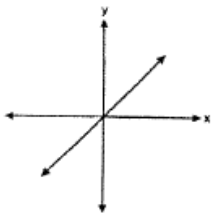
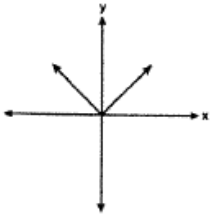
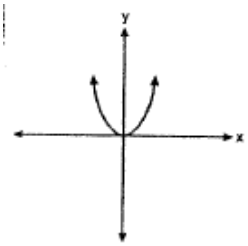
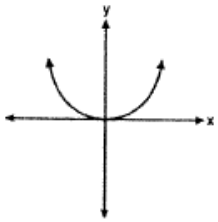
1. Which graph represents a linear function?

A. 

C. 

B. 

D. 

2. What is the slope of the line that passes through the points (-6, 1) and (4, -4)?

1. -2

C. $-\frac{1}{2}$

2. 2

D. $\frac{1}{2}$

3. Students in a ninth grade class measured their heights, *h*, in centimeters. The height of the shortest student was 155 cm, and the height of the tallest student was 190 cm. What inequality represents the range of heights?

A. $155 < h < 190$

B. $155 \leq h \leq 190$

C. $h \geq 155$ **or** $h \leq 190$

D. $h > 155$ **or** $h < 190$

4. The faces of a cube are numbered from 1 to 6. If the cube is tossed once, what is the probability that a prime number or a number divisible by 2 is obtained?

A. $\frac{6}{6}$

C. $\frac{4}{6}$

B. $\frac{5}{6}$

D. $\frac{1}{6}$

5. Which ordered pair is a solution set of the following system of inequalities?

$$y < \frac{1}{2}x + 4$$

$$y \geq -x + 1$$

A. $(-5, 3)$

C. $(3, -5)$

B. $(0, 4)$

D. $(4, 0)$

6. Which expression is equivalent to $(3x^2)^3$?

A. $9x^5$

C. $27x^5$

B. $9x^6$

D. $27x^6$

7. Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of $12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of $8.50. What is the cost of one slice of mushroom pizza?

A. $1.50

C. $3.00

B. $2.00

D. $3.50

8. What is half of 2^6?

A. 1^3 C. 2^3

B. 1^6 D. 2^5

9. Which equation represents a line that is parallel to the line $y = -4x + 5$?

A. $y = -4x + 3$

B. $y = -\frac{1}{4}x + 5$

C. $y = \frac{1}{4}x + 3$

D. $y = 4x + 5$

10. Pam is playing with red and black marbles. The number of red marbles she has is three more than twice the number of black marbles she has. She has 42 marbles in all. How many red marbles does Pam have?

A. 13 C. 29

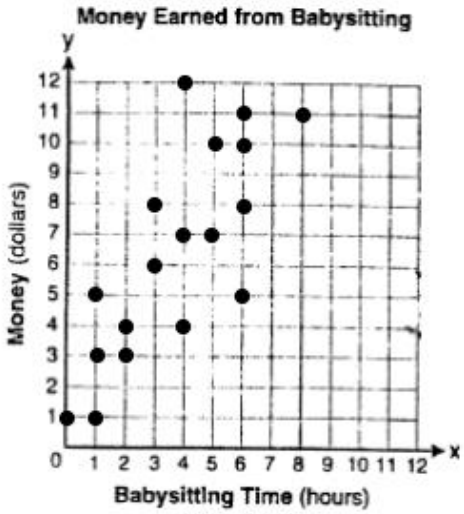
B. 15 D. 33

11. What is $\frac{\sqrt{32}}{4}$ expressed in simplest radical form?

A. $\sqrt{2}$ C. $\sqrt{8}$

B. $4\sqrt{2}$ D. $\frac{\sqrt{8}}{2}$

12. Which equation most closely represents the line of best fit for the scatter plot below?



A. $y = x$ C. $y = \frac{3}{2}x + 4$

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

13. In a linear equation the independent variable increases at a constant rate while the dependent variable decreases at a constant rate. The slope of this line is

A. Zero C. Positive

B. Negative D. Undefined

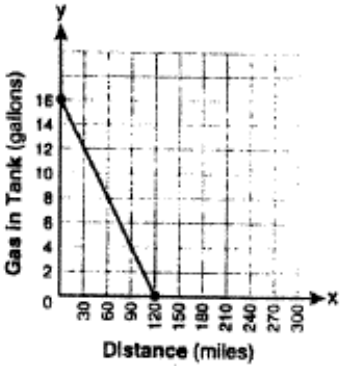
14. Which ordered pair is a solution to the system of equations $y = x$ and $y = x^2 - 2$?

A. $(-2, -2)$ B. $(0, 0)$

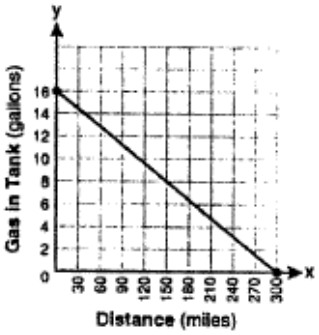
C. $(-1, 1)$ D. $(2, 2)$

15. The gas tank in a car holds a total of 16 gallons of gas. The car travels 75 miles on 4 gallons of gas. If the gas tank is full at the beginning of a trip, which graph represents the rate of change in the amount of gas in the tank?

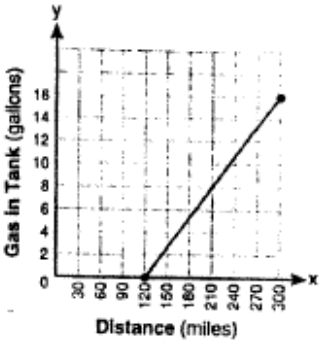
A.



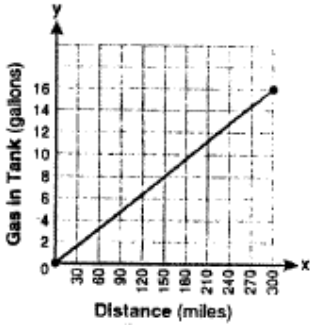
B.



C.



D.



16. If $3ax + b = c$, then x equals

A. $c - b + 3a$

C. $\frac{c-b}{3a}$

B. $c + b - 3a$

D. $\frac{b-c}{3a}$

17. Nicole's aerobics class exercises to fast-paced music. If the rate of the music is 120 beats per minute, how many beats would there be in a class that is 0.75 hour long?

A. 90

C. 5,400

B. 160

D. 7,200

18. The length of the hypotenuse of a right triangle is 34 inches and the length of one of its legs is 16 inches. What is the length, in inches, of the other leg of this right triangle?

A. 16

C. 25

B. 18

D. 30

19. Which equation represents a line parallel to the x-axis?

A. $x = 5$

C. $x = \frac{1}{3}y$

B. $y = 10$

D. $y = 5x + 17$

20. Sam and Odel have been selling frozen pizzas for a class fundraiser. Sam has sold half as many pizzas as Odel. Together they have sold a total of 126 pizzas. How many pizzas did Sam sell?

A. 21 C. 63

B. 42 D. 84

21. Which ordered pair is in the solution set of the system of equations $y = -x + 1$ and $y = x^2 + 5x + 6$?

A. $(-5, -1)$ C. $(5, -4)$

B. $(-5, 6)$ D. $(5, 2)$

22. Which statement is true about the data set 3, 4, 5, 6, 7, 7, 10?

A. Mean = Mode C. Mean = Median

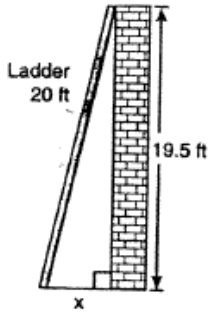
B. Mean > Mode D. Mean < Median

23. Which value of *x* is in the solution set of the inequality $-4x + 2 > 10$?

A. -2 C. 3

B. 2 D. -4

24. Don placed a ladder against the side of his house as shown in the diagram below.



Which equation could be used to find the distance, *x*, from the foot of the ladder to the base of the house?

A. $x = 20 - 19.5$

B. $x = 20^2 - 19.5^2$

C. $x = \sqrt{20^2 - 19.5^2}$

D. $x = \sqrt{20^2 + 19.5^2}$

25. Which value of *x* is a solution of $\frac{5}{x} = \frac{x + 13}{6}$?

A. -2 C. -10

B. -3 D. -15

26. A rectangle has an area of 24 square units. The width is 5 units less than the length. What is the length, in units, of the rectangle?

A. 6 C. 3

B. 8 D. 19

27. The bowling team at Lincoln High School must choose a president, vice president, and secretary. If the team has 10 members, which expression could be used to determine the number of ways the officers could be chosen?

A. ${}_{3}P_{10}$ C. ${}_{10}P_{3}$

B. ${}_{7}P_{3}$ D. ${}_{10}P_{7}$

28. The table below shows a cumulative

Age Group	Total
20-29	8
20-39	18
20-49	25
20-59	31
20-69	35

frequency distribution of runners' ages.

According to the table, how many runners are in their forties?

A. 25 C. 7

B. 10 D. 6

29. Mr. Turner bought x boxes of pencils. Each box holds 25 pencils. He left 3 boxes of pencils at home and took the rest to school. Which expression represents the total number of pencils he took to school?

A. $22x$ C. $25 - 3x$

B. $25x - 3$ D. $25x - 75$

30. Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?

A. 2.25 C. 9.0

B. 3.375 D. 13.5

31. Which value of p is the solution of $5p - 1 = 2p + 20$?

A. $\frac{19}{7}$ C. 3

B. $\frac{19}{3}$ D. 7

32. The statement 2 + 0 = 2 is an example of the use of which property of real numbers?

A. associative C. additive inverse

B. additive identity D. distributive.

33. Mrs. Smith wrote "Eight less than three times a number is greater than fifteen" on the board. If x represents the number, which inequality is a correct translation of this statement?

A. $3x - 8 > 15$

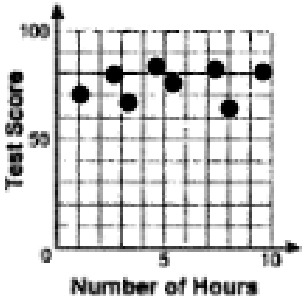
B. $3x - 8 < 15$

C. $8 - 3x > 15$

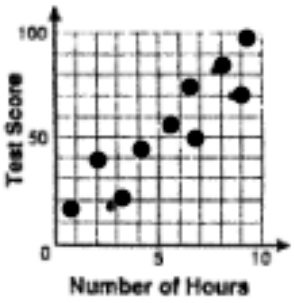
D. $8 - 3x < 15$

34. There is a negative correlation between the number of hours a student watches television and his or her social studies test score. Which scatter plot below displays this correlation?

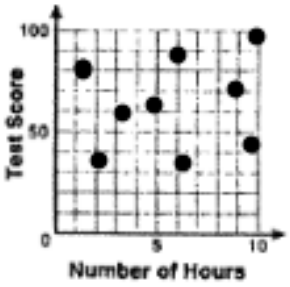
A.



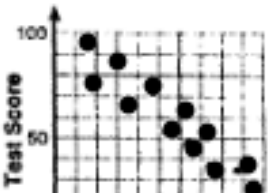
B.



C.



D.



35. When $3g^2 - 4g + 2$ is subtracted from $7g^2 + 5g - 1$, the difference is

A. $-4g^2 - 9g + 3$

B. $4g^2 + g + 1$

C. $4g^2 + 9g - 3$

D. $10g^2 + g + 1$

36. Factored completely, the expression $2x^2 + 10x - 12$ is equivalent to

A. $2(x - 6)(x + 1)$

B. $2(x + 6)(x - 1)$

C. $2(x + 2)(x + 3)$

D. $2(x - 2)(x - 3)$

37. Factored, the expression $16x^2 - 25y^2$ is equivalent to

A. $(4x - 5y)(4x + 5y)$

B. $(4x - 5y)(4x - 5y)$

C. $(8x - 5y)(8x + 5y)$

D. $(8x - 5y)(8x - 5y)$

38. What is the product of $-3x^2y$ and $(5xy^2 + xy)$?

A. $-15x^3y^3 - 3x^3y^2$

B. $-15x^3y^3 - 3x^3y$

C. $-15x^2y^2 - 3x^2y$

D. $-15x^3y^3 + xy$

39. Which value of x makes the expression $\frac{x+4}{x-3}$ undefined?

A. -4

B. -3

C. 3

D. 0

40. Which expression represents $\frac{25x - 125}{x^2 - 25}$ in simplest form?

A. $\frac{5}{x}$

B. $-\frac{5}{x}$

C. $\frac{25}{x-5}$

D. $\frac{25}{x+5}$

41. What is the product of $\frac{x^2 - 1}{x + 1}$ and $\frac{x+3}{3x-3}$ expressed in simplest form?

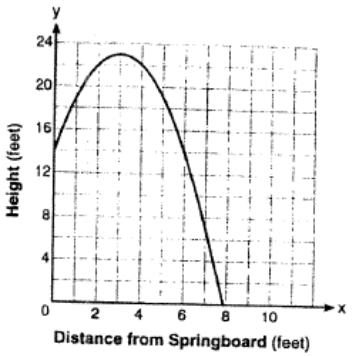
A. x

B. $\frac{x}{3}$

C. $x + 3$

D. $\frac{x+3}{3}$

42. A swim team member performs a dive from a 14-foot high springboard. The parabola shows the path of her dive.



Which equation represents the axis of symmetry?

A. $x = 3$

B. $y = 3$

C. $x = 23$

D. $y = 23$

43. Which expression represents $\frac{2x^3 - 12x}{x - 6}$ in simplest form?

A. 0

B. $2x$

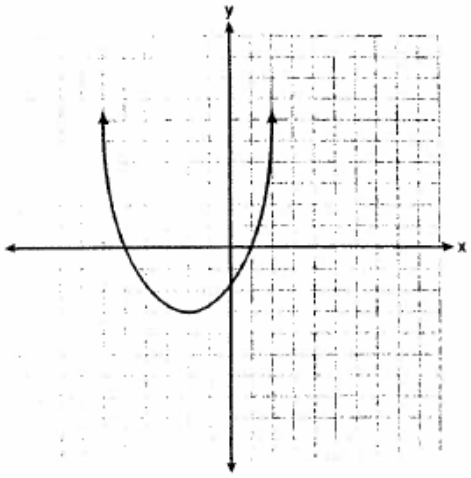
C. $4x$

D. $2x + 2$

44. Consider the graph of the equation $y = ax^2 + bx + c$, when $a \neq 0$. If a is multiplied by 3, what is true of the graph of the resulting parabola?

A. The vertex is 3 units above the vertex of the original parabola.
B. The new parabola is 3 units to the right of the original parabola.
C. The new parabola is wider than the original parabola.
D. The new parabola is narrower than the original parabola.

45. What are the vertex and the axis of symmetry of the parabola shown in the diagram below?



A. The vertex is (-2, -3) and the axis of symmetry is $x = -2$.

B. The vertex is (-2, -3) and the axis of symmetry is $y = -2$.

C. The vertex is (-3, -2) and the axis of symmetry is $y = -2$.

D. The vertex is (-3, -2) and the axis of symmetry is $x = -2$.

46. What is the product of $\frac{4x}{x-1}$ and $\frac{x^2-1}{3x+3}$ expressed in simplest form?

A. $\frac{4x}{3}$
B. $\frac{4x^2}{3}$
C. $\frac{4x^2}{3(x+1)}$
D. $\frac{4(x+1)}{3}$

47. Is the equation $3(2x-4) = -18$ equivalent to $6x - 12 = -18$?

A. Yes, the equations are equivalent by the Associative Property of Multiplication.

B. Yes, the equations are equivalent by the Commutative Property of Multiplication.

C. Yes, the equations are equivalent by the Distributive Property of Multiplication.

D. No, the equations are not equivalent.

48. $\sqrt{16} + \sqrt[3]{8} =$

A. 4
B. 6
C. 9
D. 10

49. Which expression is equivalent to x^6x^2 ?

A. x^4x^3
B. x^5x^3
C. x^7x^3
D. x^9x^3

50. Which number does not have a reciprocal?

A. -1
C. $\frac{1}{1000}$
B. 0
D. 3

51. What is the multiplicative inverse of ½?

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

52. What is the solution for this equation?

$$|2x - 3| = 5$$

A. $x = -4$ **or** $x = 4$
B. $x = -4$ **or** $x = 3$
C. $x = -1$ **or** $x = 4$
D. $x = -1$ **or** $x = 3$

53. What is the solution set of the inequality

$$5 - |x + 4| \leq -3 \text{ ?}$$

A. $-2 \leq x \leq 6$
B. $x \leq -2$ **or** $x \geq 6$
C. $-12 \leq x \leq 4$
D. $x \leq -12$ **or** $x \geq 4$

54. Which equation is equivalent to

$$5x - 2(7x + 1) = 14x \text{ ?}$$

A. $-9x - 2 = 14x$
B. $-9x + 1 = 14x$
C. $-9x + 2 = 14x$
D. $12x - 1 = 14x$

55. Which equation is equivalent to

$$4(2 - 5x) = 6 - 3(1 - 3x) \text{ ?}$$

A. $8x = 5$
B. $8x = 17$
C. $29x = 5$
D. $29x = 17$

56. The total cost (c) in dollars of renting a sailboat for n days is given by the equation

$$c = 120 + 60n$$

If the total cost was $360, for how many days was the sailboat rented?

A. 2
C. 6
B. 4
D. 8

57. Solve: $3(x + 5) = 2x + 35$

Step 1: $3x + 15 = 2x + 35$
Step 2: $5x + 15 = 35$
Step 3: $5x = 20$
Step 4: $x = 4$

Which is the first incorrect step in the solution shown above?

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

58. A 120-foot-long rope is cut into 3 pieces. The first piece of rope is twice as long as the second piece of rope. The third piece of rope is three times as long as the second piece of rope. What is the length of the longest piece of rope?

A. 20 feet
C. 60 feet
B. 40 feet
D. 80 feet

59. The cost to rent a construction crane is $750 per day plus $250 per hour for use. What is the maximum number of hours the crane can be used each day if the rental cost is not to exceed $2500 per day?

A. 2.5
C. 7.0
B. 3.7
D. 13.0

60. What is the solution to the inequality $x - 5 > 14$?

A. $x > 9$
C. $x > 19$
B. $x < 9$
D. $x < 19$

61. The lengths of the sides of a triangle are y, $y + 1$, and 7 centimeters. If the perimeter is 56 centimeters, what is the value of y?

A. 24
C. 31
B. 25
D. 25

62. Which number serves as a counterexample to this statement below?

All positive integers are divisible by 2 or 3.

A. 100
C. 30
B. 57
D. 25

63. What is the conclusion of the statement in the box below?

If $x^2 = 4$, then $x = -2$ **or** $x = 2$.

A. $x^2 = 4$
C. $x = -2$
B. $x = 2$
D. $x = -2$ **or** $x = 2$

64. Which of the following is a valid conclusion to the statement "If a student is a high school band member, then the student is a good musician"?

A. All good musicians are high school band members.
B. A student is a high school band member.
C. All students are good musicians.

D. All high school band members are good musicians.

65. The chart below shows an expression evaluated for hour different values of *x*.

x	$x^2 + x + 5$
1	7
2	11
6	47
7	61

Josiah concluded that for all positive values of *x*, $x^2 + x + 5$ produces a prime number. Which value of *x* serves as a counterexample to prove Josiah's conclusion false?

A. 5

B. 11

C. 16

D. 21

66. John's solution to an equation is shown below.

Given: $x^2 + 5x + 6 = 0$

Step 1: $(x + 2)(x + 3) = 0$

Step 2: $x + 2 = 0$ **or** $x + 3 = 0$

Step 3: $x = -2$ **or** $x = -3$

Which property of real numbers did John use for Step 2?

A. Multiplication Property of Equality

B. Zero Product Property of Multiplication

C. Commutative Property of Multiplication

D. Distributive Property of Multiplication over Addition

67. Stan's solution to an equation is shown below.

Given: $n + 8(n + 20) = 110$

Step 1: $n + 8n + 20 = 110$

Step 2: $9n + 20 = 110$

Step 3: $9n = 110 - 20$

Step 4: $9n = 90$

Step 5: $\frac{9n}{9} = \frac{90}{9}$

Step 6: $n = 10$

Which statement about Stan's solution is true?

A. Stan's solution is correct.

B. Stan made a mistake in Step 1.

C. Stan made a mistake in Step 3.

D. Stan made a mistake in Step 5.

68. When is this statement true?

The opposite of a number is less than the original number.

A. This statement in never true.

B. This statement is always true.

C. This statement is true for positive numbers.

D. This statement is true for negative numbers.

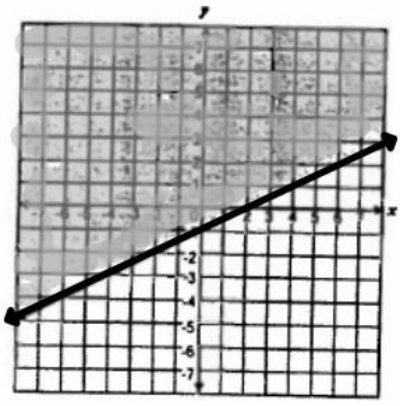
C. $y > \frac{1}{2}x - 1$

D. $y \geq \frac{1}{2}x - 1$

69. What is the *y*-intercept of the graph of $4x + 2y = 12$?

A. – 4
B. – 2
C. 6
D. 12

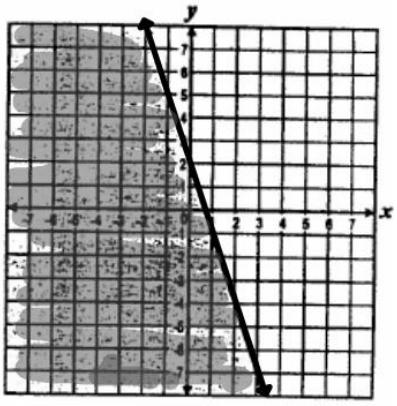
70. Which inequality is shown on the graph below?



A. $y < \frac{1}{2}x - 1$

B. $y \leq \frac{1}{2}x - 1$

71. Which inequality does the shaded region of the graph represent?



A. $3x + y \leq 2$

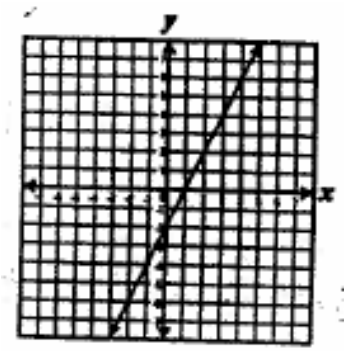
B. $3x + y \geq 2$

C. $3x + y \leq -2$

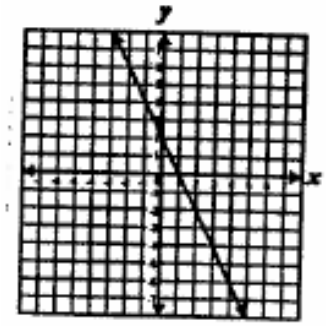
D. $3x + y \geq -2$

72. Which best represents the graph of $y = 2x - 2$?

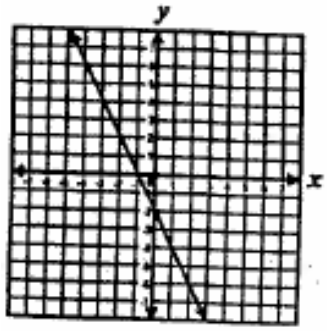
A.



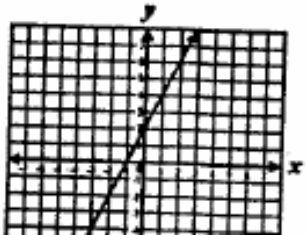
B.



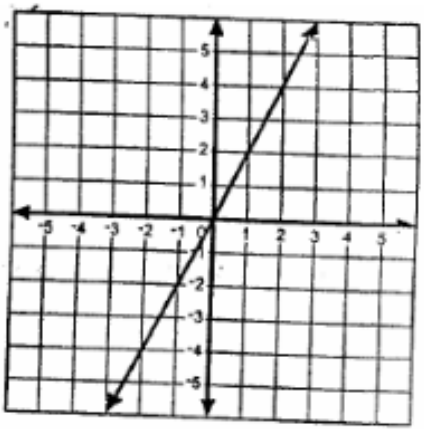
C.



D.



73. Which equation best represents the graph below?



A. $y = x$

B. $y = 2x$

C. $y = x + 2$

D. $y = 2x + 2$

74. Which point lies on the line defined by $3x + 6y = 2$?

A. (0, 2)

B. (0, 6)

C. $\left(1, -\frac{1}{6}\right)$

D. $\left(1, -\frac{1}{3}\right)$

75. What is the equation of the line that has a slope of 4 and passes through the point (3, -10)?

A. $y = 4x - 22$

B. $y = 4x + 22$

C. $y = 4x - 43$

D. $y = 4x + 43$

76. The data in the table shows the cost of renting a bicycle by the hour, including a deposit.

Hours (h)	Cost in dollars (c)
2	15
5	30
8	45

If hours, h, were graphed on the horizontal axis and cost, c, were graphed on the vertical axis, what would the equation of a line be that fits the data?

A. $c = 5h$

B. $c = \frac{1}{5}h + 5$

C. $c = 5h + 5$

D. $c = 5h - 5$

77. Some ordered pairs for a linear function of x are given in the table below.

x	y
1	1
3	7
5	13
7	19

Which of the following equations was used to generate the table above?

A. $y = 2x + 1$

B. $y = 2x - 1$

C. $y = 3x - 2$

D. $y = 4x - 3$

78. The equation of the line l is $6x + 5y = 3$, and the equation of line q is $5x - 6y = 0$. Which statement about the two lines is true?

A. Lines l and q have the same y-intercept.

B. Lines l and q are parallel.

C. Lines l and q have the same x-intercept.

D. Lines l and q are perpendicular.

79. Which equation represents a line that is parallel to $y = -\frac{5}{4}x + 2$?

A. $y = -\frac{5}{4}x + 1$

B. $y = -\frac{4}{5}x + 2$

C. $y = \frac{4}{5}x + 3$

D. $y = \frac{5}{4}x + 4$

80. What is the solution to this system of equations?

$$y = -3x - 2$$
$$6x + 2y = -4$$

A. (6, 2)

B. (1, -5)

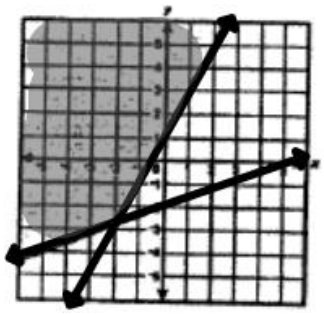
C. No solution

D. Infinitely many solutions

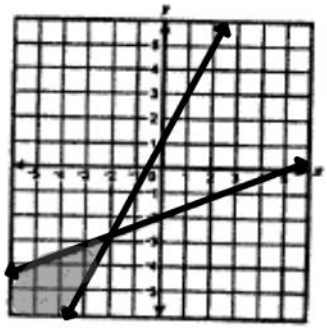
81. Which graph best represents the solution to this system of inequalities?

$$2x \geq y - 1$$
$$2x - 5y \leq 10$$

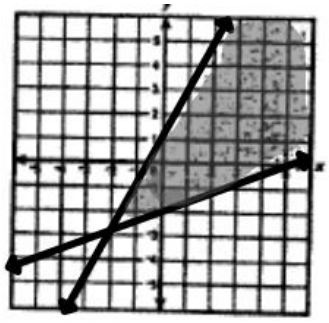
A.



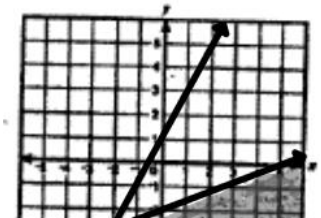
B.



C.



D.



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

$$x + 3y = 7$$
$$x + 2y = 10$$

A. $\left(\frac{7}{2}, \frac{13}{4}\right)$

B. $\left(\frac{7}{2{,}17}{5}\right)$

C. (-2, -3)

D. (16, -3)

83. Marcy has a total of 100 dimes and quarters. If the total value of the coins is $14.05, how many quarters does she have?

A. 27

B. 40

C. 56

D. 73

84. Which of the following best describes the graph of this system of equations?

$$y = -2x + 3$$
$$5y = -10x + 15$$

A. Two identical lines

B. Two parallel lines

C. Two lines intersection in only one point

D. Two lines intersecting in only two points

85. $\frac{5x^3}{10x^7} =$

A. $2x^4$

B. $\frac{1}{2x^4}$

C. $\frac{1}{5x^4}$

D. $\frac{x^4}{5}$

86. $(4x^2 - 2x + 8) - (x^2 + 3x - 2) =$

A. $3x^2 + x + 6$

B. $3x^2 + x + 10$

C. $3x^2 - 5x + 6$

D. $3x^2 - 5x + 10$

87. The sum of two binomials is $5x^2 - 6x$. If one of the binomials is $3x^2 - 2x$, what is the other binomial?

A. $2x^2 - 4x$

B. $2x^2 - 8x$

C. $8x^2 + 4x$

D. $8x^2 - 8x$

88. Which of the following expressions is equal to $(x + 2) + (x - 2)(2x + 1)$?

A. $2x^2 - 2x$

B. $2x^2 - 4x$

C. $2x^2 + x$

D. $4x^2 + 2x$

89. A volleyball court is shaped like a rectangle. It has a width of x meters and a length of $2x$ meters. Which of the expressions gives the area of the court in square meters?

A. $3x$

B. $2x^2$

C. $3x^2$

D. $2x^3$

90. Which is the factored form of $3a^2 - 24ab + 48b^2$?

A. $(3a - b)(a - 6b)$

B. $(3a - 16)(a - 3b)$

C. $3(a - 4b)(a - 4b)$

D. $3(a - 8b)(a - 8b)$

91. Which is a factor of $x^2 - 11x + 24$?

A. $x + 3$

B. $x - 3$

C. $x + 4$

D. $x - 4$

92. Which of the following shows $9t^2 + 12t + 4$ factored completely?

A. $(3t + 2)^2$

B. $(3t + 4)(3t + 1)$

C. $(9t + 4)(t + 1)$

D. $9t^2 + 12t + 4$

93. What is the complete factorization of $32 - 8z^2$?

A. $-8(2 + z)(2 - z)$

B. $8(2 + z)(2 - z)$

C. $-8(2 + z)^2$

D. $8(2 - z)^2$

94. If x^2 is added to x, the sum is 42. Which of the following could be the value of x?

A. – 7

B. – 6

C. 14

D. 42

95. Two airplanes left the same airport traveling in opposite directions. If one airplane averages 400 miles per hour and the other airplane averages 250 miles per hour, in how many hours will the distance between the two planes be 1625 miles?

A. 2.5

B. 4

C. 5

D. 10.8

96. Lisa will make punch that is 25% fruit juice by adding pure fruit juice to a 2-liter mixture that is 10% pure fruit juice. How many liters of pure fruit juice does she need to add?

A. 0.4 liters

B. 0.5 liters

C. 2 liters

D. 8 liters

97. Which relation is a function?

A. $\{(-1, 3), (-2, 6), (0, 0), (-2, -2)\}$

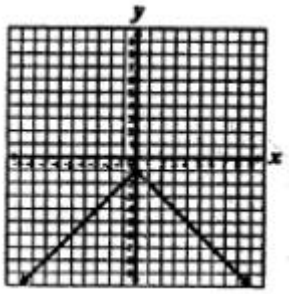
B. $\{(-2, -2), (0, 0), (1, 1), (2, 2)\}$

C. $\{(4, 0), (4, 1), (4, 2), (4, 3)\}$

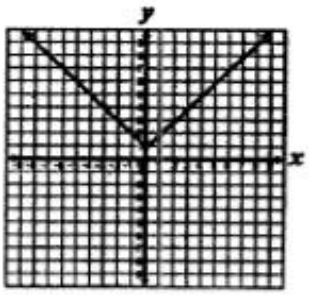
D. $\{(7, 4), (8, 8), (10, 8), (10, 10)\}$

98. For which equation graphed below are <u>all</u> the *y*-values negative?

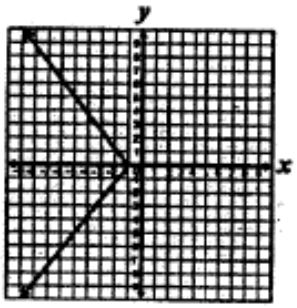
A.



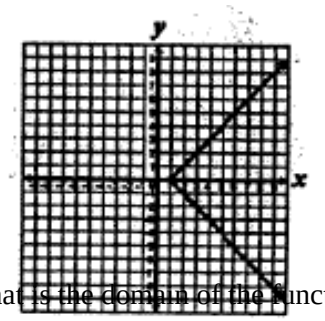
B.



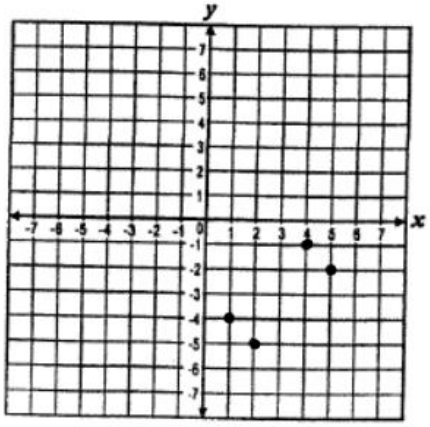
C.



D.



99. What is the domain of the function shown on the graph below?



A. $\{-1, -2, -3, -4\}$

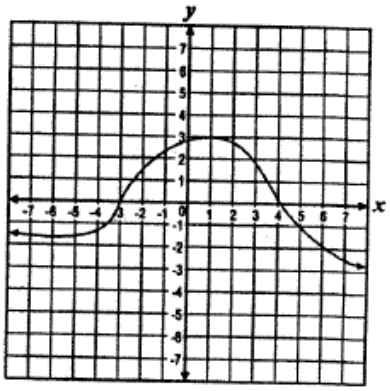
B. $\{-1, -2, -4, -5\}$

C. $\{1, 2, 3, 4\}$

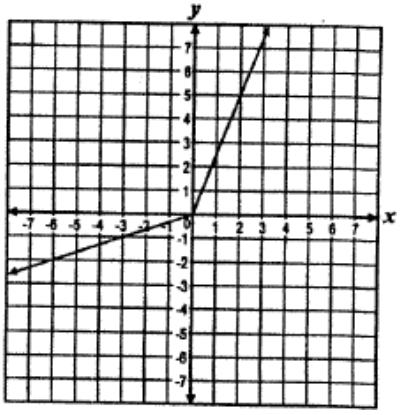
D. $\{1, 2, 4, 5\}$

100. Which of the following graphs represents a relation that is <u>not</u> a function of x?

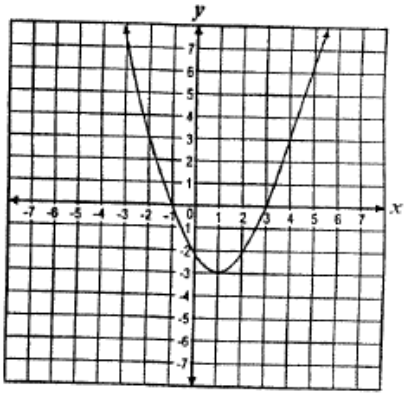
A.



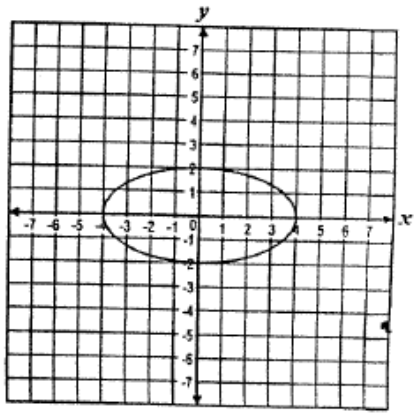
B.



C.



D.



100 Problem Keystone Review: KEY

1. A	2. C	3. B	4. A	5. D	6. D	7. B	8. D	9. A	10. C
11. A	12. D	13. B	14. D	15. B	16. C	17. C	18. D	19. B	20. B
21. B	22. C	23. D	24. B	25. D	26. B	27. C	28. C	29. D	30. B
31. D	32. B	33. A	34. D	35. C	36. B	37. A	38. A	39. C	40. D
41. D	42. A	43. B	44. D	45. A	46. A	47. C	48. B	49. B	50. B
51. D	52. C	53. D	54. A	55. C	56. B	57. B	58. C	59. C	60. C
61. A	62. D	63. D	64. D	65. A	66. B	67. B	68. C	69. C	70. D
71. A	72. A	73. B	74. C	75. A	76. C	77. C	78. D	79. A	80. D
81. C	82. D	83. A	84. A	85. B	86. D	87. A	88. A	89. D	90. C
91. B	92. A	93. B	94. A	95. A	96. A	97. B	98. B	99. D	100. D