ALGEBRA AND FUNCTIONS

_____1. Evaluate $5x + 6$ given $x = 7$

        a. 18   b. 35

        c. 41   d. 13

_____2. Evaluate $\dfrac{2x + 5y}{3x - 2y}$ given $x = 3$ and $y = 5$

        a. -31   b. $\dfrac{31}{19}$

        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. $x = \dfrac{4}{3}$ 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 Interest is I = Prt. Which equation is the possible representation
when solving for t?

    a. $t = \dfrac{I}{r}$ b. t = IPr

    c. $t = \dfrac{I}{Pr}$ d. $t = \dfrac{Pr}{I}$

_____9. The formula for the volume of a cone is $V = \dfrac{1}{3}\pi r^2 h$. Which of the equations below
is a possible representation when solving for h?

    a. $h = \dfrac{V\pi r^2}{3}$ b. $h = \dfrac{3\pi r^2}{V}$

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

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

    a. $x = \dfrac{C + By}{A}$ b. $x = \dfrac{C - By}{A}$

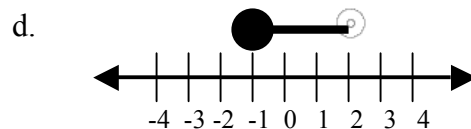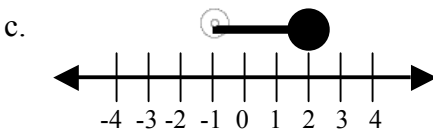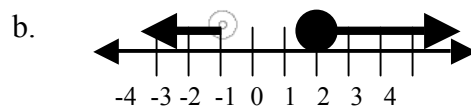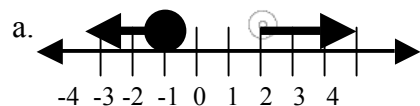   c. x = A(C − By)   d. x = A(C + By)

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

    a. x > 4   b. x < 4

    c. x > 2   d. x < 2
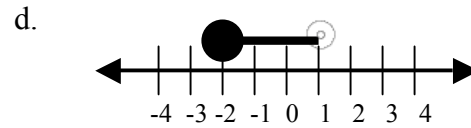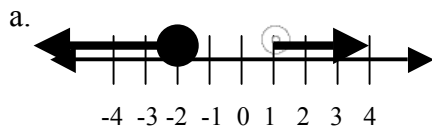
_____12. Solve the inequality   -2x + 15 > 4x + 3

    a. x > 2   b. x < 2

    c. x > 6   d. x < 6

_____13. Which is the graph of x ≤ -1 or x > 2

a.

-4 -3 -2 -1 0 1 2 3 4

b.

-4 -3 -2 -1 0 1 2 3 4

c.

-4 -3 -2 -1 0 1 2 3 4

d.

-4 -3 -2 -1 0 1 2 3 4

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

a.

-4 -3 -2 -1 0 1 2 3 4

b.

-4 -3 -2 -1 0 1 2 3 4

c.

-4 -3 -2 -1 0 1 2 3 4

d.

-4 -3 -2 -1 0 1 2 3 4
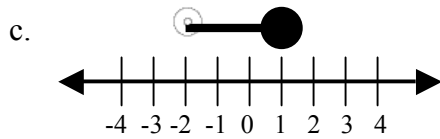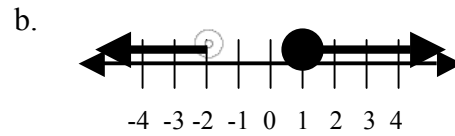
_____15. Which property is being illustrated given $(2 + x) + y = 2 + (x + y)$

     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. $\dfrac{4}{x} < 32$ b. $\dfrac{x}{4} < 32$ 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.
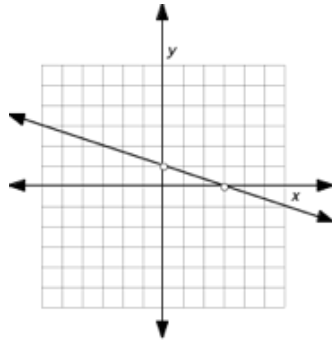How many pounds did she lose the first month?

    a. 5   b. 29

    c. 4.5   d. 9

_____30. What is the slope of the line
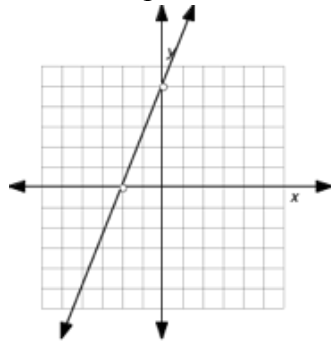
a. $\frac{2}{5}$ b. $\frac{5}{2}$ c. $\frac{-2}{5}$ d. $\frac{-5}{2}$

_____31. What is the slope of the 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. $y = 5x - 2$
        $y = 3x + 2$ $y = 4x - 5$ $y = -\tfrac{1}{2}x + 4$ $y = -5x + 1$

_____35. Determine which lines are perpendicular.

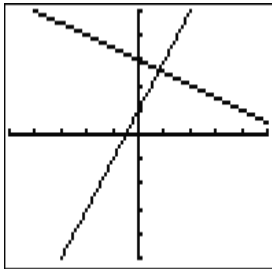   a. $y = 2x + 3$ b. $y = 4x + 1$ c. $y = 2x - 2$ d. $y = 5x - 2$
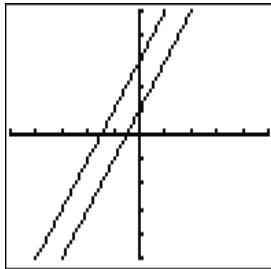 $y = 3x + 2$ $y = 4x - 5$ $y = -\tfrac{1}{2}x + 4$ $y = -5x + 1$

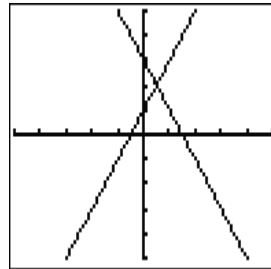_____36. Which lines appear to have the same slope?

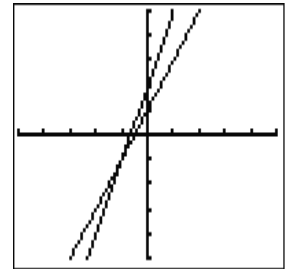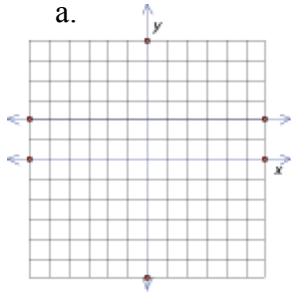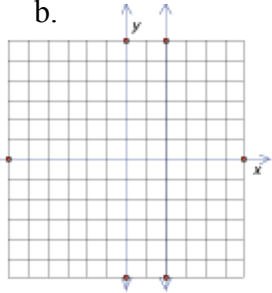 a.   b.   c.   d.

_____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.
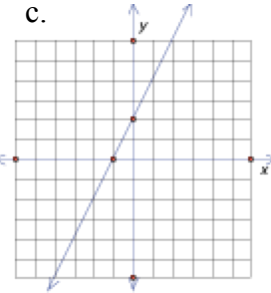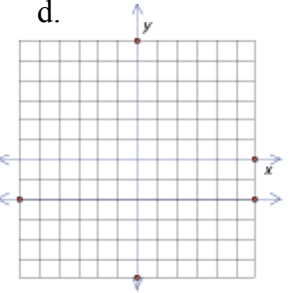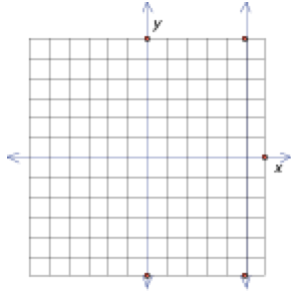
_____39. Which of the following is the graph of y = 2x - 3?

a.　　　　　　　b.　　　　　　　c.　　　　　　　d.

_____40. Which of the following is the graph of y = - ½ x + 4?

a.　　　　　　　b.　　　　　　　c.　　　　　　　d.

_____41. Which of the following is the graph of y ≥ x + 2?

a.　　　　　　　b.　　　　　　　c.　　　　　　　d.
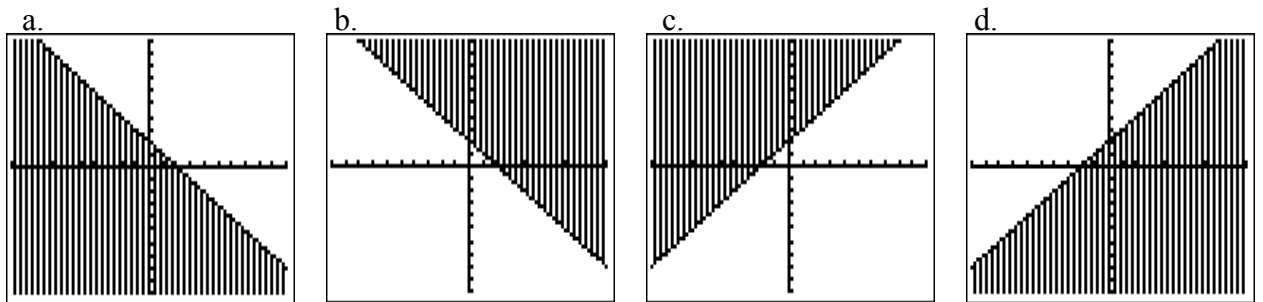
_____42. Which of the following is the graph of y ≤ x + 4?

a.　　　　　　　b.　　　　　　　c.　　　　　　　d.

_____43. Which is the following is the graph of y < 2
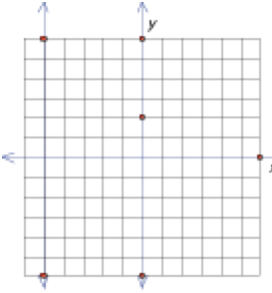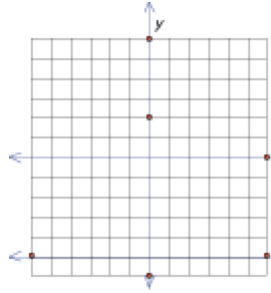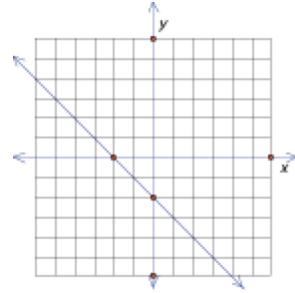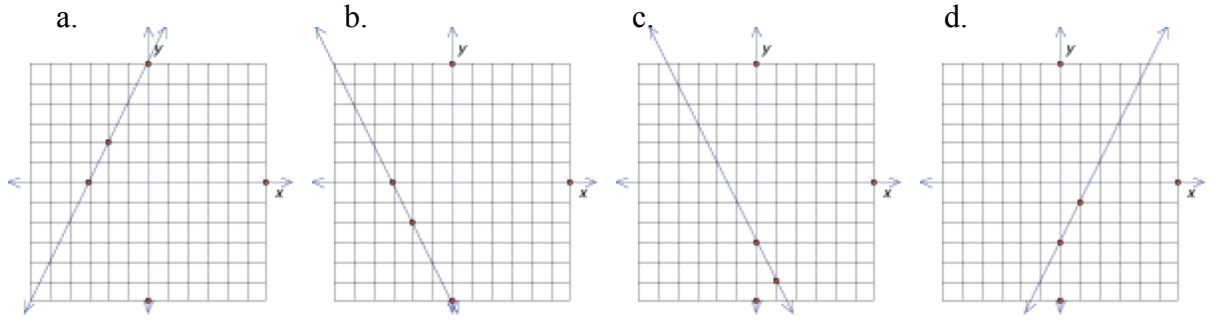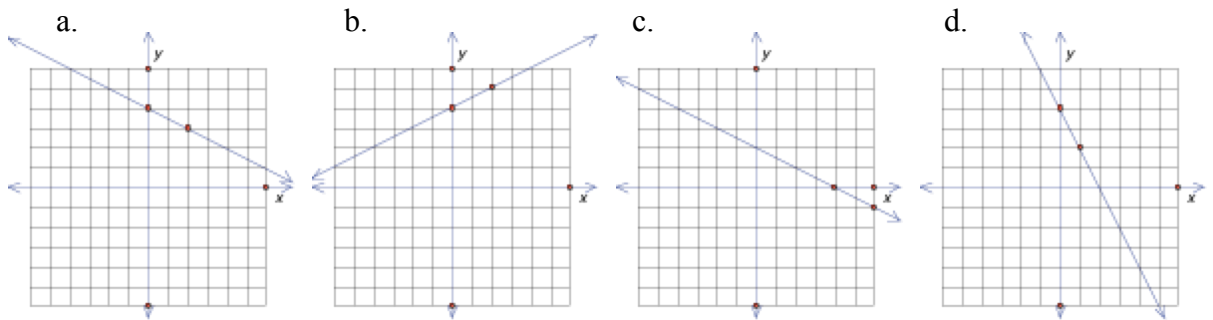
a.   b.   c.   d.
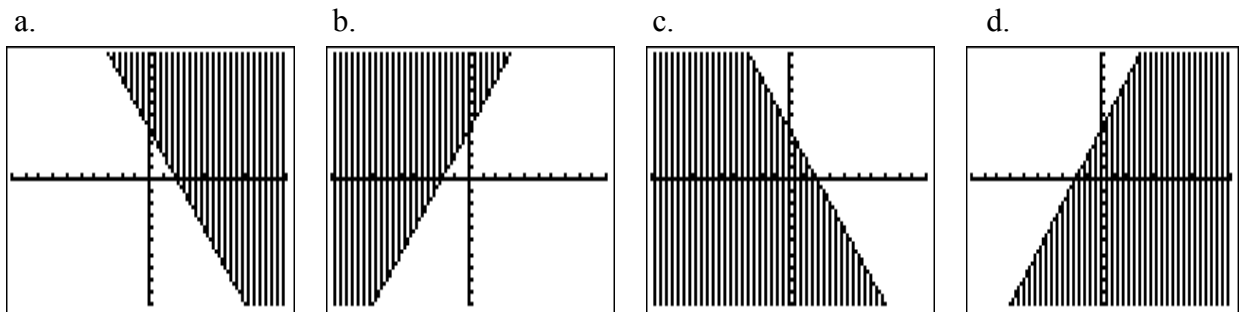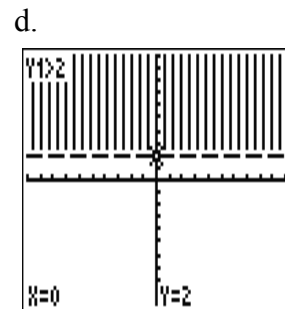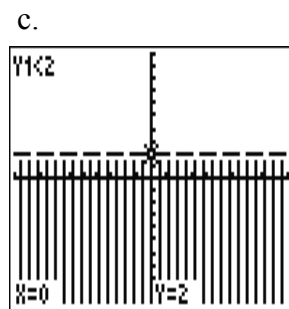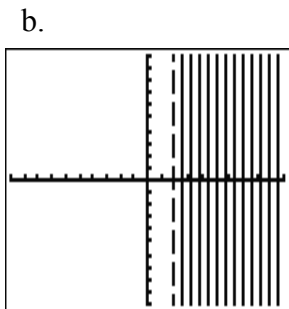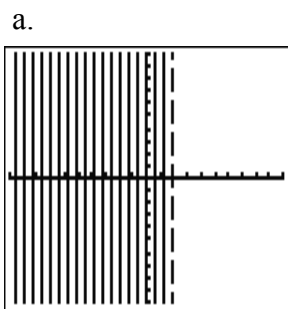
Determine the x-intercept and y-intercept of the graph of the equation

_____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 value shown. The relationship of x to y is represented by with 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. What is the solution to the linear system?
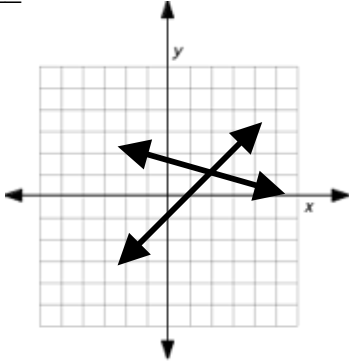
    a. (1, 2)   b. (2, 1)

    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 a 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   b. 130 double   c. 50 double   d. 80 double
        150 single   120 single   200 single   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?

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

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

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

_____61. Which point is a solution to the system

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

_____62. The following diagram is broken into the dimensions shown below. Which expression represents the area of the configuration?
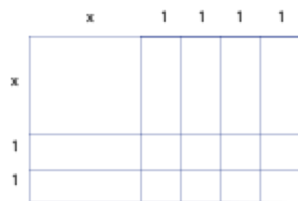
     a. $2x + 6$ b. $x^2 + 6$

     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 $\begin{bmatrix} 10 & 6 \\ 2 & 7 \end{bmatrix}$
Khaki

Store B
Shirts   Pants

Denim $\begin{bmatrix} 4 & 1 \\ 5 & 8 \end{bmatrix}$
Khaki

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 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, $\frac{1}{3}$, $\frac{1}{9}$, ____, $\frac{1}{81}$ 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

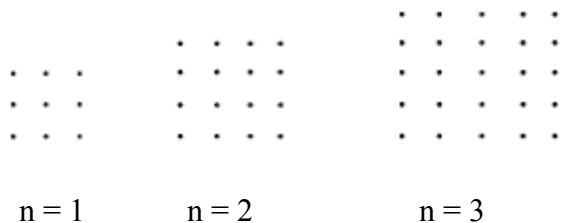   c. 125   d. 91

_____80. Given the following sequence 2, 8, 18, 32, 50, …   What is the nth 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 nth term in this sequence?
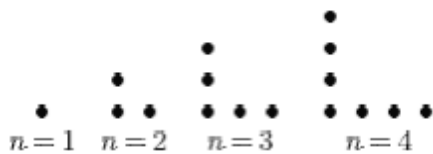
      a. n   b. $n + 1$

      c. $n^2 + 2$ d. $n + 2$

_____82. A sequence is represented by the figure below. Which expression would be used to represent the nth term in the sequence?

n = 1   n = 2   n = 3

    a. n^2 b. $2n$

    c. $n^2 + 2$ d. $(n + 2)^2$

_____83. Give a formula for the number of dots in the nth figure in this sequence.

$n = 1$ $n = 2$ $n = 3$ $n = 4$

    a. ½ (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. $6<x<8$
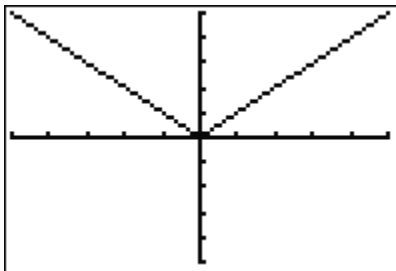
      c. $\dfrac{3}{2}<x<2$ d. $x<\dfrac{2}{3}$ or $x>2$

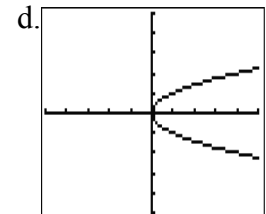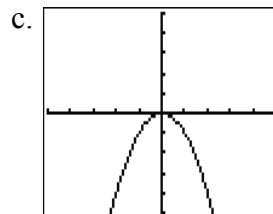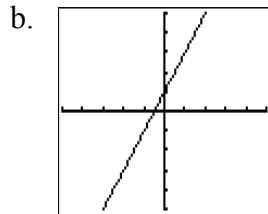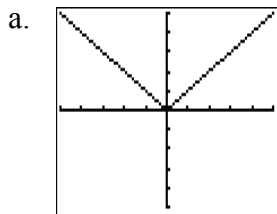_____96. Given the graph below. Which function is represented by the graph?

      a. $y=x$ b. $y=-x$

      c. $y=|x|$ d. $y=-|x|$

_____97. Which graph below is NOT a function?

a.   b.   c.   d.

_____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 $x^2 \bullet x^7$

      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 $\dfrac{10x^4}{2x}$

      a. $5x^3$ b. $5x^5$

      c. $5x^4$ d. $5x^2$

_____102. Simplify $\dfrac{4x^5y^3}{20x^2y}$

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

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