is the difference between the binomials  $2x + 3$  and  $x + 3$  ?**

**A**  $x$

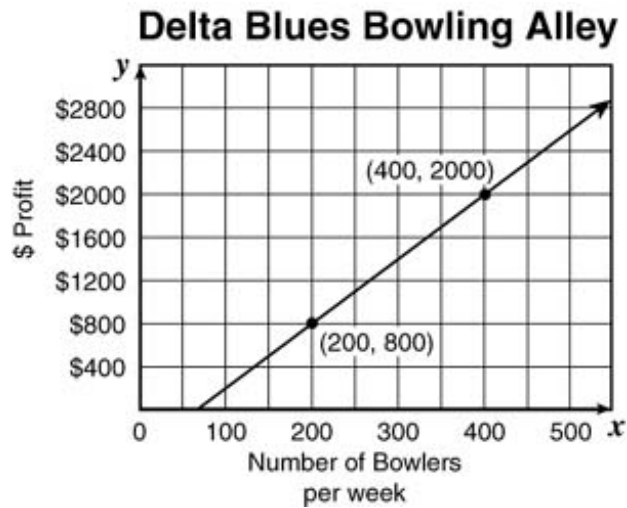
**B**  $x + 3$

**C**  $2x$

**D**  $3x + 6$

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10. The graph below models  $p$ , the weekly profit of the Delta Blues Bowling Alley, based on  $n$  bowlers per week.

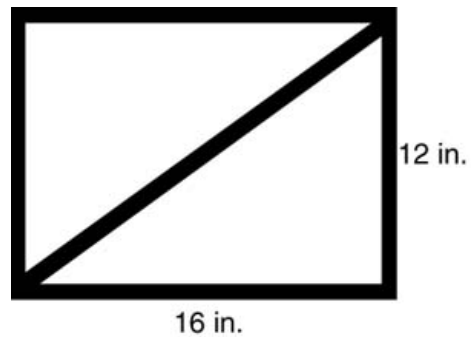


Based on the graph, which of these is **CLOSEST** to the profit for a week in which 600 people bowled?

- A \$1200
  - B \$2000
  - C \$3200
  - D \$4400
-



11. The flag corps made rectangular flags for their new half-time routine. Each flag measured 12 inches in width and 16 inches in length. The design called for gold ribbon to be sewn around the edges and down the diagonal of the flag as shown.



About or approximately how many inches of ribbon were needed for the design?

- A 40
  - B 56
  - C 76
  - D 112
- 

12. On school picture day, 6 cheerleaders decided they wanted to get their pictures taken together in groups of two. They wanted each cheerleader to be photographed with every other cheerleader. How many different groups of two were possible?

- A 12
  - B 15
  - C 30
  - D 36
-

13. Which is an equation of the line that passes through the point (0, -3) and has a slope of  $\frac{1}{2}$  ?

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

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

C  $y = 2x + 3$

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

---

14. Which of these is a linear equation?

I.  $|x - 3| = y$

II.  $x + y = 5$

III.  $x^2 + 2x + 1 = 0$

A I only

B II only

C I, II, and III

D None are linear equations.

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15.

Chris recently accepted a job as an auto salesman for Magnolia Autos. His employer allowed him to choose one of these wage plans in order to determine  $w$ , his total weekly salary:

Plan 1: \$500 per week plus 5% of  $s$ , his total sales for the week

Plan 2: \$400 per week plus 6% of  $s$ , his total sales for the week

Which pair of equations could be solved to determine the value of  $s$  total sales for which  $w$  total wages would be the same for both plans?

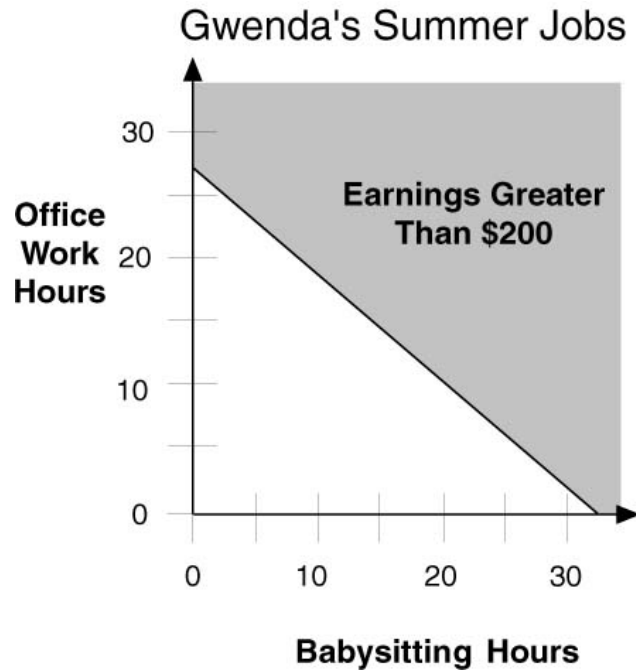
- A  $w = 500 - 5s$   
 $w = 400 - 6s$
- B  $w = 500 + 5s$   
 $w = 400 + 6s$
- C  $w = 500 + 0.05s$   
 $w = 400 + 0.06s$
- D  $w = 500 - 0.05s$   
 $w = 400 - 0.06s$
- 

16. Which is equivalent to the following expression?

$$\left( \frac{2x^5y^6z^2}{-3x^2y^4z^6} \right)^{-2}$$

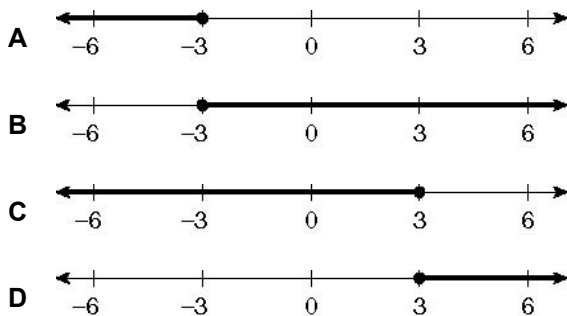
- A  $\frac{4x^6y^4}{9z^8}$
- B  $\frac{9z^8}{4x^6y^4}$
- C  $\frac{-9z^8}{4x^6y^4}$
- D  $\frac{-4x^6y^4}{9z^8}$
-

17. During the summer, Gwenda earns \$6.00 per hour when she baby-sits and \$7.50 per hour when she works in her aunt's office. She wants to earn at least \$200. Which statement is NOT justified by the graph?



- A If she baby-sits for 35 hours, she will reach her goal.  
 B If she does office work for 5 hours and baby-sits for 20 hours, she will reach her goal.  
 C If she does office work for 20 hours, and baby-sits for 15 hours, she will reach her goal.  
 D If she does office work for 30 hours, she will reach her goal.
- 

18. Which is the graph of  $-8 \leq -x - 5$ ?



19. Becky and John were playing a game called backgammon that uses two cubes numbered 1 through 6. At the end of the game, Becky needed to roll a 6 and a 1 on the two number cubes to win. The table shows the outcome of tossing two cubes.

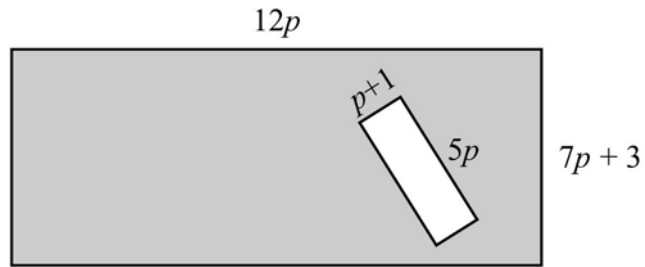
**Outcome Table for Two Number Cubes**

		Cube One					
		1	2	3	4	5	6
Cube Two	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
	2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
	4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
	5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
	6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

What is the probability of rolling a combination of a 6 and a 1 on the two number cubes?

- A 1 out of 6
  - B 1 out of 12
  - C 1 out of 18
  - D 1 out of 36
-

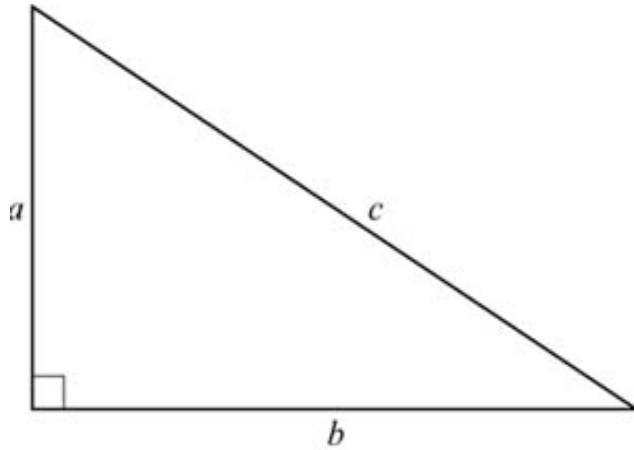
20. A rectangle with length  $5p$  and width  $p + 1$  is contained within a larger rectangle with dimensions  $12p$  by  $7p + 3$ .



Which expression represents the area of the shaded region?

- A  $84p^2 + 36p$
  - B  $79p^2 + 31p$
  - C  $42p^2 + 14p$
  - D  $79p^2 + 41p$
-

21. The area of a right triangle is 20 square inches. The sum of the length of the two legs is 13 inches.

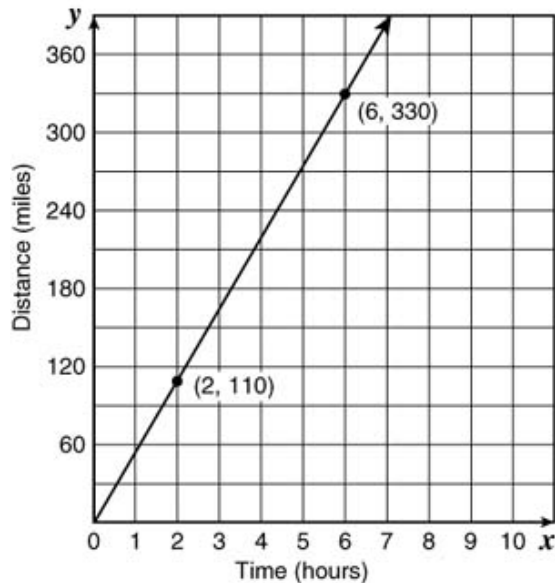


Which system of equations could be used to find the length of the legs of the triangle?

- A  $a + b = 13$   
 $\frac{1}{2}ab = 20$
- B  $\frac{1}{2}(a + b) = 20$   
 $ab = 13$
- C  $a + b = 13$   
 $ab = 20$
- D  $a^2 + b^2 = 13^2$   
 $\frac{1}{2}ab = 20$
-

22.

The Pearl High School Band traveled by bus to Washington, D.C. to march in the 2001 Inaugural Parade. Assume that the graph below shows  $y$ , the total distance the bus had traveled after  $x$  hours.



Which of these equations **BEST** describes the information given by the graph?

- A  $y = x + 55$
  - B  $y = 55x$
  - C  $y = 2x + 110$
  - D  $y = 110x$
- 

23.

Marilyn had to read a book that contains 319 pages for her literature class. She can read about 30 pages in 20 minutes. Which of these is **CLOSEST** to the number of *hours* it would take Marilyn to read the entire book?

- A 3.5 hours
  - B 8 hours
  - C 213 hours
  - D 478.5 hours
-



24. The approximate height at which the base of a cumulus cloud begins to form can be calculated using the formula

$$H = 120(T - D)$$

where  $H$  is height in meters from the ground to the base of the cloud,  $T$  is the ground air temperature in degrees Celsius, and  $D$  is the dew point temperature in degrees Celsius.

Which is the BEST estimate for the height of the base of a cumulus cloud on a day when the ground air temperature is  $33^\circ$  Celsius and the dew point temperature is  $22^\circ$  Celsius?

- A 131 meters
  - B 1080 meters
  - C 1200 meters
  - D 1320 meters
- 

25. Which polynomial is equivalent to  $(2y - 3)^2$ ?

- A  $4y^2 + 6y - 9$
  - B  $4y^2 - 12y + 9$
  - C  $4y^2 + 9$
  - D  $4y^2 - 9$
-

26. Clarissa used a  $2 \times 2$  matrix to represent the number of books needed for each semester for the two courses she is taking this year at Mississippi State University.  $S_1$  is the matrix for the first semester, and  $S_2$  is the matrix for the second semester.

	Textbooks	Workbooks	
$S_1 =$	$\begin{bmatrix} 1 \\ 3 \end{bmatrix}$	$\begin{bmatrix} 2 \\ 0 \end{bmatrix}$	English Math

	Textbooks	Workbooks	
$S_2 =$	$\begin{bmatrix} 0 \\ 2 \end{bmatrix}$	$\begin{bmatrix} 4 \\ 1 \end{bmatrix}$	English Math

Which matrix represents the total number of textbooks and workbooks needed for the whole year?

A  $\begin{bmatrix} 1 & 2 & 0 & 4 \\ 3 & 0 & 2 & 1 \end{bmatrix}$

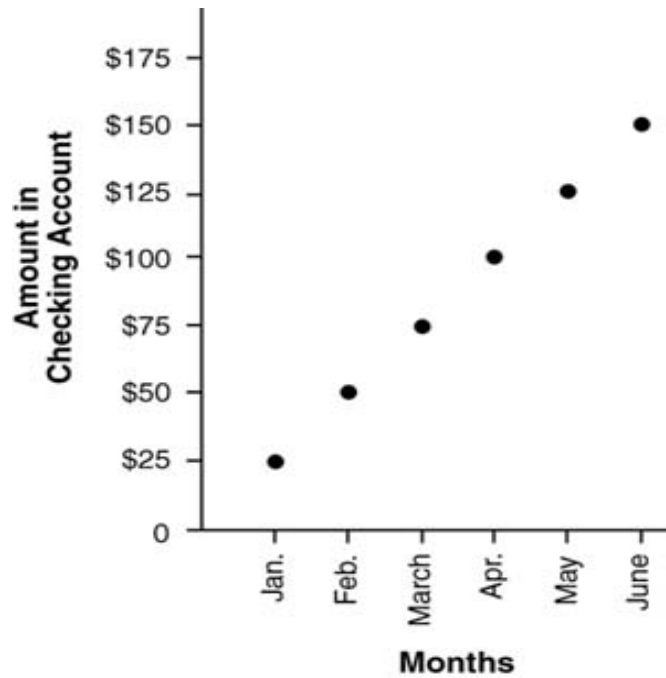
B  $\begin{bmatrix} 0 & 8 \\ 6 & 0 \end{bmatrix}$

C  $\begin{bmatrix} 4 & 6 \\ 0 & 12 \end{bmatrix}$

D  $\begin{bmatrix} 1 & 6 \\ 5 & 1 \end{bmatrix}$

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27. The graph below represents the amount of money Carla had in her checking account each month for 6 consecutive months.



Which is the closest to the amount deposited to Carla's account each month?

- A \$25
  - B \$75
  - C \$125
  - D \$150
-

28. The formula for  $V$ , the volume of a right circular cone, is  $V = \frac{1}{3}\pi r^2 h$ , where  $r$  is the radius of the base and  $h$  is the height of the cone. What formula correctly expresses  $h$  in terms of  $r$  and  $V$ ?

A  $h = \frac{3V}{\pi r^2}$

B  $h = \frac{V}{3\pi r^2}$

C  $h = \frac{\pi r^2}{3V}$

D  $h = \frac{3\pi V}{r^2}$

---

29. Jan took a taxi to visit the Petrified Forest northwest of Jackson, Mississippi. The taxi fare for the trip was \$14.80, based on a fixed charge of \$2.00 plus a charge of \$0.80 for each mile. Which of these could be used to determine  $m$ , the number of miles that Jan rode in the taxi?

A  $14.80 = 2.00 + 0.80m$

B  $14.80 = 2.00m + 0.80$

C  $14.80m = 2.00 + 0.80m$

D  $14.80m = 2.00m + 0.80$

---

30. Marion scored 85, 78, 74, 75, 93, and 95 on six tests. What is the *range* of these six scores?

A 10

B 21

C 82

D 83

---

31. The length of a rectangular metal sheet is 6 inches longer than twice its width. The area of the sheet is 540 square inches. What is the *length* of the metal sheet?

- A 18 inches
  - B 26 inches
  - C 36 inches
  - D 42 inches
- 

32. Angela graphed the following two linear equations on a coordinate grid.

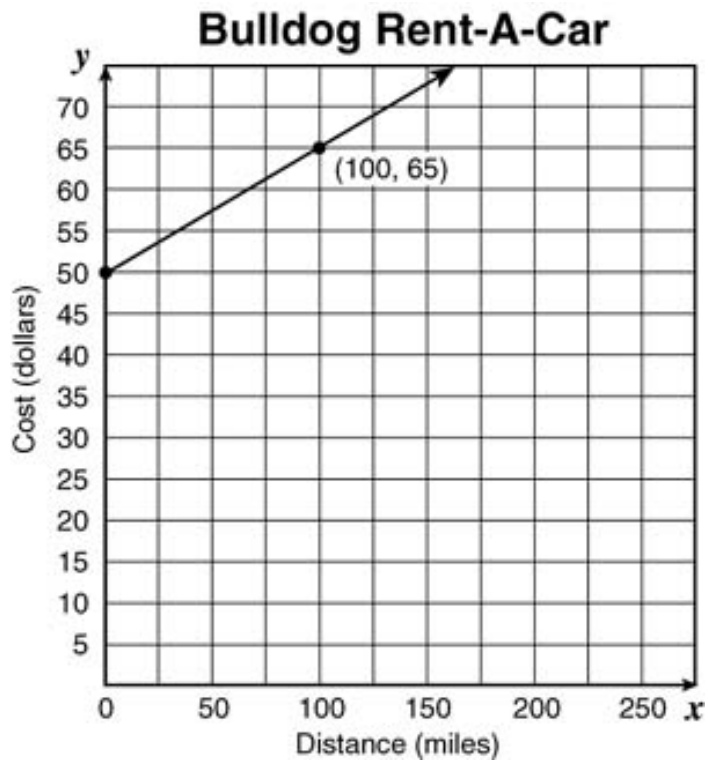
$$2x + 3y = 4$$

$$4x + 6y = 7$$

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.
-

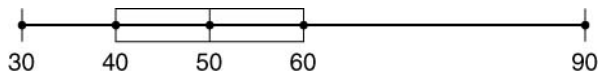
33. The graph below represents the cost of renting a car from Bulldog Rent-A-Car.



Based on the graph, if  $y$  represents the total cost of the rental and  $x$  represents the total number of miles driven, which of these equations could be used to determine the total cost of renting a car from Bulldog Rent-A-Car?

- A  $y = 0.15x + 50$
  - B  $y = 50x + 0.15$
  - C  $y = 6.67x + 50$
  - D  $y = 50x + 6.67$
-

34. The following box-and-whisker plot represents the grades students received on a recent mathematics test.



What was the *median* score on the test?

- A 45  
B 50  
C 55  
D 60
- 

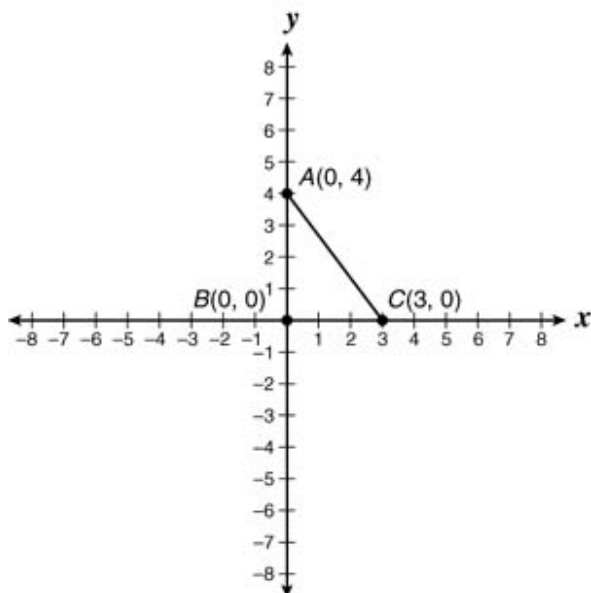
35. What is the sum of the solutions to the equation  $|x - 3| = -2$ ?

- A 1  
B 5  
C 6  
D there is no solution
- 

36. Mrs. Campbell gave her Algebra I students a list of trinomials to factor for homework. Which of these can be factored into two binomials?

- A  $x^2 + 3x + 2$   
B  $x^2 + 4x + 5$   
C  $x^2 + 5x + 7$   
D  $x^2 + 6x + 10$
-

37. Points  $A$ ,  $B$ , and  $C$  form the right triangle below.



What is the length of the hypotenuse for  $\triangle ABC$ ?

- A 3
  - B 4
  - C 5
  - D 7
- 

38. A line contains the points  $(0, 1)$  and  $(-2, -1)$ . What must be the value of  $x$  for the point  $(x, -5)$  for it to be on the same line?

- A -6
  - B -1
  - C 1
  - D 6
-



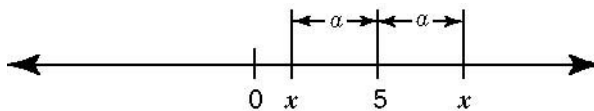
39. Which of these could be the area of a perfect square?

- A  $x^2 - 9x + 6$
  - B  $x^2 - 6x + 9$
  - C  $x^2 - 5x + 6$
  - D  $x^2 - 6x + 5$
- 

40. Mr. George wants to build a fence for his wife's vegetable garden. The garden will be in the shape of a rectangle with the length 5 feet more than the width. Which equation defines  $P$ , the number of feet of fencing Mr. George needs to order, in terms of  $w$ , the width of the garden?

- A  $P = 2w + 5$
  - B  $P = 2w + 10$
  - C  $P = 4w + 5$
  - D  $P = 4w + 10$
- 

41. The number line below shows two possible locations for  $x$ , a number that is  $a$  units from 5.



Which BEST represents the relationship between  $x$ ,  $a$ , and 5?

- A  $x - 5 = a$
  - B  $x - a = 5$
  - C  $|x - 5| = a$
  - D  $|x - a| = 5$
-

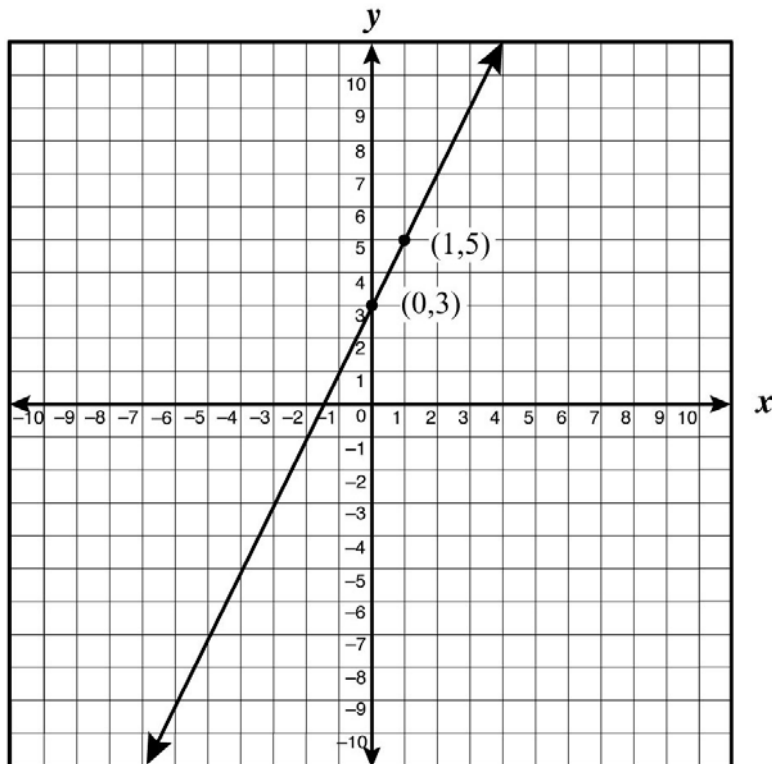
42. A manufacturer made cylindrical containers in heights ranging from 2 feet to 6 feet. A customer wanted a container with a 3-foot diameter and a volume,  $V$ , of at least 35 cubic feet. This relationship is shown by the inequality

$$\pi r^2 h \geq V$$

where  $r$  is the radius and  $h$  is the height. Which is the smallest standard height the manufacturer can supply and meet the customer's volume requirements? [Use 3.14 for  $\pi$ ].

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

43. The graph below shows a line graphed through the points  $(0, 3)$  and  $(1, 5)$ .



Which of these equations represents a line that is *parallel* to the line shown on the graph?

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

44. 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  $5x + 10y = 6$   
 $5x - 10y = 6$

---

45. Expressed in scientific notation, the Earth's mass is  $6.58 \times 10^{21}$  tons. Which of these is the number of zeros this measure would contain if it were written in decimal notation?

A 19

B 20

C 21

D 24

---

46. What is the equation in slope-intercept form for the line that passes through the point  $(8, -3)$  and has a *y-intercept* of  $-2$ ?

A  $y = -8x - 2$

B  $y = -\frac{1}{8}x - 2$

C  $y = -2x - \frac{1}{8}$

D  $y = -2x - 8$

---

47. A company bought a copy machine for \$4500 on January 1. If the machine decreases in value by \$473.50 each year, then its value after  $t$  years is given by the formula below.

$$V = 4500 - 473.50t$$

According to the formula, how many years from now will the machine have no value?

- A Between 6 and 7 years
  - B Between 7 and 8 years
  - C Between 8 and 9 years
  - D Between 9 and 10 years
- 

48. Which of these is the *smaller* solution to the quadratic equation,  $x^2 - 5x + 3 = 0$ ?

- A  $\frac{5\sqrt{13}}{2}$
  - B  $-\frac{5\sqrt{13}}{2}$
  - C  $\frac{5 - \sqrt{13}}{2}$
  - D  $\frac{5 + \sqrt{13}}{2}$
- 

49. Which of these is NOT factorable over the set of real numbers?

- A  $x^2 + 7x + 10$
  - B  $x^2 + 8x + 15$
  - C  $x^2 + 9x + 14$
  - D  $x^2 + 10x + 11$
-

50. Mr. Brady asked his algebra class to make a scale drawing of the classroom, which is shaped like a rectangle with a width of 20 feet and a length of 24 feet. Travis made the width of the classroom in his scale drawing 5 inches. What should be the length in Travis's scale drawing?

- A 6 inches
  - B 8 inches
  - C 9 inches
  - D 10 inches
- 

51. What is the value of  $\frac{x+4}{x^2-4}$  for  $x = -2$ ?

- A  $-\frac{1}{4}$
  - B  $\frac{1}{4}$
  - C 0
  - D undefined
- 

52. Conner purchased 3 soft drinks at a convenience store. Before tax was added, the total cost of the 3 drinks was equal to the cost of 1 drink plus \$2. Which of these equations could be used to determine  $c$ , the cost of 1 soft drink?

- A  $c+3 = c+2$
  - B  $c-3 = c+2$
  - C  $3c = c+2$
  - D  $\frac{c}{3} = c+2$
-

**53.** The formula for the perimeter of a rectangle is  $P = 2l + 2w$ . Which expresses  $l$ , the length of a rectangle, in terms of  $p$ , its perimeter, and  $w$ , its width?

A  $l = p - 2w$

B  $l = p + w$

C  $l = \frac{p - 2w}{2}$

D  $l = \frac{p + 2w}{2}$

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**54.** A girls' club was planning a trip to Florida for spring break. The van they want to rent travels about 15 miles for each gallon of gas. Which of these is CLOSEST to the number of gallons of gas they will need for the trip, a total of 1380 miles?

A 9.2 gallons

B 92 gallons

C 204 gallons

D 20,400 gallons

---

**55.** What is the slope of the line containing the points (5, -8) and (-5, 8)?

A Undefined

B  $-\frac{8}{5}$

C 0

D  $\frac{8}{5}$

---

56. Which of these is equivalent to the expression,  $a(b + c)$ , for real numbers  $a$ ,  $b$ , and  $c$ ?

- A  $ab + c$
  - B  $ab + ac$
  - C  $b + ac$
  - D  $a + b + a + c$
- 

57. The members of the student council decoration committee bought 45 bags of streamers to decorate the gym for the prom. If each bag of streamers had cost 10 cents less, they could have bought 5 more bags. What was the cost of one bag of streamers?

- A \$0.45
  - B \$0.50
  - C \$0.60
  - D \$1.00
- 

58. Which expression is equivalent to  $(x - 2)^2$ ?

- A  $x^2 - 4$
  - B  $x^2 + 4$
  - C  $x^2 - 4x + 4$
  - D  $x^2 + 4x - 4$
-



59. The following set of ordered pairs,  $(n, p)$ , represents  $p$ , the monthly profit of a store for four different months based on  $n$  items sold each month.

$$\{(1000, 4000), (2000, 10,000), (3000, 16,000), (4000, 22,000)\}$$

Which of these could represent the relationship between  $n$  and  $p$  in the ordered pairs of the set?

- A  $p = 6n - 2000$
  - B  $p = n + 6000$
  - C  $p = n + 1000$
  - D  $p = 5000 - 6n$
- 

60. The slope-intercept form of a linear equation is written  $y = mx + b$ . Which equation could be used to solve for  $b$ , given the values for  $y$ ,  $m$ , and  $x$ ?

- A  $b = mx + y$
  - B  $b = y + mx$
  - C  $b = mx - y$
  - D  $b = y - mx$
-

**61.** The area in square units of a certain rectangle is equal to the expression  $15x^2 - 32x + 16$ . Which of these expressions could NOT be equal to one side of the rectangle?

I.  $5x + 2$

II.  $3x - 4$

III.  $5x - 4$

A I only

B II only

C III only

D I and III only

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**62.** At the Metro Jackson Basketball Championships, the Lady Jaguars scored ten more points than the Lady Bulldogs. If  $J$  represents the number of points the Jaguars scored, which of these could represent the number of points the Bulldogs scored?

A  $J + 10$

B  $J - 10$

C  $10 - J$

D  $10J$

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**63.** A rectangle has an area of  $6x^2 - x - 12$  and a width of  $2x - 3$ . Which expression represents the length of the rectangle?

A  $4x - 15$

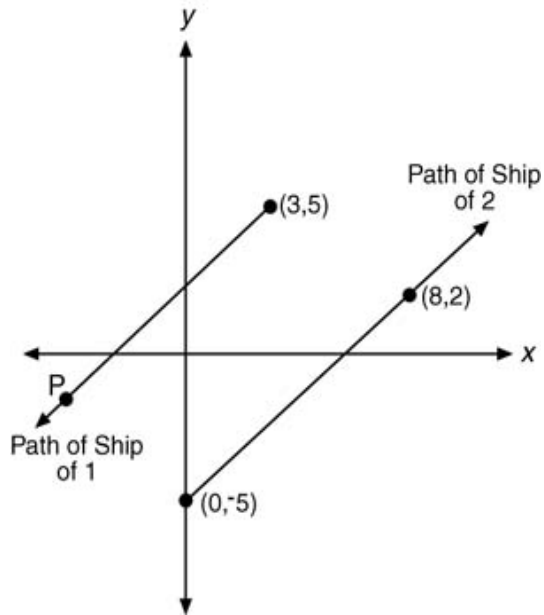
B  $4x - 9$

C  $3x - 4$

D  $3x + 4$

---

64. A coordinate plane laid over a nautical map showed the paths of 2 ships. The diagram below shows the positions of the ships and their paths.

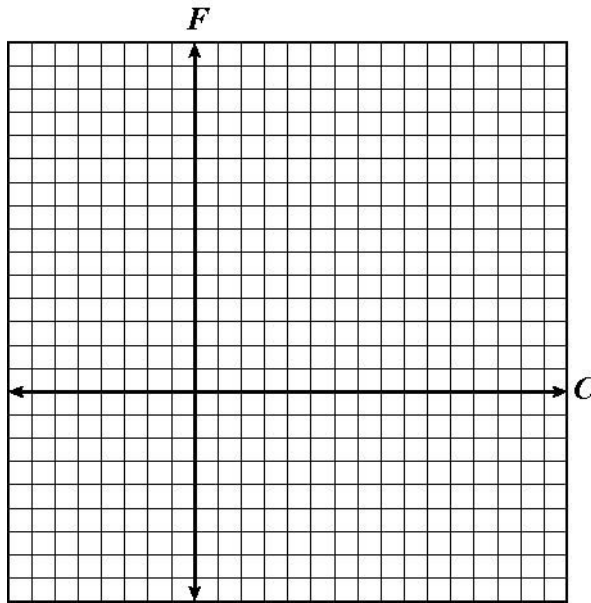


Determine the coordinates of *any* third-quadrant point  $P$  on the path of Ship 1 so that the paths of the two ships will be parallel. Show your work in your response booklet and explain how you know your answer is correct.

65. The formula shown below is used to convert temperatures in degrees Celsius ( $^{\circ}\text{C}$ ) to temperatures in degrees Fahrenheit ( $^{\circ}\text{F}$ ).

$$F = \frac{9}{5}C + 32$$

- a. On the grid below, sketch the graph of the function defined by the formula. Label the vertical axis " $F$ " and the horizontal axis " $C$ ". Be sure to include a scale for your graph. Label the coordinates of at least two points on your graph.



- b. State the range for  $C \geq 0^{\circ}$  of the function you graphed.
- c. What is the  $y$ -intercept of your graph? Explain its meaning in terms of real-world temperatures.