

ALGEBRA AND FUNCTIONS

_____ 1. Evaluate $5x + 6$ given $x = 7$.

- a. 18 b. 35 c. 41 d. 13

_____ 2. Evaluate $\frac{2x+5y}{3x-2y}$ given $x = 3$ and $y = 5$.

- a. -31 b. $\frac{31}{19}$ c. 7 d. -18

_____ 3. Evaluate $x^2 + 2x - 8$ given $x = 4$.

- a. 8 b. 16 c. 4 d. 12

_____ 4. Solve the equation $3x + 5 = 17$.

- a. $x = 2$ b. $x = 5$ c. $x = 3$ d. $x = 4$

_____ 5. Solve the equation $-2x - 4 = 10$.

- a. $x = -3$ b. $x = 3$ c. $x = -7$ d. $x = 7$

_____ 6. Solve the equation $5x - 7 = 2x + 11$.

- a. $x = 3$ b. $x = 6$ c. $x = \frac{4}{3}$ d. $x = 18$

_____ 7. Solve $5(x - 4) = 3x - 10$.

- a. $x = -3$ b. $x = -1$ c. $x = 5$ d. $x = 6$

_____ 8. The formula for simple interest is $I = Prt$. Which equation is the possible representation when solving for t ?

- a. $t = \frac{I}{r}$ b. $t = IPr$ c. $t = \frac{I}{Pr}$ d. $t = \frac{Pr}{I}$

_____ 9. The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Which of the equations below is a possible representation when solving for h ?

- a. $h = \frac{V\pi r^2}{3}$ b. $h = \frac{3\pi r^2}{V}$ c. $h = V - \frac{r^2 h}{3}$ d. $h = \frac{3V}{\pi r^2}$

_____10. The standard form for a linear equation is $Ax + By = C$. Which equation is solved for x ?

a. $x = \frac{C + By}{A}$

b. $x = \frac{C - By}{A}$

c. $x = A(C - By)$

d. $x = A(C + By)$

_____11. Solve the inequality $3x - 1 < x + 7$.

a. $x > 4$

b. $x < 4$

c. $x > 2$

d. $x < 2$

_____12. Solve the inequality $-2x + 15 > 4x + 3$.

a. $x > 2$

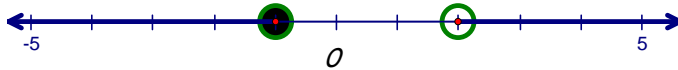
b. $x < 2$

c. $x > 6$

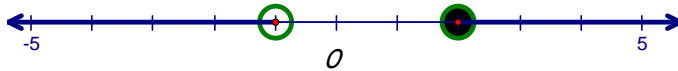
d. $x < 6$

_____13. Which is the graph of $x \leq -1$ or $x > 2$?

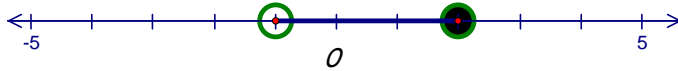
a.



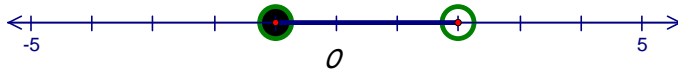
b.



c.

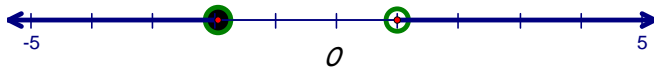


d.

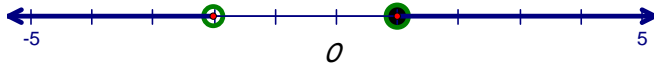


_____14. Which is the graph of $-2 \leq x < 1$?

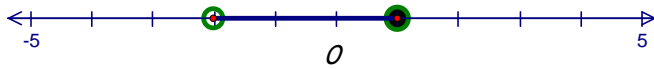
a.



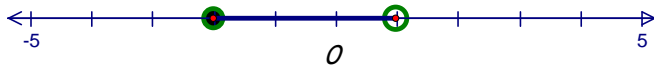
b.



c.



d.



- _____15. Which property is being illustrated given $(2 + x) + y = 2 + (x + y)$.
- a. commutative b. associative c. inverse d. identity
- _____16. Which property is being illustrated given $(a + b) + c = (b + a) + c$.
- a. commutative b. associative c. inverse d. identity
- _____17. Which property is being illustrated given $a + (-a) = 0$.
- a. commutative b. associative c. inverse d. identity
- _____18. Which property is being illustrated given $a + 0 = a$.
- a. commutative b. associative c. inverse d. identity
- _____19. Which is an example of an expression?
- a. $2x - 4 = 10$ b. $2x - 4 > 10$ c. $2x - 4$ d. $2x - 4 < 10$
- _____20. What is an equivalent algebraic statement of, “five times the sum of x and 2”?
- a. $5x + 2$ b. $2x + 5$ c. $5(x + 2)$ d. $5(2x)$
- _____21. What is the equivalent algebraic statement of, “two less than the product of x and 4”?
- a. $2 - 4x$ b. $4x - 2$ c. $2(4x)$ d. $4x + 2$
- _____22. What is the equivalent algebraic statement of, “twice the sum of x and 3”?
- a. $2x + 3$ b. $2(3x)$ c. $2(x + 3)$ d. $2x + 6$
- _____23. What is an equivalent algebraic statement of, “seven times the sum of x and one is five”?
- a. $7x + 1 = 5$ b. $7x = 5$ c. $7(x + 1) = 5$ d. $7(x - 1) = 5$
- _____24. What is an equivalent algebraic statement of, “three times the difference of a number x and two is twenty”?
- a. $3(x - 2) = 20$ b. $3(2 - x) = 20$ c. $3(x + 22)$ d. $3(2x) = 20$
- _____25. What is an equivalent algebraic statement of, “four times x is more than twenty-eight”?
- a. $4x - 28$ b. $28 - 4x$ c. $4x < 28$ d. $4x > 28$
- _____26. What is an equivalent algebraic statement of, “the quotient of a number, x , and 4 is less than 32”?
- a. $\frac{4}{x} < 32$ b. $\frac{x}{4} < 32$ c. $4x - 32$ d. $32 - 4x$

_____27. The length of a rectangle is four more than twice the width. The perimeter is 32. What are the dimensions of the rectangle?

- a. 4 and 8 b. 4 and 12 c. 2 and 16 d. 6 and 10

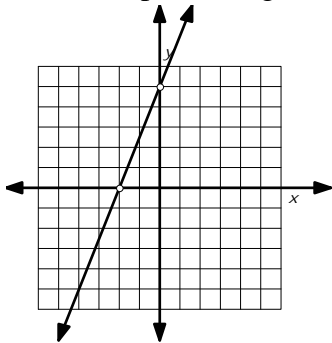
_____28. Carol is 25 years older than her sister Amanda. Mike is three times as old as Amanda. The sum of their ages is 90. How old is Carol?

- a. 13 b. 38 c. 39 d. 10

_____29. Stephanie lost 36 pounds in 3 months. The second month she lost two more than the first month. The third month she lost five more than the second month. How many pounds did she lose the first month?

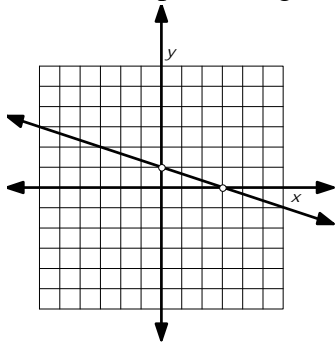
- a. 5 b. 29 c. 4.5 d. 9

_____30. What is the slope of the given line?



- a. $\frac{2}{5}$ b. $\frac{5}{2}$
c. $-\frac{2}{5}$ d. $-\frac{5}{2}$

_____31. What is the slope of the given line?



- a. -3 b. 3
c. $-\frac{1}{3}$ d. $\frac{1}{3}$

_____32. The slope of a vertical line is _____.

- a. negative b. zero c. positive d. undefined

_____33. The slope of a horizontal line is _____.

- a. negative b. zero c. positive d. undefined

_____34. Determine which lines are parallel.

- a. $y = 2x + 3$ b. $y = 4x + 1$ c. $y = 2x - 2$ d. $y = 5x - 2$
 $y = 3x + 2$ $y = 4x - 5$ $y = -\frac{1}{2}x + 4$ $y = -5x + 1$

_____ 35. Determine which lines are perpendicular.

a. $y = 2x + 3$
 $y = 3x + 2$

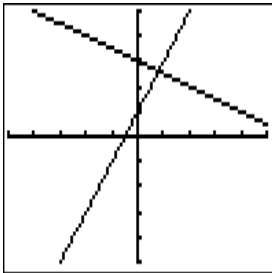
b. $y = 4x + 1$
 $y = 4x - 5$

c. $y = 2x - 2$
 $y = -\frac{1}{2}x + 4$

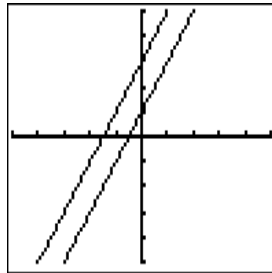
d. $y = 5x - 2$
 $y = -5x + 1$

_____ 36. Which diagram depicts lines that appear to have the same slope?

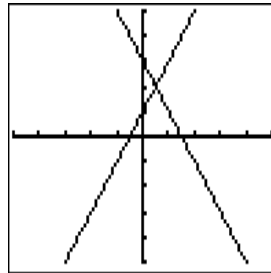
a.



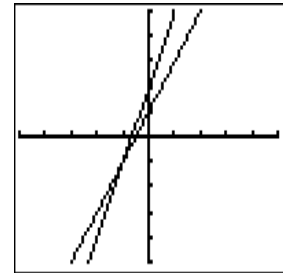
b.



c.

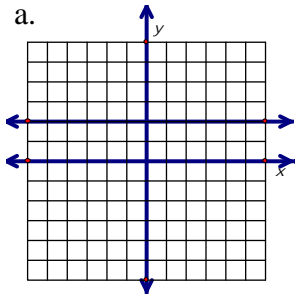


d.

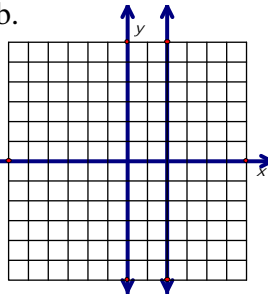


_____ 37. Which of the following is the graph of $y = 2$?

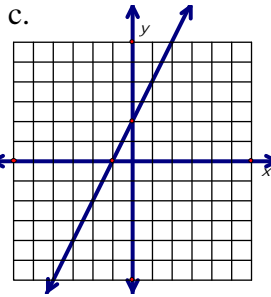
a.



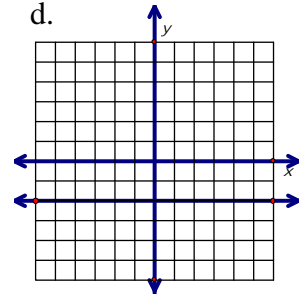
b.



c.

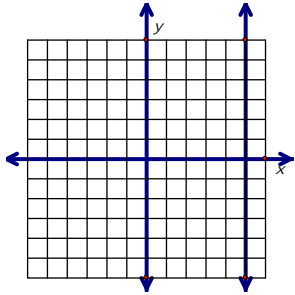


d.

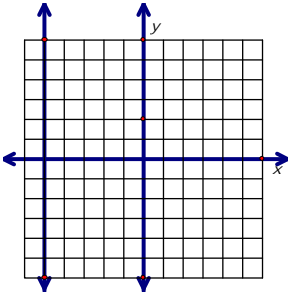


_____ 38. Which of the following is the graph of $x = -5$?

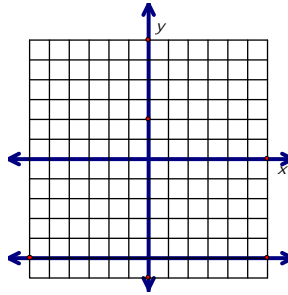
a.



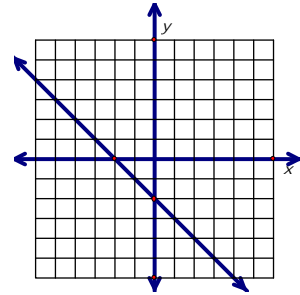
b.



c.

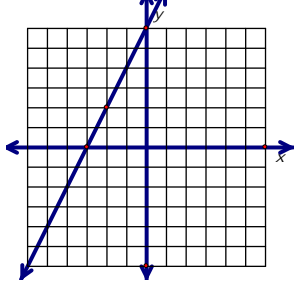


d.

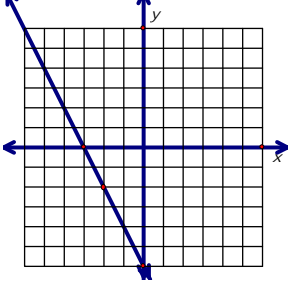


_____ 39. Which of the following is the graph of $y = 2x - 3$?

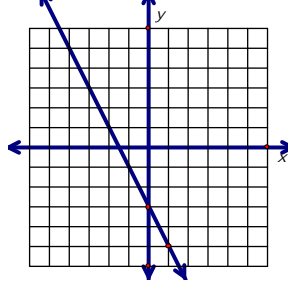
a.



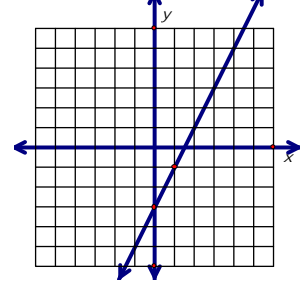
b.



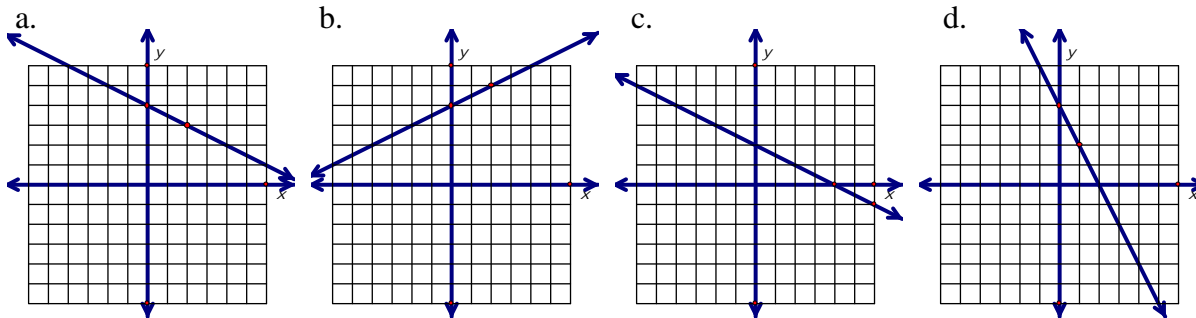
c.



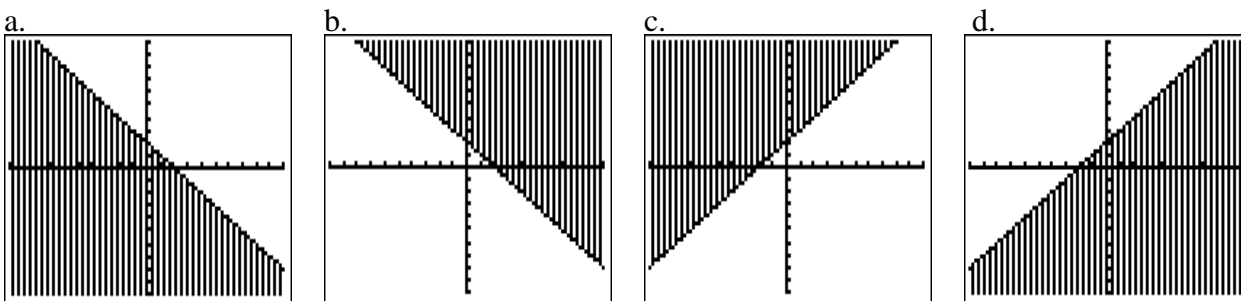
d.



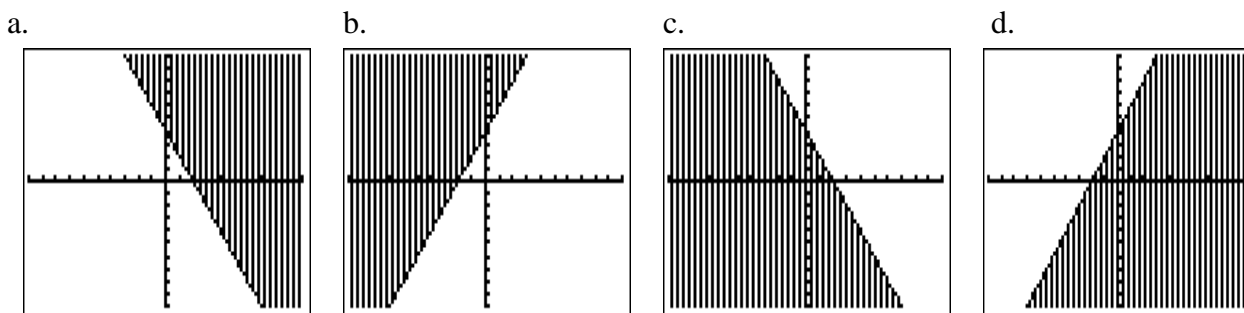
_____ 40. Which of the following is the graph of $y = -\frac{1}{2}x + 4$?



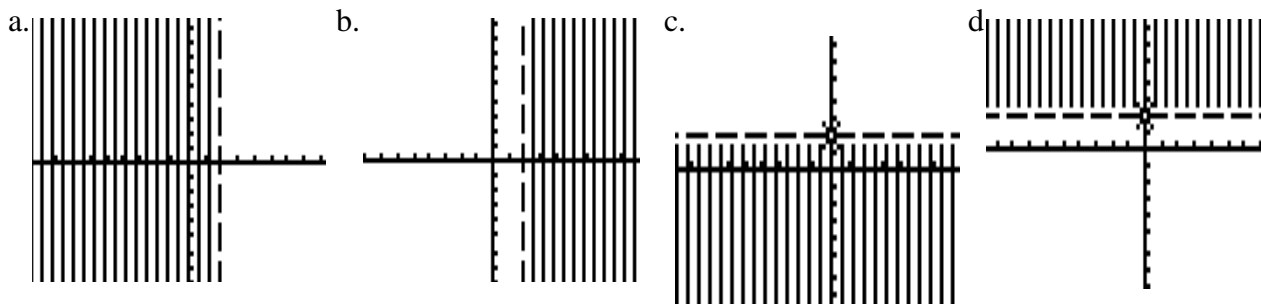
_____ 41. Which of the following is the graph of $y \geq x + 2$?



_____ 42. Which of the following is the graph of $y \leq x + 4$?



_____ 43. Which is the following is the graph of $y < 2$?



Determine the x-intercept and y-intercept of the graph of the equation

_____ 44. $2x - 5y = 10$.

a. x-int. = -5 b. x-int. = 5
y-int. = -2 y-int. = -2

c. x-int. = 5 d. x-int. = -5
y-int. = 2 y-int. = 2

_____ 45. $2y = 4x + 8$.

a. x-int. = -2 b. x-int. = 2
y-int. = 4 y-int. = 4

c. x-int. = 2 d. x-int. = -2
y-int. = -4 y-int. = -4

Determine which ordered pair is a solution

_____ 46. $4x - 5y = 7$.

a. (3, 1) b. (1, 3) c. (2, 5) d. (8, 25)

_____ 47. $12 - 3x = y$.

a. (2, 9) b. (2, 6) c. (3, 5) d. (-3, -21)

_____ 48. Which equation describes the pattern in the table?

x	1	2	3	4
y	7	9	11	13

a. $y = 3x + 1$ b. $y = 2x + 5$ c. $y = 2x - 3$ d. $y = 4x + 1$

_____ 49. Consider the table of values shown. The relationship of x to y is represented by which equation?

x	y
1	3
2	7
3	11
4	15

a. $y = 3x + 1$ b. $y = x + 2$
c. $y = 3x + 2$ d. $y = 4x - 1$

_____50. Which equation fits with the values in the variable?

x	y
1	4
2	7
3	10
4	13

- a. $y = x + 3$ b. $y = 2x + 3$
c. $y = 3x + 1$ d. $y = 4x - 1$

_____51. The cost C of placing an advertisement in a newspaper cost \$15 plus \$3 per line. Which equation models the cost of an advertisement with n lines?

- a. $C = 3n + 15$ b. $C = 15n + 3$ c. $C = 18n$ d. $C = 45n$

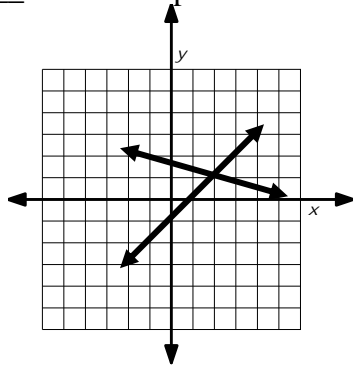
_____52. A car costs C to rent a car is \$300 plus \$0.25 per mile. Write a model for the cost for n miles.

- a. $C = 300n + 0.25$ b. $C = 0.25n + 300$
c. $C = 325n$ d. $C = 300 + 0.25$

_____53. Which equation is equivalent to $4x + 2y = -26$?

- a. $y = -2x - 13$ b. $y = 2x - 13$ c. $y = -4x - 13$ d. $y = 4x - 13$

_____54. Which point is the solution to the linear system graphed below?



- a. (1, 2) b. (2, 1)
c. (0, 2) d. (0, -1)

_____55. Which point is a solution to the linear system?

- $3x - 2y = 2$ a. (4, 5) b. (2, 5) c. (-4, 10) d. (5, 2)
 $x + 2y = 14$

_____56. Which point is the solution to the linear system?

- $2x + 3y = 5$ a. (1, 1) b. (4, -1) c. (9, 0) d. (1, 3)
 $-2x + 10y = -18$

_____57. Selling frozen yogurt at a fair, you make \$565 and use 250 cones. A single-scoop cone costs \$2 and a double-scoop cone costs \$2.50. How many of each type of cone did you sell?

- a. 100 double
150 single
- b. 130 double
120 single
- c. 50 double
200 single
- d. 80 double
170 single

_____58. Health Club A charges a \$60 yearly enrollment fee and \$2 per visit. Health Club B charges a \$20 yearly enrollment fee and \$4 per visit. What is the number of visits at which both clubs cost the same?

- a. 20 b. 24 c. 40 d. 43

_____59. Which point is a solution to the system of linear inequalities?

- $y > -5$
 $x < 3$
 $2x + y < 13$
- a. (1, 0) b. (5, 3) c. (3, -4) d. (4, 2)

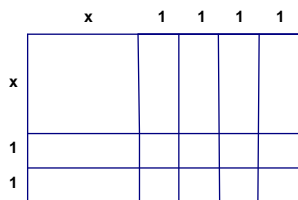
_____60. Which point is a solution to the system of linear inequalities?

- $x + y > 2$
 $y < 2x + 3$
 $4x - 2y > -8$
- a. (-5, 1) b. (1, -1) c. (-3, 5) d. (2, 3)

_____61. Which point is a solution to the system?

- $x = 1$
 $y = x^2 + 2x + 4$
- a. (2, 3) b. (1, 7) c. (1, 4) d. (2, 7)

_____62. The following diagram is broken into the dimensions shown below. Which expression represents the area of the configuration?



- a. $2x + 6$ b. $x^2 + 6$
- c. $(x + 4)(x + 2)$ d. $(2x)(4x)$

_____63. Find the sum of $(x^2 + 2x - 3)$ and $(3x^2 - 5x + 2)$.

- a. $4x^2 + 7x - 1$ b. $4x^2 - 3x - 1$
- c. $4x^2 - 3x + 1$ d. $4x^2 - 7x - 1$

_____64. Which expression is equivalent to $(7x^2 - 4x + 5) - (2x^2 - 1)$?

- a. $5x^2 - 4x + 4$ b. $7x^2 - 6x + 6$
- c. $5x^2 - 4x + 6$ d. $7x^2 - 4x + 4$

- _____ 65. From 1985 through 1995, the gross farm income G and farm expenses E (in billions of dollars) in the US can be modeled by $G = 2x^2 + 5x + 50$ and $E = x^2 + 3x + 17$ where x is the number of years since 1985. Write a model for the net farm income N for these years. $N = G - E$.
- a. $-5x^2 + 2x - 33$ b. $3x^2 + 8x + 67$
c. $x^2 + 2x + 33$ d. $-x^2 + 2x + 33$
- _____ 66. Find the product of $(x + 4)(x - 1)$.
- a. $x^2 - 5x - 4$ b. $x^2 - 3x + 4$
c. $x^2 + 3x + 4$ d. $x^2 + 3x - 4$
- _____ 67. What are the factors of $x^2 + 7x + 10$?
- a. $(x + 2)(x + 5)$ b. $(x + 7)(x + 10)$
c. $(x + 10)(x + 1)$ d. $(x + 4)(x + 3)$
- _____ 68. What are the factors of $x^2 - 6x + 8$?
- a. $(x + 4)(x + 2)$ b. $(x + 8)(x - 2)$
c. $(x - 4)(x - 2)$ d. $(x - 8)(x + 2)$
- _____ 69. Factor $x^2 - 16$.
- a. $(x + 4)(x - 4)$ b. $(x - 4)(x - 4)$
c. $(x + 4)(x + 4)$ d. $(x - 4)$
- _____ 70. Factor $4x^2 - 9$.
- a. $(2x + 3)(2x + 3)$ b. $(2x - 3)(2x + 3)$
c. $(4x + 3)(4x - 3)$ d. $(2x - 3)(2x - 3)$
- _____ 71. The solution set for $x^2 + 3x - 10 = 0$ is _____.
- a. $\{-5, 2\}$ b. $\{5, -2\}$
c. $\{3, -10\}$ d. $\{-10, 3\}$
- _____ 72. The solution set for $x^2 - 10x = -24$ is _____.
- a. $\{-10, 24\}$ b. $\{6, 4\}$
c. $\{-6, -4\}$ d. $\{10, 24\}$

_____73. Find the sum of the matrices $\begin{bmatrix} 1 & 3 & -2 \\ 0 & 6 & 8 \\ 4 & -5 & 10 \end{bmatrix} + \begin{bmatrix} 4 & 7 & 0 \\ -3 & 4 & 1 \\ 8 & 6 & 9 \end{bmatrix}$.

a. $\begin{bmatrix} 5 & 10 & -2 \\ -3 & 10 & 9 \\ 12 & 1 & 19 \end{bmatrix}$

b. $\begin{bmatrix} 5 & 10 & -2 \\ -3 & 10 & 9 \\ 12 & 11 & 19 \end{bmatrix}$

c. $\begin{bmatrix} 5 & 10 & 2 \\ 3 & 4 & 1 \\ 12 & 1 & 19 \end{bmatrix}$

d. $\begin{bmatrix} 5 & 10 & -2 \\ -3 & 10 & 9 \\ 12 & -1 & 19 \end{bmatrix}$

_____74. Store A and Store B are combining inventories to create Megastore C. The inventories of Stores A and B are recorded in the matrices below. How many khaki pants will Megastore C have in its inventory?

	Store A	
	Shirts	Pants
Denim	$\begin{bmatrix} 10 & 6 \end{bmatrix}$	
Khaki	$\begin{bmatrix} 2 & 7 \end{bmatrix}$	

	Store B	
	Shirts	Pants
Denim	$\begin{bmatrix} 4 & 1 \end{bmatrix}$	
Khaki	$\begin{bmatrix} 5 & 8 \end{bmatrix}$	

a. 14 b. 17

c. 7 d. 15

_____75. The Atlanta Braves had 59 wins and 29 losses, the Seattle Mariners had 37 wins and 51 losses, and the Chicago Cubs had 48 Wins and 39 losses. Use the information about these 3 Major League Baseball teams' wins and losses in 1998 to write a matrix.

a. $\begin{bmatrix} 59 & 29 \\ 37 & 51 \\ 48 & 39 \end{bmatrix}$

b. $\begin{bmatrix} 59 & 37 \\ 29 & 51 \\ 48 & 39 \end{bmatrix}$

c. $\begin{bmatrix} 59 & 29 \\ 37 & 48 \\ 51 & 39 \end{bmatrix}$

_____76. Simplify $2\begin{bmatrix} -6 & -10 & 2 \\ 4 & -7 & -4 \end{bmatrix} - \begin{bmatrix} -1 & 5 & 13 \\ -3 & -6 & 19 \end{bmatrix}$.

a. $\begin{bmatrix} -11 & -25 & -9 \\ 11 & -8 & -27 \end{bmatrix}$

b. $\begin{bmatrix} -13 & -25 & 1 \\ 11 & -20 & -11 \end{bmatrix}$

c. $\begin{bmatrix} -13 & -15 & 17 \\ 11 & -20 & -27 \end{bmatrix}$

d. $\begin{bmatrix} 5 & -25 & 1 \\ 11 & -20 & -11 \end{bmatrix}$

_____77. What is the next number in the sequence? 3, 7, 11, 15, 19, _____.

a. 23

b. 21

c. 24

d. 26

_____78. In the sequence: $1, \frac{1}{3}, \frac{1}{9}, \underline{\hspace{1cm}}, \frac{1}{81}$ what is the missing term?

a. $\frac{1}{12}$

b. $\frac{1}{18}$

c. $\frac{1}{27}$

d. $\frac{1}{72}$

_____79. What is the next number in the sequence? 1, 8, 27, 64, _____.

- a. 82 b. 120
c. 125 d. 91

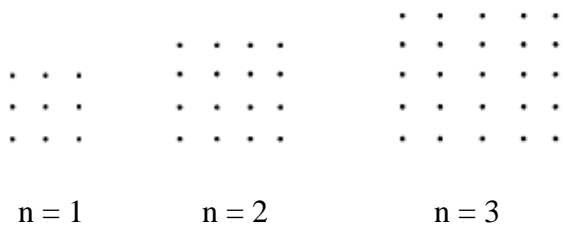
_____80. Given the following sequence 2, 8, 18, 32, 50, ... What is the n^{th} term in this sequence?

- a. $2n$ b. $2n^2$
c. $n + 1$ d. $n^2 + 1$

_____81. Given the following sequence 3, 6, 11, 18, 27 ... What is the n^{th} term in this sequence?

- a. n b. $n + 1$
c. $n^2 + 2$ d. $n + 2$

_____82. A sequence is represented by the figure below. Which expression would be used to represent the n^{th} term in the sequence?



- a. n^2 b. $2n$
c. $n^2 + 2$ d. $(n + 2)^2$

_____83. Give a formula for the number of dots in the n^{th} figure in this sequence.



- a. $\frac{1}{2}(n - 1)$ b. $2(n - 1)$
c. $2n - 1$ d. $2n + 1$

_____84. Simplify $\sqrt{90}$.

- a. $\sqrt{3}\sqrt{30}$ b. $\sqrt{3}\sqrt{10}$ c. $3\sqrt{10}$ d. $10\sqrt{3}$

_____85. Simplify $\sqrt{48}$.

- a. $\sqrt{2}\sqrt{24}$ b. $4\sqrt{3}$ c. $3\sqrt{2}$ d. $2\sqrt{3}$

_____86. The $\sqrt{20}$ is between what two numbers?

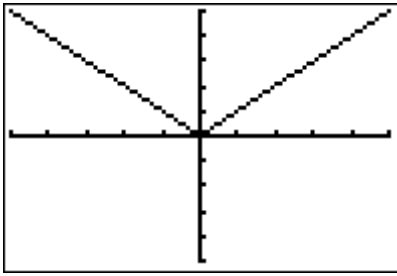
- a. 3 and 4 b. 4 and 5 c. 5 and 6 d. 6 and 7

_____87. The $\sqrt{54}$ is between what two numbers?

- a. 4 and 5 b. 5 and 6 c. 6 and 7 d. 7 and 8

- _____ 88. Lisa is going on a trip to Paris where the Euro is the monetary unit. To convert her money, she used the formula $E = 1.6U$, where E is Euros and U is U.S. Dollars. About how many U.S dollars will 5000 Euros be worth?
- a. \$8000 b. \$3125 c. \$312 d. \$800
- _____ 89. Use the formula distance = rate x time. What is the rate(in meters/second) for an object that can travel 80 meters in 5 seconds?
- a. 16 b. 75 c. 85 d. 400
- _____ 90. Nick and Chris leave the same place on their bicycles and travel in opposite directions. Nick averages 10 miles per hour and Chris averages 12 miles per hour. After how many hours are they 132 miles apart?
- a. 6 b. 11 c. 12 d. 22
- _____ 91. Two trains left a station at 1:00 p.m., traveling in opposite directions. One train travels an average of 80 miles per hour and the other travels an average of 90 miles per hour. What time are they 1360 miles apart?
- a. 8 pm. b. 9 p.m. c. 10 p.m. d. 11 p.m.
- _____ 92. Solve $|x - 3| = 7$.
- a. 10 only b. -4 only c. 10 and -4 d. -10 and -4
- _____ 93. Solve $|x + 4| = 12$.
- a. 8 only b. 3 and 8 c. -16 only d. 8 and -16
- _____ 94. Which inequality is equivalent to $|2x - 3| < 11$?
- a. $-4 < x < 4$ b. $-4 < x < 7$
c. $x < -4$ and $x > 7$ d. $x < 7$
- _____ 95. Which inequality is equivalent to $|4x - 7| < 1$?
- a. $-2 < x < 8$ b. $6 < x < 8$
c. $\frac{3}{2} < x < 2$ d. $x < \frac{2}{3}$ or $x > 2$

_____ 96. Given the graph below. Which function is represented by the graph?



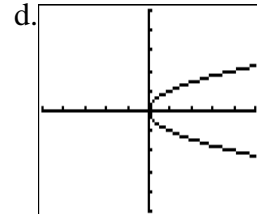
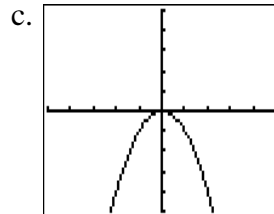
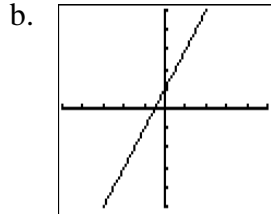
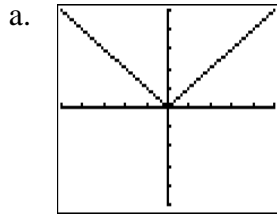
a. $y = x$

b. $y = -x$

c. $y = |x|$

d. $y = -|x|$

_____ 97. Which graph below is NOT a function?



_____ 98. Which set of points is a relation?

a. $\{(0, 4), (-1, 1), (1, 4), (1, 7)\}$

b. $\{(1, 2), (1, 3), (2, 4), (3, 6)\}$

c. $\{(1, 0), (2, 0), (3, 2), (4, 5)\}$

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

_____ 99. Simplify $x^2 \cdot x^7$

a. x^9

b. x^{14}

c. x^5

d. x^{11}

_____ 100. Simplify $2x^3y^5 \cdot 4xy^2$

a. $8x^3y^5$

b. $8x^4y^7$

c. $8x^3y^7$

d. $8x^2y^3$

_____ 101. Simplify $\frac{10x^4}{2x}$

a. $5x^3$

b. $5x^5$

c. $5x^4$

d. $5x^2$

_____ 102. Simplify $\frac{4x^5y^3}{20x^2y}$

a. $\frac{x^7y^4}{5}$

b. $5x^7y^4$

c. $\frac{x^3y^2}{5}$

d. $5x^3y^2$

Algebra & Functions
Key

- | | | | | |
|-------|-------|-------|-------|--------|
| 1. C | 21. B | 41. C | 61. B | 81. C |
| 2. A | 22. C | 42. D | 62. C | 82. D |
| 3. B | 23. C | 43. C | 63. B | 83. C |
| 4. D | 24. A | 44. B | 64. C | 84. C |
| 5. C | 25. D | 45. A | 65. C | 85. B |
| 6. B | 26. B | 46. A | 66. D | 86. B |
| 7. C | 27. B | 47. B | 67. A | 87. D |
| 8. C | 28. B | 48. B | 68. C | 88. B |
| 9. D | 29. D | 49. D | 69. A | 89. A |
| 10. B | 30. B | 50. C | 70. B | 90. A |
| 11. B | 31. C | 51. A | 71. A | 91. B |
| 12. B | 32. D | 52. B | 72. B | 92. C |
| 13. A | 33. B | 53. A | 73. A | 93. D |
| 14. D | 34. B | 54. B | 74. D | 94. B |
| 15. B | 35. C | 55. A | 75. A | 95. C |
| 16. A | 36. B | 56. B | 76. A | 96. C |
| 17. C | 37. A | 57. B | 77. A | 97. D |
| 18. D | 38. B | 58. A | 78. C | 98. C |
| 19. C | 39. D | 59. A | 79. C | 99. A |
| 20. C | 40. A | 60. D | 80. B | 100. B |
| | | | | 101. A |
| | | | | 102. C |