Algebra 2 with Trig
1st Semester Study Guide

Name_____

Date_____ Period____

Multiple Choice
Identify the choice that best completes the statement or answers the question.

Name the property of real numbers illustrated by the equation.

____ 1. $-4(x + 3) = -4x - 12$

    a. Commutative Property of Addition
    b. Associative Property of Addition
    c. Distributive Property
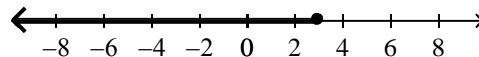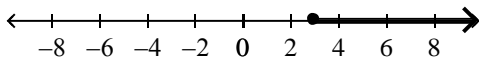   d. Associative Property of Multiplication

____ 2. $3 + \left(\sqrt{8} + 11 \right) = \left(3 + \sqrt{8} \right) + 11$

    a. Distributive Property
    b. Commutative Property of Multiplication
    c. Associative Property of Addition
    d. Associative Property of Multiplication
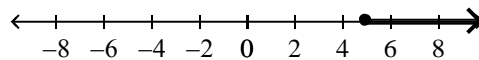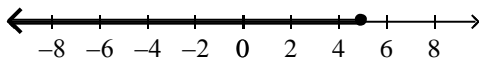
What inequality represents the sentence?

____ 3. 14 fewer than a number is at least −8

    a. $x + 14 \leq -8$ c. $14 - x \geq -8$
    b. $x - 14 \geq -8$ d. $x - 14 < -8$

Solve the inequality. Graph the solution set.

____ 4. $2 + 2k \leq 8$

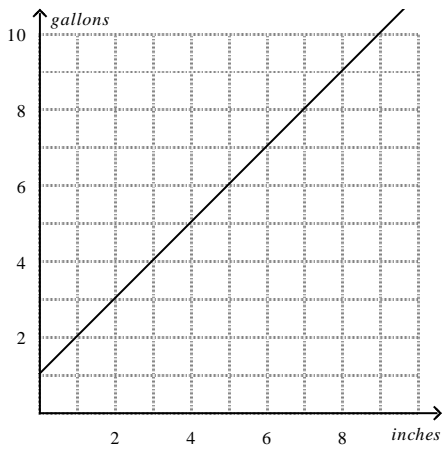   a. $k \geq 3$ c. $k \leq 3$

    b. $k \leq 5$ d. $k \geq 5$

Use a graph to find the solution.

____ 5. You want to set up an aquarium and need to determine what size tank to buy. The graph shows tank sizes using a rule that relates the capacity of the tank to the combined lengths of the fish it can hold.

If you want three 2-in. platys, eight 1-in. guppies, and a 3-in. loach, what is the smallest capacity tank you can buy?
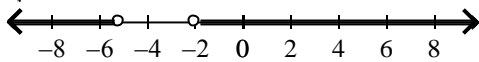
a. 15-gallon   c. 18-gallon
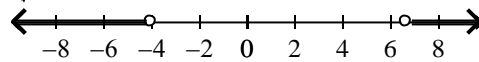b. 21-gallon   d. 17-gallon

Solve the compound inequality. Graph the solution.

____ 6. $9x - 5 < -41$ or $3x + 13 > 7$

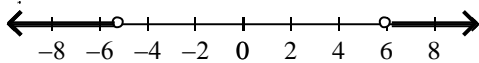a. $x < -5\frac{1}{9}$ or $x > -2$

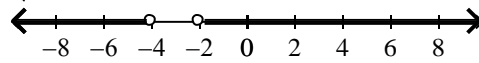c. $x < -4$ or $x > 6\frac{2}{3}$

b. $x < -5\frac{1}{9}$ or $x > 6\frac{2}{3}$

d. $x < -4$ or $x > -2$

Solve the absolute value equation. Graph the solution.
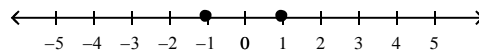
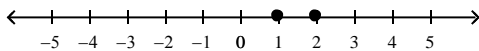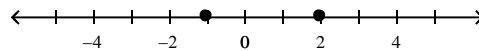____ 7. $|2x - 1| = 3$

a. $x = 1$ or $x = 4$
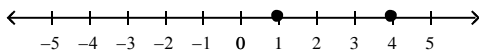
c. $x = 1$ or $x = -1$
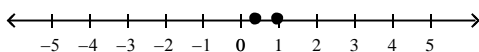

b. $x = 1$ or $x = 2$
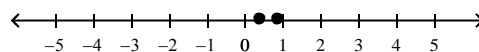

d. $x = 2$ or $x = -1$
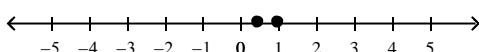

____ 8. $4|4x - 3| - 8 = -4$
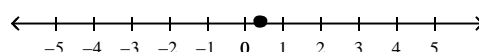
a. $x = \frac{7}{16}$ or $x = 1$

c. $x = \frac{7}{16}$ or $x = \frac{15}{16}$

b. $x = 1$ or $x = \frac{1}{2}$

d. $x = \frac{7}{16}$ or $x = \frac{1}{2}$

Insert <, >, or = to make the sentence true.

____ 9. $\sqrt{3}$ ▢ $\sqrt{7}$

    a. >   b. <   c. =

____ 10. You start with $15 and save $8 each week. What algebraic expression models the total amount you save?

    a. $8 + 15w$ c. $15 + 8w$

    b. $15 - 8w$ d. $23w$

Evaluate the expression for the given value of the variable(s).

____ 11. $|4b - 4| + |3 - b^2| + 2b^3; b = 2$

    a. 19   b. 17   c. −11   d. 21

Combine like terms. What is a simpler form of each expression?

____ 12. $-3(-4y + 3) + 7y$

    a. $19y - 9$ b. $10y$ c. $-19y + 3$ d. $-19y - 9$

Solve the equation.

____ 13. $0.125r - 0.0625 + 0.25r = 0.25 + r$

    a. $r = -0.3$ b. $r = -0.5$ c. $r = 0.23$ d. $r = -0.28$

Use an algebraic equation to solve the problem.

____ 14. A rectangle is 3 times as long as it is wide. The perimeter is 60 cm. Find the dimensions of the rectangle. Round to the nearest tenth if necessary.

    a. 7.5 cm by 22.5 cm   c. 20 cm by 60 cm

    b. 7.5 cm by 52.5 cm   d. 15 cm by 22.5 cm

____ 15. The sides of a triangle are in the ratio 3 : 4 : 5. What is the length of each side if the perimeter of the triangle is 90 cm?

    a. 10.5 cm, 11.5 cm, and 12.5 cm   c. 7.5 cm, 11.5 cm, and 32.1 cm

    b. 22.5 cm, 30 cm, and 37.5 cm   d. 19.3 cm, 25.7 cm, and 32.1 cm

Is the following *always*, *sometimes*, or *never* true?

____ 16. $14 + 3x - 7 = 7x + 7 - 4x$

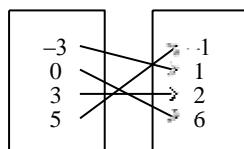   a. always   b. sometimes   c. never
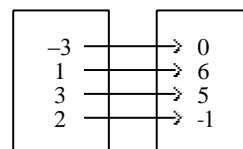
____ 17. Make a mapping diagram for the relation.

    $\{(-3, 1), (0, 6), (3, 2), (5, -1)\}$

    a.   c.

b.
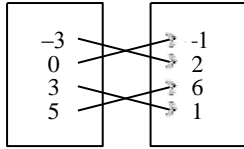
d.
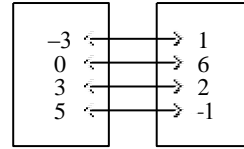
Is the relation a function?

_____ 18.
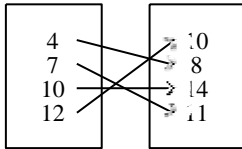
a. yes
b. no

_____ 19. Use the vertical-line test to determine which graph represents a function.

a.
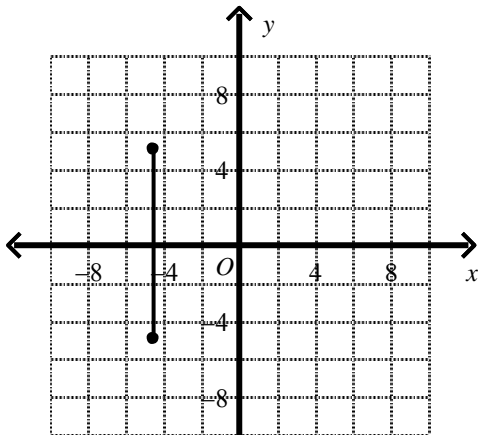
c.
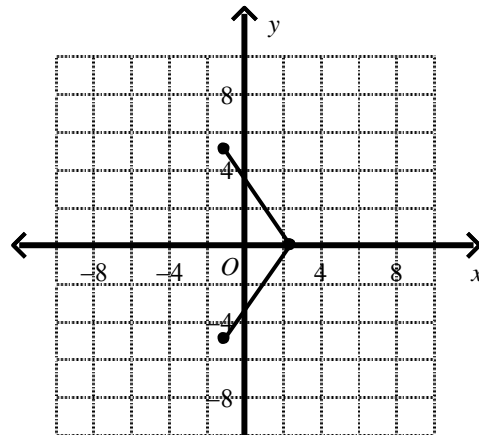
b.
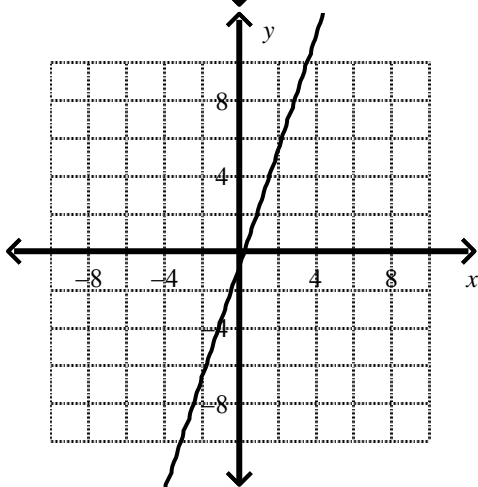
d.
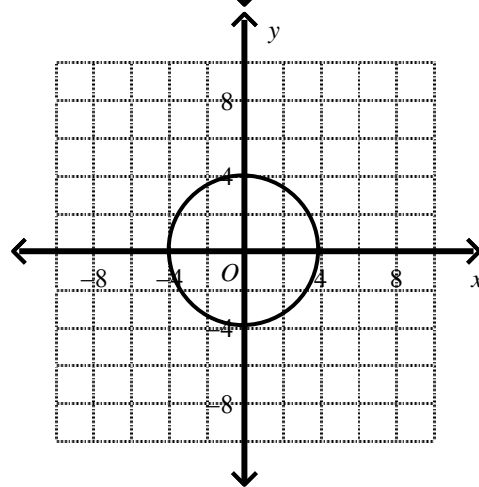
_____ 20. Tickets to a concert are available online for $20 each, plus a one-time handling fee of $1.75. The total cost is a function of the number of tickets bought. What function rule models the cost of the concert tickets (t)? Evaluate the function for 3 tickets.

a. $20t + 1.75$; $25.25
b. $1.75t + 20$; $25.25

c. $20t + 1.75$; $61.75
d. $1.75t + 20$; $61.75

Determine whether y varies directly with x. If so, find the constant of variation k and write the equation.

_____ 21.

x	y
6	9.6
9	14.4
12	19.2
15	24

a. yes; $k = 1.6$; $y = 1.6x$
b. yes; $k = 3$; $y = 3x$

c. yes; $k = 6$; $y = 6x$
d. no

What is the graph of each direct variation equation?

_____ 22. $y = 2.5x$

a.
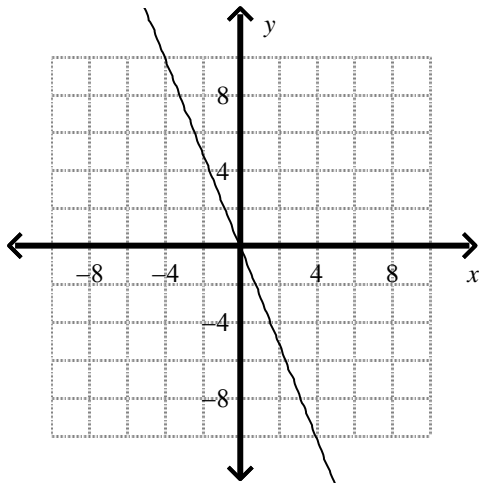
c.
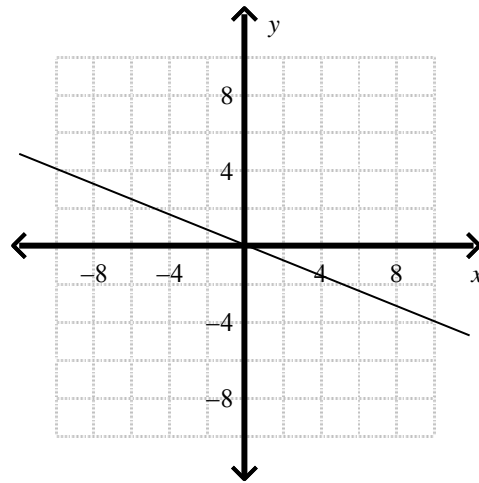
b.
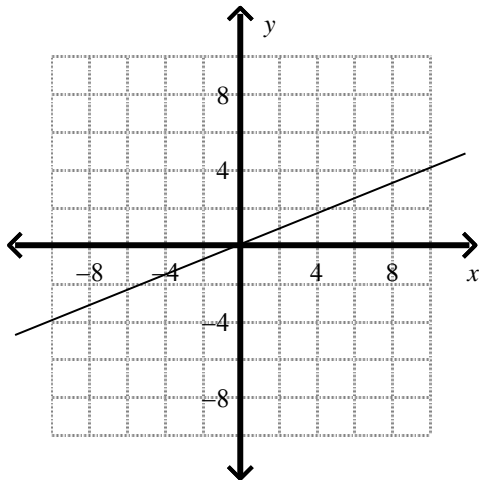
d.
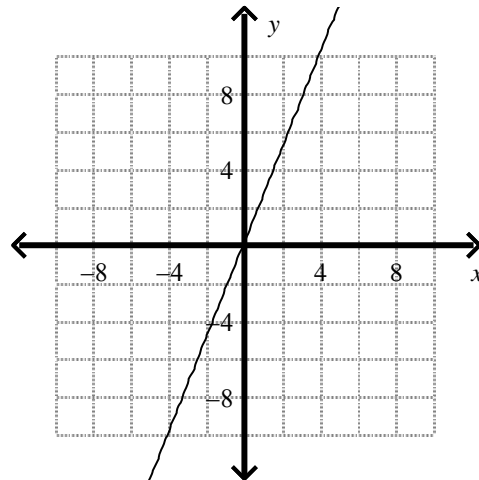
What is the slope of the line that passes through the given points?

_____ 23. (−12, −4) and (11, −10)

    a. $-\dfrac{23}{6}$

    c. $-\dfrac{6}{23}$

    b. $\dfrac{23}{6}$

    d. $\dfrac{6}{23}$

Write the equation in slope-intercept form. What are the slope and y-intercept?

_____ 24. $\dfrac{3}{5}x + \dfrac{1}{2}y = 6$

    a. $y = -\dfrac{6}{5}x - 12$

        slope: $-\dfrac{6}{5}$; y-intercept: −12

    c. $y = \dfrac{6}{5}x - 12;$

        slope: $\dfrac{6}{5}$; y-intercept: −12

    b. $y = \dfrac{6}{5}x + 12;$

        slope: 12; y-intercept: $\dfrac{6}{5}$

    d. $y = -\dfrac{6}{5}x + 12$

        slope: $-\dfrac{6}{5}$; y-intercept: 12

What is the graph of the equation?

_____ 25. $2x - y = 5$

    a.
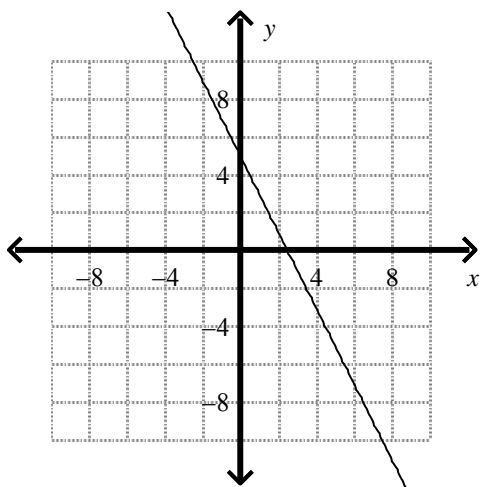
    c.
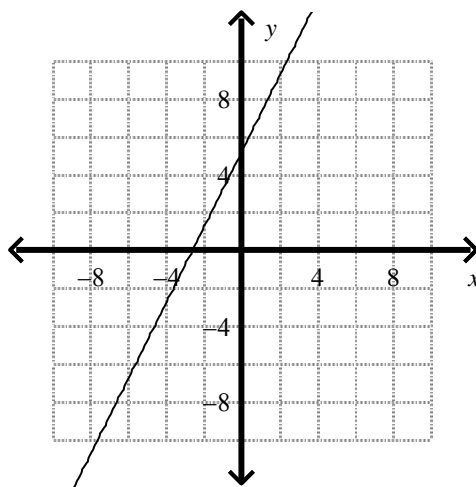
    b.

    d.
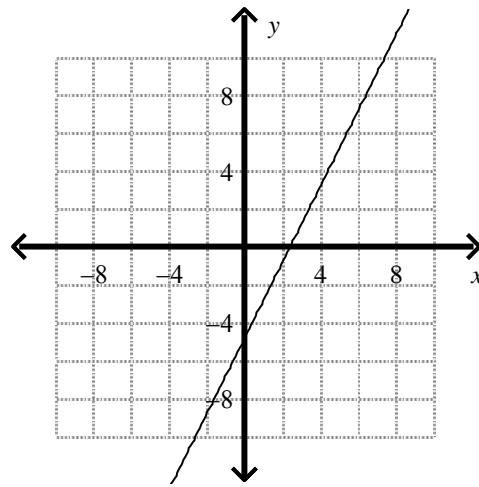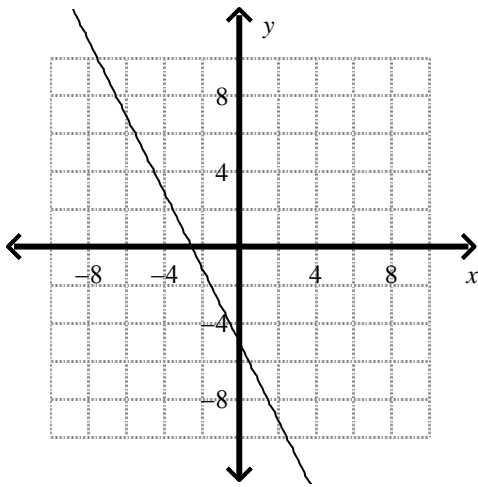
What is an equation of the line, in point-slope form, that passes through the given point and has the given slope?

_____ 26. point: $(6, -7)$; slope: 4

    a. $y - 7 = 4(x - 6)$ c. $y + 7 = 4(x - 6)$

    b. $y + 7 = 4(x + 6)$ d. $y - 7 = 4(x + 6)$

What is the equation of the given line in standard form?   Use integer coefficients.

_____ 27. $y = \dfrac{5}{7}x - 12$

    a. $-5x + 7y = -12$ c. $-5x + 7y = -84$

    b. $-5x - 7y = -84$ d. $5x + 7y = -84$

_____ 28. $y = -6.9x + 5.1$

    a. $-69x + 10y = 51$ c. $69x + 10y = -51$

    b. $69x + 10y = 51$ d. $-69x + 10y = -51$

What are the intercepts of the equation?   Graph the equation.

_____ 29. $-2x + 2y = -8$

    a. *x*-intercept: (–4, 0)   c. *x*-intercept: (4, 0)

        y-intercept: (0, 4)   *y*-intercept: (0, –4)
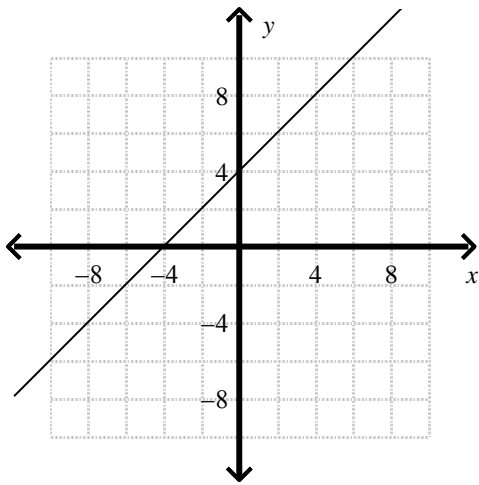
b. *x*-intercept: (–4, 0)
   y-intercept: (0, 4)
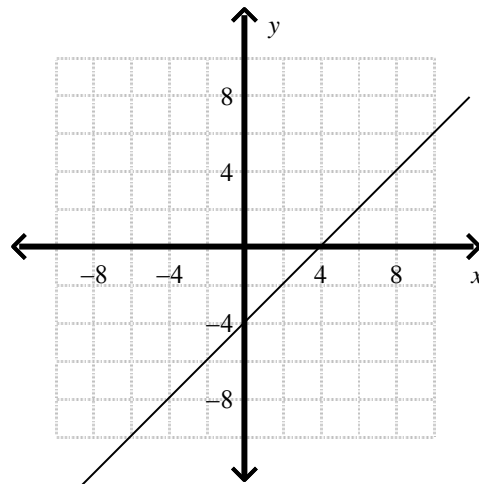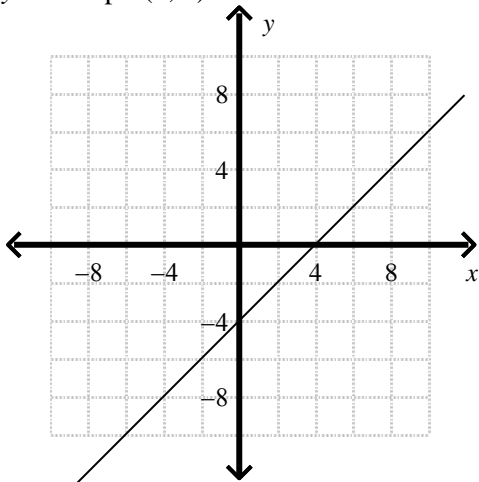
d. *x*-intercept: (4, 0)
   y-intercept: (0, –4)
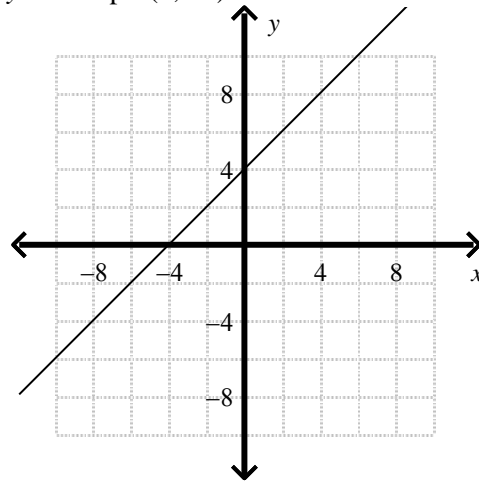
____ 30. The office manager of a small office ordered 180 packs of printer paper.   Based on average daily use, she knows that the paper will last about 40 days.   What graph represents this situation?   How many packs of printer paper should the manager expect to have after 35 days?

a.

c.

22.5

packs

157.5

packs

b.

d.

paper

150

100

50

20   40   60   *days*

22.5

packs

paper

150

100

50

20   40   60   *days*

157.5

packs

What is the equation of the line in slope-intercept form?

_____ 31. the line parallel to $y = 8x - 8$ through (5, 2)

    a. $y = 8x - 38$

    c. $y = -\frac{1}{8}x - 38$

    b. $y = 8x - 42$

    d. $y = -8x - 38$

_____ 32. the line perpendicular to $y = \frac{1}{3}x + 5$ through (2, 1)

    a. $y = \frac{1}{3}x + 7$

    c. $y = 3x + 7$

    b. $y = -3x + 7$

    d. $y = -\frac{1}{3}x + 7$

Make a scatter plot and describe the correlation.

_____ 33. The table lists average monthly temperatures and electricity cost for a Texas home in 2008.   The table displays the values rounded to the nearest whole number.   Make a scatter plot.   How would you describe the correlation?

Month	Average Temp (°F)	Electricity Bill ($)
January	55	156
February	53	158
March	57	154
April	63	157
May	69	160
June	74	162
July	78	167
August	83	173

a.

c.

bill

100
90
80
70
60
50
40
30

140   160   180   *temp.*
As
temperature increases, the electricity cost decreases; there is a positive correlation.
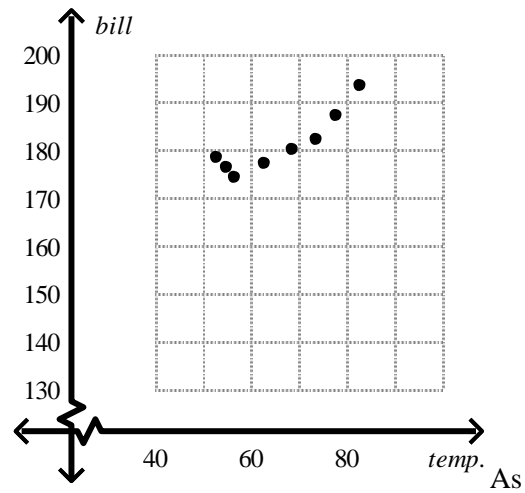
b.

bill

200
190
180
170
160
150
140
130

40   60   80   *temp.*
As
temperature increases, the electricity cost increases; there is a positive correlation.

bill

200
190
180
170
160
150
140
130

40   60   80   *temp.*
As
temperature increases, the electricity cost increases; there is a negative correlation.

d.

bill

100
90
80
70
60
50
40
30
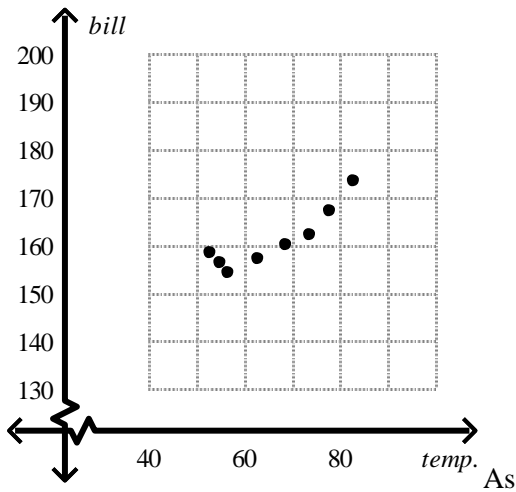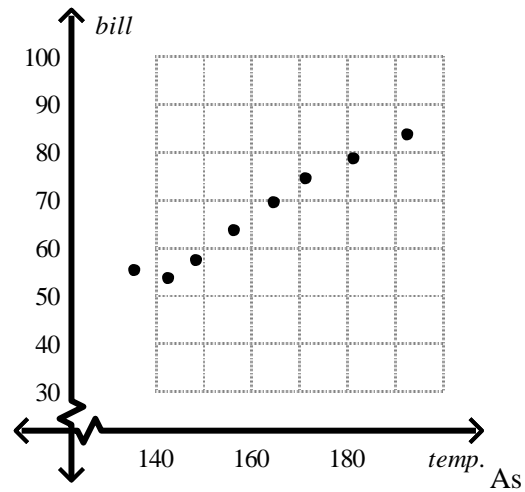
140   160   180   *temp.*
As
temperature increases, the cost of electricity decreases; there is a negative correlation.

____ 34. A nationwide club begins a chapter near you. You research the membership of the club over the past few decades. The table shows your data. What is the equation for a line of best fit? How many members would you expect there to be in the year 2019?

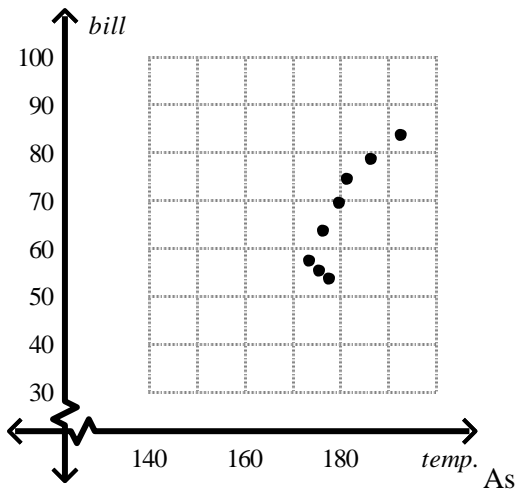| Year	1980	1985	1990	1995	2000	2005
Membership	5,100	6,500	8,100	10,500	12,000	12,600

a. $y = 5,100x + 329.17$; 27,438
b. $y = 329.17x + 5,100$; 27,438
c. $y = 329.17x + 5,100$; 17,938
d. $y = 5,100x + 329.17$; 17,938

____ 35. How are the functions $y = x$ and $y = x + 5$ related? How are their graphs related?

a. Each output for $y = x + 5$ is 5 less than the corresponding output for $y = x$.
   The graph of $y = x + 5$ is the graph of $y = x$ translated down 5 units.
b. Each output for $y = x + 5$ is 5 more than the corresponding output for $y = x$.
   The graph of $y = x + 5$ is the graph of $y = x$ translated up 5 units.
c. Each output for $y = x + 5$ is 5 more than the corresponding output for $y = x$.
   The graph of $y = x + 5$ is the graph of $y = x$ translated down 5 units.
d. Each output for $y = x + 5$ is 5 less than the corresponding output for $y = x$.
   The graph of $y = x + 5$ is the graph of $y = x$ translated up 5 units.

The function $f(x)$ is represented by the given table.   What are the corresponding values of the given $g(x)$?

____ 36. The function $f(x)$ is represented by the table below.   What are the corresponding
values of $g(x)$ for the transformation $g(x) = 6f(x)$?

x	$f(x)$
−7	8
−3	3
0	−1
2	7
10	5

a.

x	$g(x)$
−7	30
−3	42
0	0
2	18
10	48

c.

x	$g(x)$
−7	−48
−3	−18
0	6
2	−42
10	−30

b.

x	$g(x)$
−7	−42
−3	−18
0	0
2	12
10	60

d.

x	$g(x)$
−7	48
−3	18
0	−6
2	42
10	30

____ 37. Write an equation for the following transformation of $y = x$:
a vertical compression by a factor of $\dfrac{1}{4}$

a. $y = -4x$
b. $y = -\dfrac{1}{4}x$

c. $y = 4x$
d. $y = \dfrac{1}{4}x$

What is the graph of the absolute value equation?

____ 38. $y = |x + 6|$

a.

c.

b.

d.
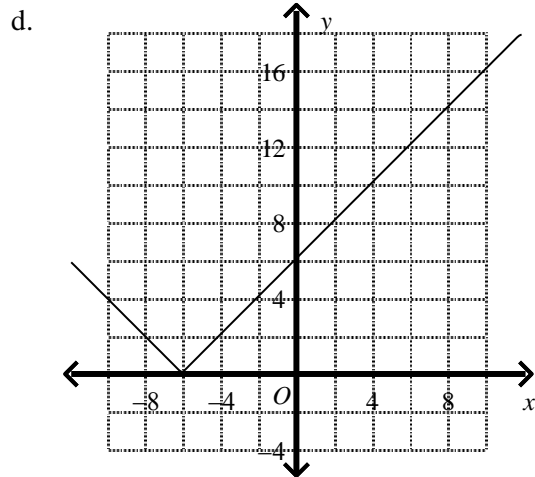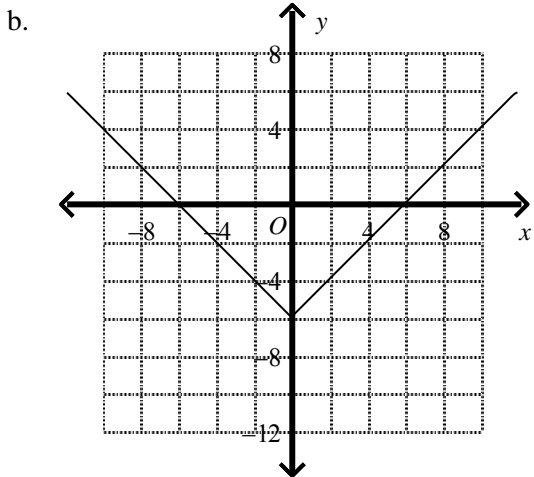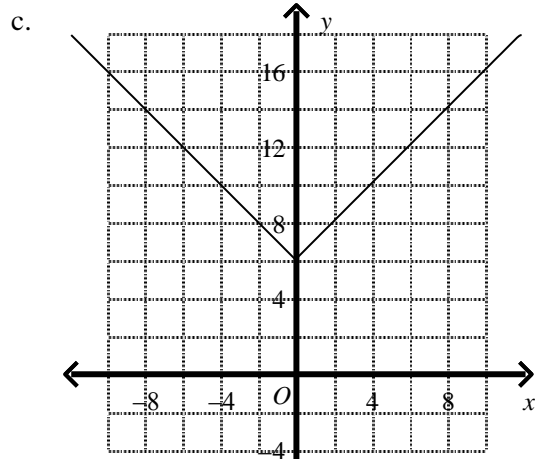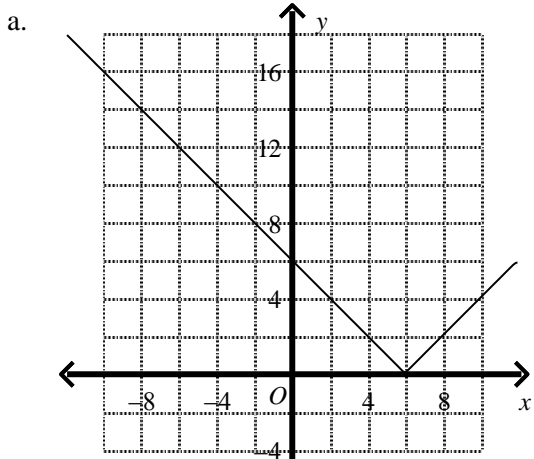
What is the graph of the absolute value function?

_____ 39. $y = |-2x| + 1$

a.

c.

b.

d.
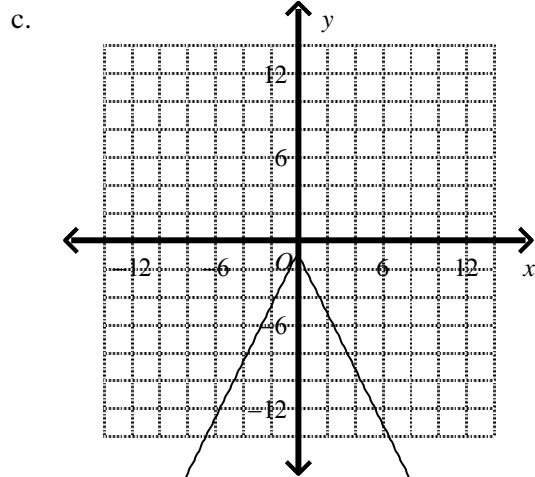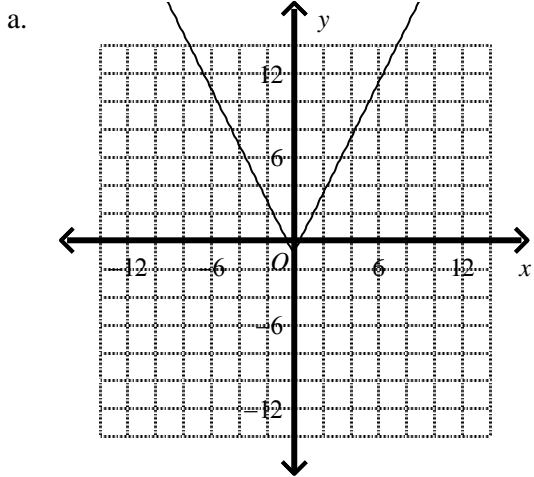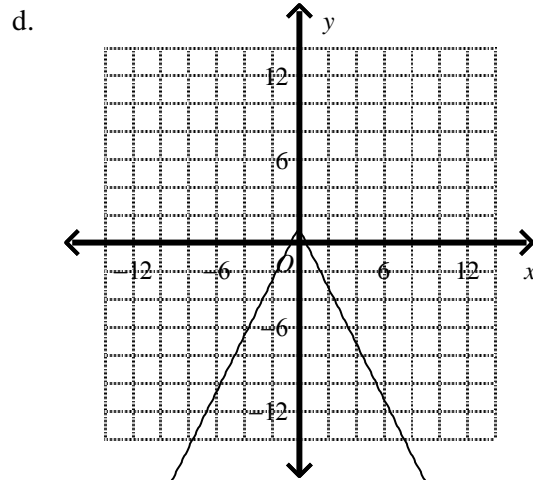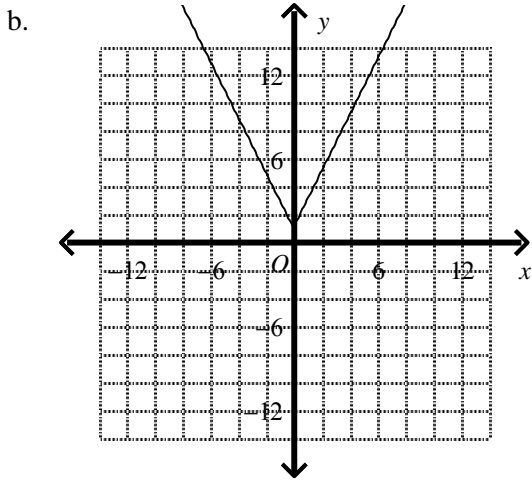
What is the equation of the absolute value function?

_____ 40.
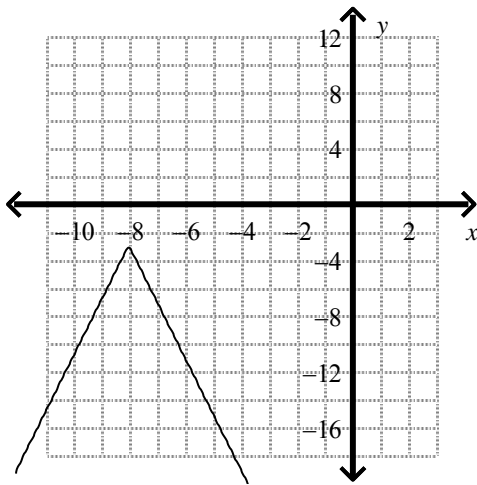
a. $y = -4|x - 8| - 3$ c. $y = 4|x + 8| - 3$

b. $y = -4|x - 8| + 3$ d. $y = -4|x + 8| - 3$

Write an inequality for the graph.

_____ 41.
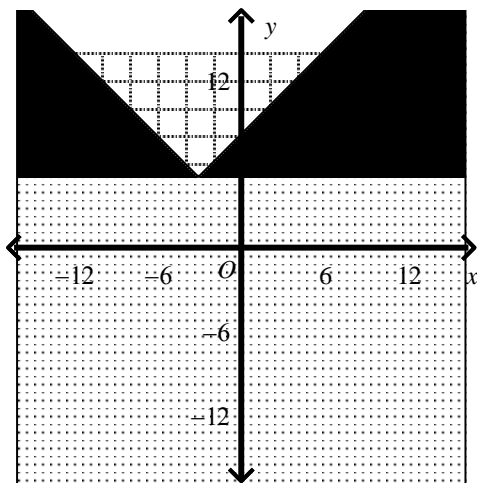
a. $y \leq |x - 3| + 5$ c. $y \geq |x + 3| + 5$

b. $y \leq |x + 3| + 5$ d. $y \leq |x + 3| - 5$

Without graphing, is each system *independent, dependent,* or *inconsistent*?

____ 42. $\begin{cases} -x - 5y = 7 \\ 4x - y = -7 \end{cases}$

    a. inconsistent   c. dependent

    b. independent

Solve the system of inequalities by graphing.

____ 43. $\begin{cases} y \geq x \\ y > |2x + 2| - 5 \end{cases}$

a.

c.

b.

d.
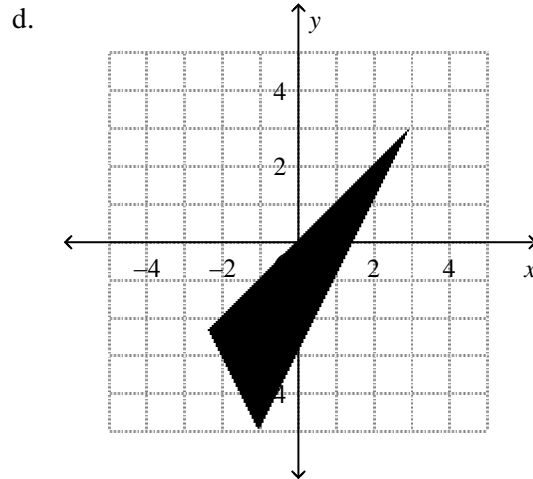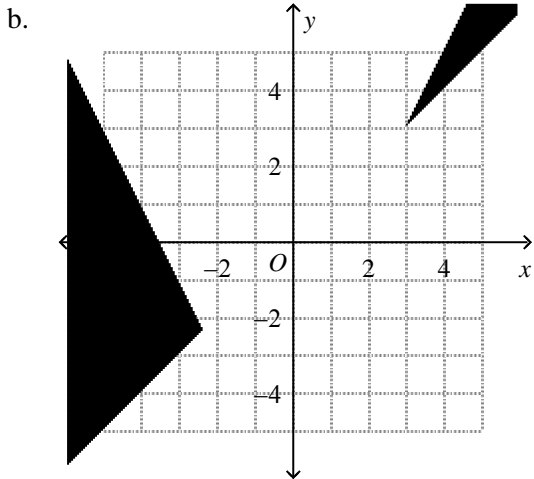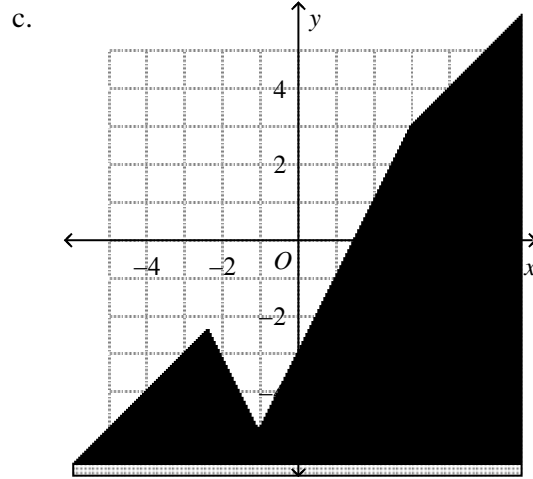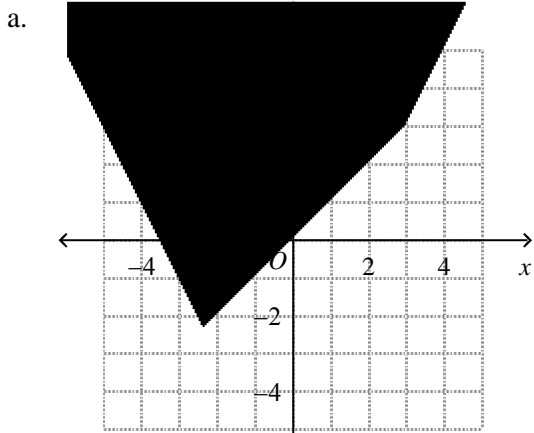
____ 44. An exam consists of two parts, Section *X* and Section *Y*. There can be a maximum of 80 questions. There must be at least 10 more questions in Section *Y* than in Section *X*. Write a system of inequalities to model the number of questions in each of the two sections. Then solve the system by graphing.

a. $\begin{cases} X \geq 0 \\ Y \geq 0 \\ X + Y \geq 80 \\ Y \geq X + 10 \end{cases}$

c. $\begin{cases} X \geq 0 \\ Y \geq 0 \\ X + Y \leq 80 \\ Y \geq X + 10 \end{cases}$
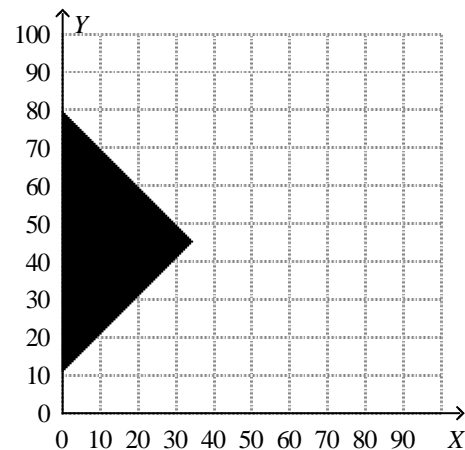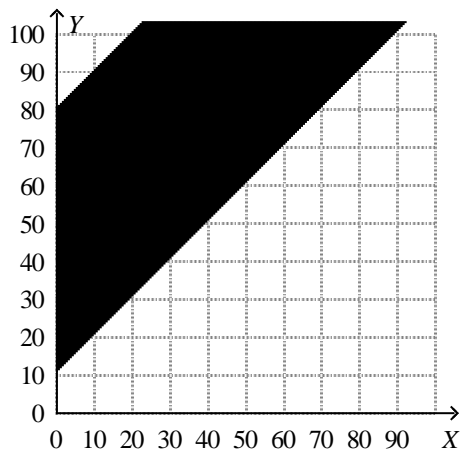
b.
$$\begin{cases} X \geq 0 \\ Y \geq 0 \\ X + Y \leq 80 \\ Y \geq X + 10 \end{cases}$$
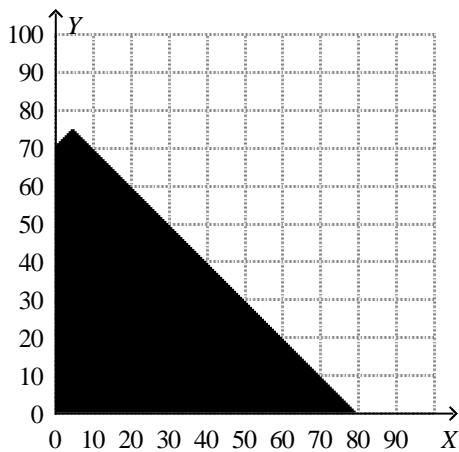
d.
$$\begin{cases} X \geq 0 \\ Y \geq 0 \\ X + Y \leq 80 \\ Y \geq X - 10 \end{cases}$$
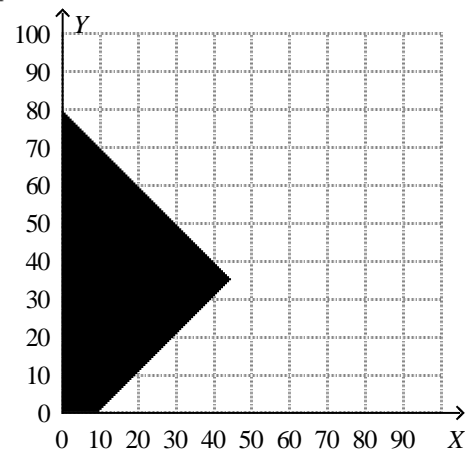
____ 45. Your computer supply store sells two types of inkjet printers. The first, type A, costs $267 and you make a $24 profit on each one. The second, type B, costs $127 and you make a $20 profit on each one. You can order no more than 170 printers this month, and you need to make at least $3760 profit on them. If you must order at least one of each type of printer, how many of each type of printer should you order if you want to minimize your cost?

a. 80 of type A
   90 of type B
b. 102 of type A
   68 of type B

c. 68 of type A
   102 of type B
d. 90 of type A
   80 of type B

Solve the system.

____ 46.
$$\begin{cases} x - 3y + 2z = -2 \\ -x + 3y + 2z = -10 \\ 4x + 4z = -8 \end{cases}$$

a. $(1, -1, 3)$
b. $(1, 1, -3)$

c. $(1, -1, -3)$
d. $(-1, -1, -3)$

____ 47. What is element a_{23} in matrix A?

$$A = \begin{bmatrix} 3 & 7 & 0 \\ 8 & 4 & -6 \\ 0 & -4 & 6 \end{bmatrix}$$

a. 7   c. −4
b. 8   d. −6

How can you represent the system of equations with a matrix?

____ 48. $\begin{cases} 15x - 15y = 4 \\ 15x + 2y = -4 \end{cases}$

a.
$$\left[\begin{array}{cc|c} 15 & -15 & 4 \\ 15 & 2 & -4 \end{array}\right]$$

c.
$$\left[\begin{array}{cc|c} 15 & 2 & -4 \\ 15 & -15 & 4 \end{array}\right]$$

b.
$$\left[\begin{array}{cc|c} 15 & -15 & -4 \\ 15 & 2 & -4 \end{array}\right]$$

d.
$$\left[\begin{array}{cc|c} 15 & -15 & 4 \\ 15 & -2 & -4 \end{array}\right]$$

What linear system of equations does the matrix represent?

____ 49.
$$\left[\begin{array}{cc|c} 9 & -11 & -2 \\ -14 & 11 & 8 \end{array}\right]$$

a. $\begin{cases} 9x = -14 \\ -11x = 11 \\ -2x = 8 \end{cases}$

c. $\begin{cases} 9x - 11y = -2 \\ -14x + 11y = 8 \end{cases}$

b. $\begin{cases} 9x - 11y = 2 \\ -14x + 11y = -8 \end{cases}$

d. $\begin{cases} 9x = -14 \\ -11x = 11 \\ 2x = -8 \end{cases}$

What is the solution of the system?

____ 50. $\begin{cases} 2x + 6y = 38 \\ 5x - y = 15 \end{cases}$

a. (4, 5)   c. (5, 4)
b. (−4, −5)   d. (−4, 5)

What is the graph of the equation?

____ 51. $y = x^2 - 4x + 5$

a.   c.
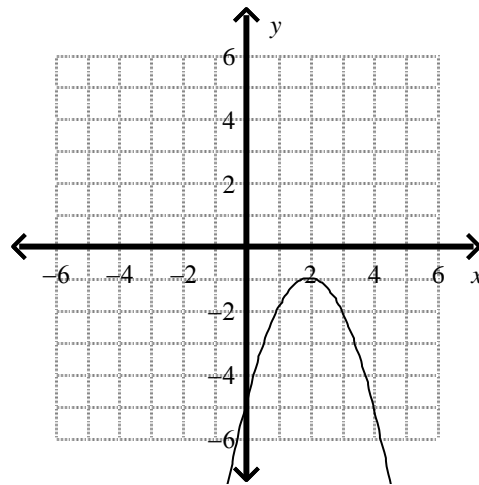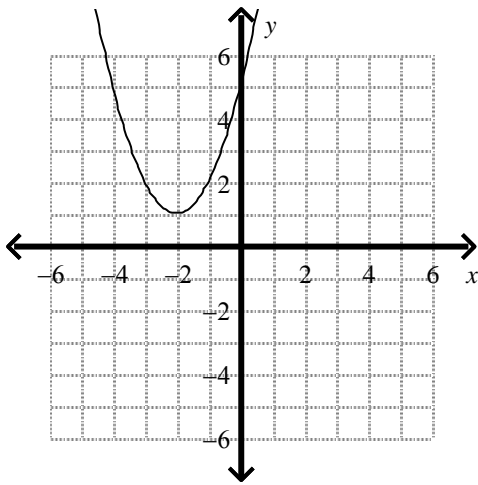
b.
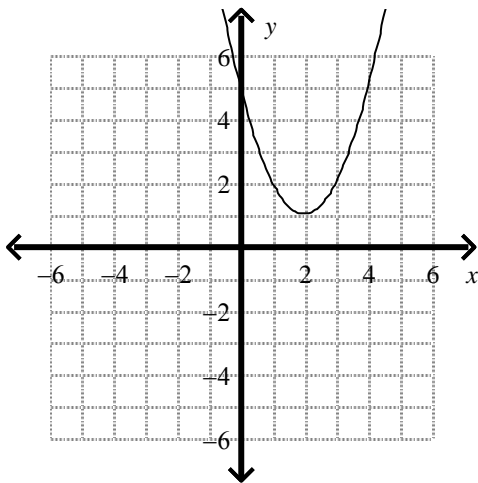
d.
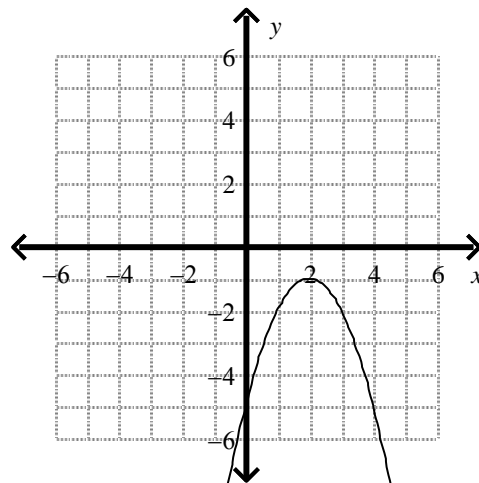
_____ 52. You live near a bridge that goes over a river. The underneath side of the bridge is an arch that can be modeled with the function $y = -0.000495x^2 + 0.619x$ where x and y are in feet. How high above the river is the bridge (the top of the arch)? How long is the section of bridge above the arch?

   a. The bridge is about 193.52 ft above the river and the length of the bridge above the arch is about 625.25 ft
   b. The bridge is about 193.52 ft above the river and the length of the bridge above the arch is about 1250.51 ft
   c. The bridge is about 1250.51 ft above the river and the length of the bridge above the arch is about 193.52 ft
   d. The bridge is about 1250.51 ft above the river and the length of the bridge above the arch is about 625.25 ft

_____ 53. A biologist took a count of the number of migrating waterfowl at a particular lake, and recounted the lake's population of waterfowl on each of the next six weeks.

Week	0	1	2	3	4	5	6
Population	600	600	650	750	900	1,100	1,350

Find a quadratic function that models the data as a function of x, the number of weeks. Use the model to estimate the number of waterfowl at the lake on week 8.

   a. $P(x) = 25x^2 - 25x + 600$; 1,650 waterfowl
   b. $P(x) = 30x^2 + 25x + 550$; 2,195 waterfowl
   c. $P(x) = 25x^2 - 25x + 600$; 2,000 waterfowl
   d. $P(x) = 30x^2 + 25x + 550$; 2,670 waterfowl

____ 54. Which expression is equivalent to $-x^2 + 8x + 75 = 13$?
    a. $(x - 13)(x - 5) = 13$
    b. $-(x - 5)(x + 13) = 3$
    c. $-(x - 13)(x + 5) = 3$
    d. $(x + 5)(x + 13) = 13$

What are the solutions of the quadratic equation?

____ 55. $x^2 - 9x + 18 = 0$
    a. 3, 6
    b. –3, –6
    c. 3, –6
    d. –3, 6

Solve by using tables. Give each answer to at most two decimal places.

____ 56. $2x^2 + 5x - 3 = 0$
    a. 0.5, –3
    b. 1, –6
    c. 3, –0.5
    d. 1.75, –1.75

____ 57. The function $y = -16t^2 + 486$ models the height y in feet of a stone t seconds after it is dropped from the edge of a vertical cliff. How long will it take the stone to hit the ground? Round to the nearest hundredth of a second.
    a. 7.79 seconds
    b. 11.02 seconds
    c. 0.25 seconds
    d. 5.51 seconds

____ 58. A landscaper is designing a flower garden in the shape of a trapezoid. She wants the length of the shorter base to be 3 yards greater than the height, and the length of the longer base to be 5 yards greater than the height. For what height will the garden have an area of 360 square yards? Round to the nearest tenth of a yard.
    a. 17.1 yards
    b. 34.2 yards
    c. 39.2 yards
    d. 152.6 yards

Solve the quadratic equation by completing the square.

____ 59. $-3x^2 + 7x = -5$
    a. $\frac{7}{6} \pm \frac{\sqrt{109}}{6}$
    c. $\frac{7}{3} \pm \frac{\sqrt{67}}{3}$
    b. $-\frac{7}{3} \pm \frac{\sqrt{109}}{3}$
    d. $-\frac{7}{6} \pm \frac{\sqrt{22}}{6}$

What is the solution of the quadratic system of equations?

____ 60. $\begin{cases} y = x^2 + 16x + 32 \\ y = -x^2 + 2 \end{cases}$

    a. (–7, –3) (–23, –5)
    c. (–3, –7) (–5, –23)
    b. (–3, 89) (–5, 137)
    d. (3, –7) (5, –23)

What is the solution of the system of inequalities?

____ 61. $\begin{cases} y < x^2 + 6x + 11 \\ y \geq -x^2 - 8x - 13 \end{cases}$

a.

c.

b.

d.
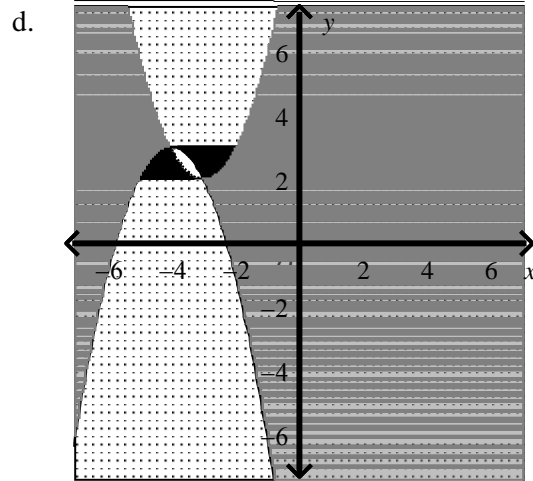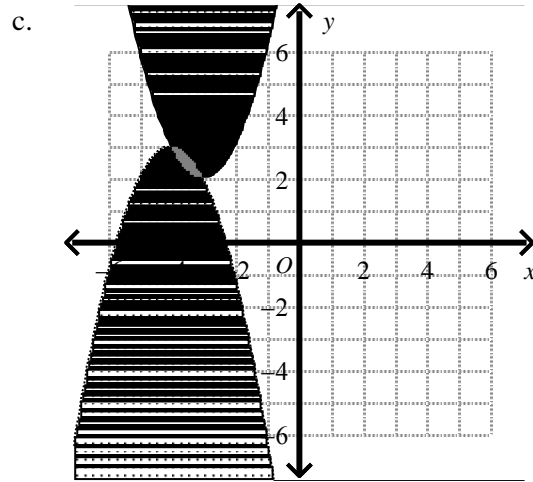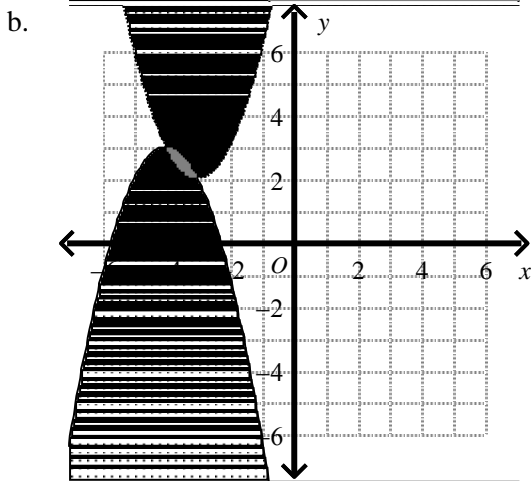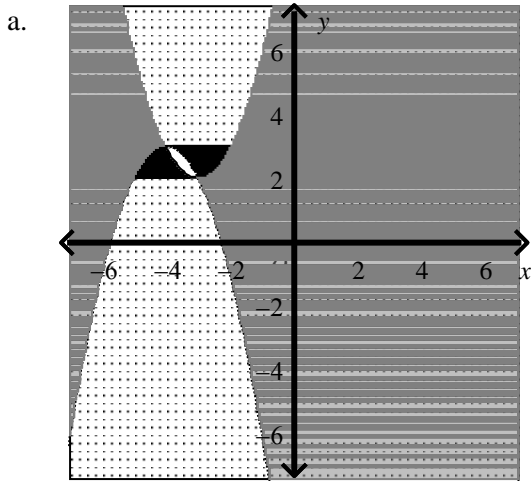
Consider the leading term of each polynomial function.   What is the end behavior of the graph?

_____ 62. $-3x^5 + 9x^4 + 5x^3 + 3$

a. The leading term is $-3x^5$. Since n is odd and a is negative, the end behavior is up and up.

b. The leading term is $-3x^5$. Since n is odd and a is negative, the end behavior is down and down.

c. The leading term is $-3x^5$. Since n is odd and a is negative, the end behavior is up and down.

d. The leading term is $-3x^5$. Since n is odd and a is negative, the end behavior is down and up.

_____ 63. What is the graph of $y = \frac{1}{4}x^3$

a.

c.

b.

d.
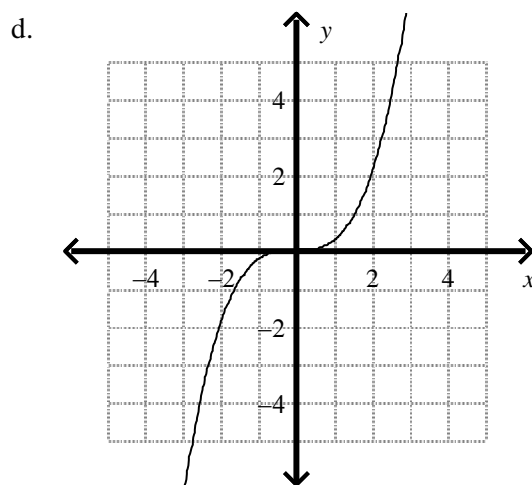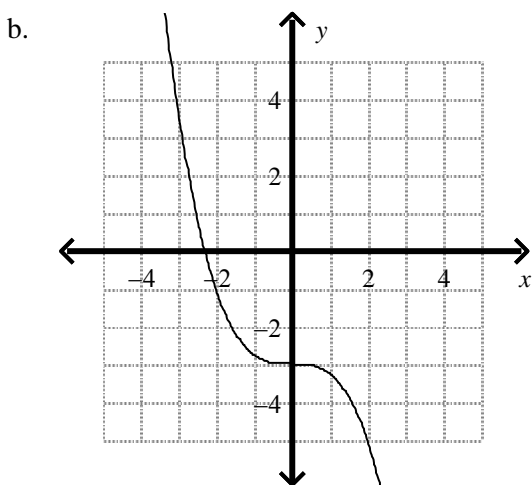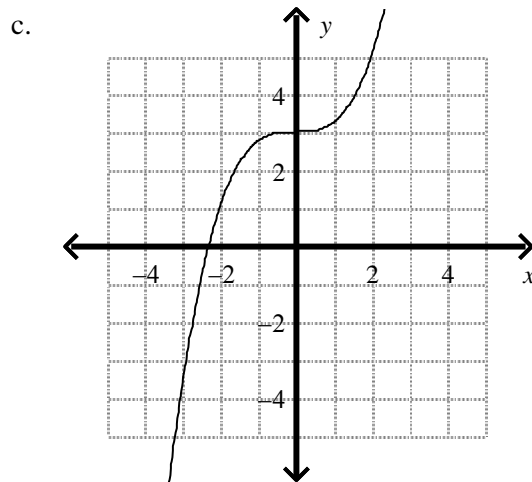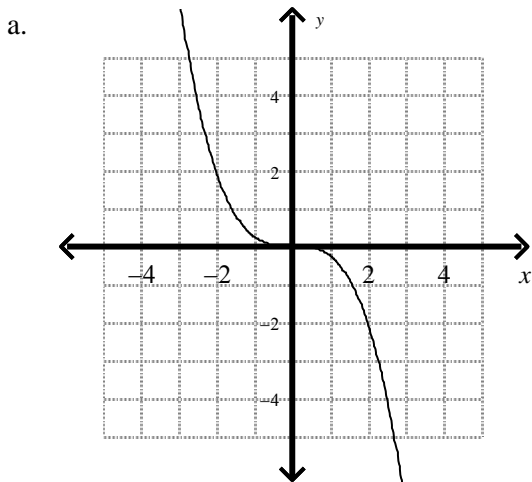
_____ 64. What is a quartic polynomial function in standard form with zeros –2, 4, 4, and 3?

a. $g(x) = x^4 + 9x^3 - 18x^2 - 32x - 96$

b. $g(x) = x^4 - 9x^3 + 18x^2 + 32x - 96$

c. $g(x) = x^4 - 9x^3 + 6x^2 + 10x - 96$

d. $g(x) = x^4 + 9x^3 + 6x^2 - 32x - 96$

What are the zeros of the function?   What are their multiplicities?

_____ 65. $f(x) = x^4 - 5x^3 + 4x^2$

a. the number 0 is a zero of multiplicity 2;   the numbers 1 and 4 are zeros of multiplicity 1

b. the numbers 0 and 1 are zeros of multiplicity 2;   the number 4 is a zero of multiplicity 1

c. the numbers –1 and –4 are zeros of multiplicity 2;   the number 0 is a zero of multiplicity 1

d. the number 0 is a zero of multiplicity 2;   the numbers –1 and –4 are zeros of multiplicity 1

What are the real or imaginary solutions of each polynomial equation?

_____ 66. $x^3 + 343 = 0$

a. –7, 7

b. $-7, \dfrac{7 \pm 7i\sqrt{3}}{2}$

c. $7, \dfrac{7 \pm 7\sqrt{3}}{2}$

d. no solution

_____ 67. Divide $x^3 + x^2 + 2x - 3$ by $x + 4$.

a. $x^2 - 3x + 14$, R –59

c. $x^2 - 3x + 14$

b. $x^2 + 5x - 10$ d. $x^2 + 5x - 10$, R 53

Divide using synthetic division.

_____ 68. Divide $-6x^3 + 18x^2 - 7x - 10$ by $(x - 2)$.

     a. $-6x^2 + 6x + 5$ c. $-6x^2 + 30x - 19$, R -20
     b. $6x^2 - 6x - 5$ d. $6x^2 - 30x + 19$, R 20

_____ 69. How many real zeros does $y = (x + 10)^3 - 8$ have?
     a. 0   c. 1
     b. 3   d. 2

Graph each function. How is each graph a translation of $f(x) = x^2$?

_____ 70. $y = (x + 3)^2 + 4$

a.
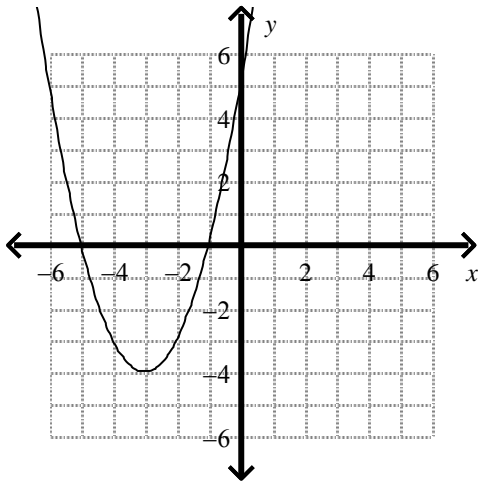
translated down 4 unit(s) and translated to the left 3 unit(s)

c.
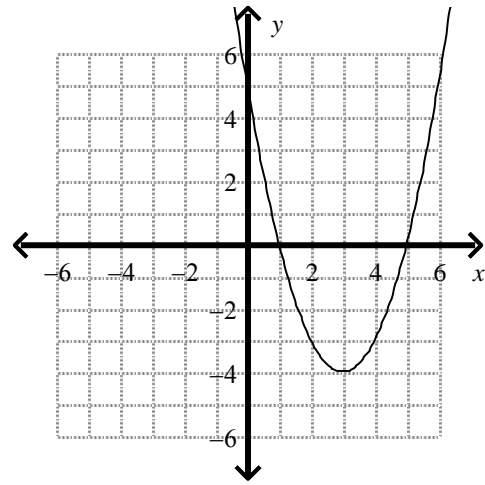
translated down 4 unit(s) and translated to the right 3 unit(s)

b.
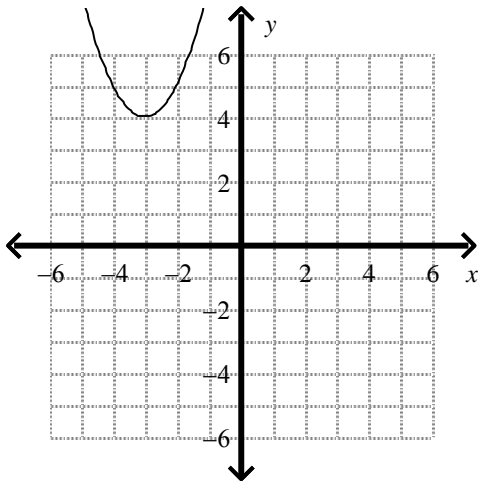
translated up 4 unit(s) and translated to the left 3 unit(s).

d.
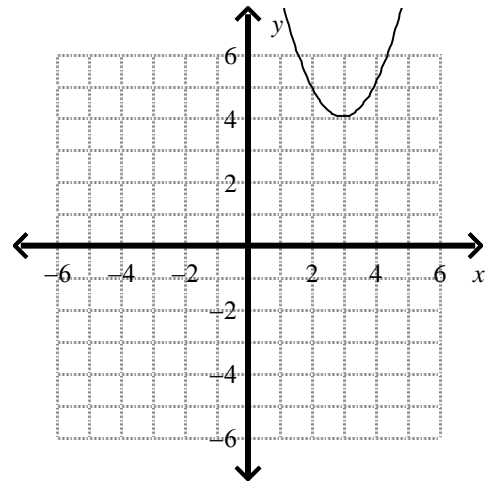
translated up 4 unit(s) and translated to the right 3 unit(s)

_____ 71. Suppose a parabola has an axis of symmetry at $x = 8$, a maximum height of 1 and also passes through the point (9, -1). Write the equation of the parabola in vertex form.
     a. $y = -2(x - 8)^2 + 1$ c. $y = (x - 8)^2 + 1$
     b. $y = -2(x + 8)^2 + 1$ d. $y = 2(x - 8)^2 - 1$

What is the expression in factored form?

_____ 72. $9x^2 - 18x + 9$
    a. $(3x + 3)^2$ c. $(3x - 3)^2$
    b. $(3x - 3)(-3x + 3)$ d. $(-3x - 3)^2$

_____ 73. $9x^2 - 12x + 4$
    a. $(-3x - 2)^2$ c. $(3x - 2)^2$
    b. $(-3x + 2)(3x - 2)$ d. $(3x + 2)^2$

What value completes the square for the expression?

_____ 74. $x^2 + 16x$

    a. 64   c. -64
    b. 8   d. -8

_____ 75. $x^2 - 18x$

    a. 9   c. 81
    b. -9 d. -81

Use the Quadratic Formula to solve the equation.

_____ 76. $-x^2 + 6x - 5 = 0$
    a. $-5, -1$ c. $-5, 11$
    b. $1, 5$ d. $2, 10$

What is the absolute value of each number?

_____ 77. $-1 + 3i$.
    a. 2   c. $\sqrt{10}$
    b. -8 d. $\sqrt{-3}$

Simplify the expression.

_____ 78. $(1 - 2i) + (-2 - i)$
    a. $1 + 3i$ c. $-1 - 3i$
    b. $-4i$ d. $-1 - 3i$

_____ 79. $(3 + i) - (2 - 2i)$
    a. $1 + 3i$ c. $4i$
    b. $5 - i$ d. $-1 - 3i$

_____ 80. $(i)(-7i)$
    a. $7i$ c. 7
    b. -7 d. $-7i$

What pair of factors should be used to find the complex solutions for x?
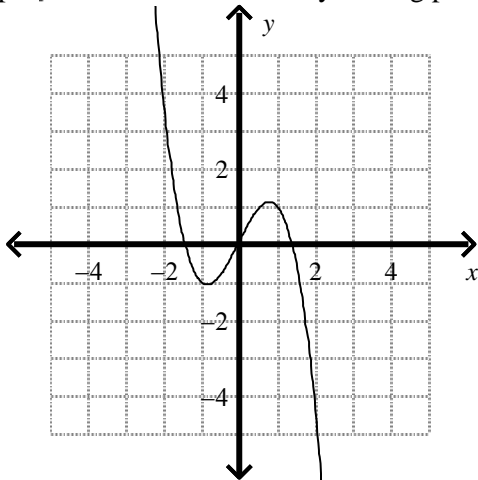
_____ 81. $49x^2 + 36 = 0$
    a. $(6x - 7i)(6x + 7i)$ c. $(7x + 6i)(7x + 6i)$
    b. $(6x + 7)(6x + 7)$ d. $(7x + 6i)(7x - 6i)$

_____ 82. $16x^2 + 4 = 0$
    a. $(4x + 2i)(4x + 2i)$ c. $(4x + 2i)(4x - 2i)$
    b. $(2x + 4)(2x + 4)$ d. $(2x - 4i)(2x + 4i)$

_____ 83. Classify $8x^4 + 7x^3 + 5x^2 + 8$ by number of terms.
    a. trinomial   c. polynomial of 5 terms
    b. binomial   d. polynomial of 4 terms

_____ 84. Graph $y = 2x - x^3$. How many turning points are there?
    a.   c.
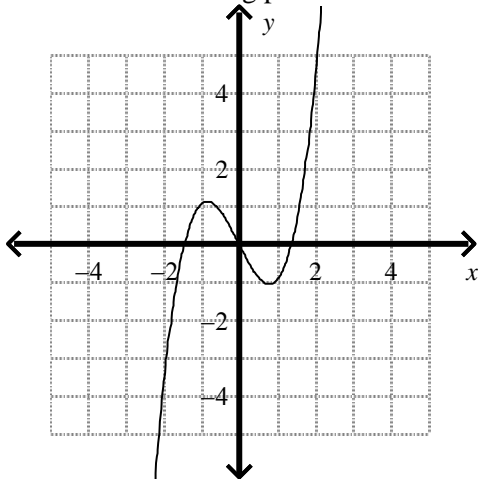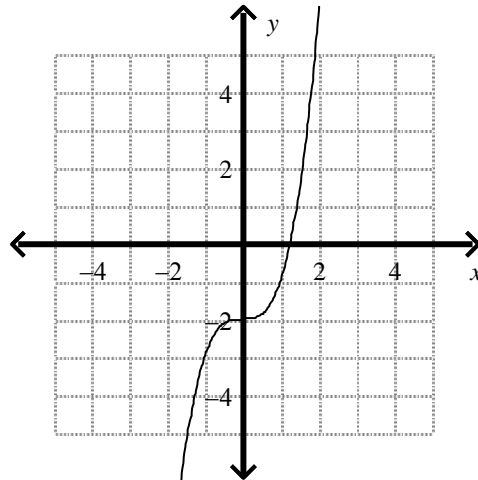
    There are two turning points.   There are no turning points.
    b.   d.
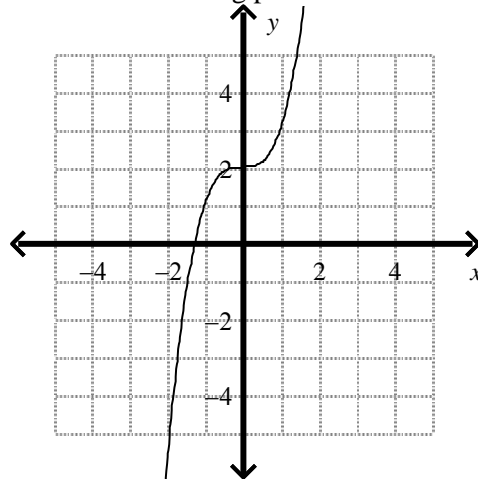
    There are two turning points.   are no turning points.

_____ 85. Find a quadratic equation with roots $-1 + 4i$ and $-1 - 4i$.
    a. $x^2 - 2x + 17 = 0$ c. $x^2 + 2x + 17 = 0$
    b. $x^2 + 2x - 17 = 0$ d. $x^2 - 2x - 17 = 0$

Find all the zeros of the equation.

_____ 86. $x^5 - 5x^4 - 8x^3 + 40x^2 - 9x + 45 = 0$

    a. $5, 3, -3, i, -i$ c. $3, -3, i, -i$
    b. $5, 3, i$ d. $5, -3, -i$

_____ 87. $20x^2 - 576 = -x^4$
    a. $-4, -6i$ c. $4, -4, 6i, -6i$
    b. $4, -4, 6i, 0$ d. $4, 6i$

_____ 88. The table shows the annual consumption of cheese per person in the U.S. for selected years in the 20th century.

Year	Pounds Consumed
1908	3.255
1937	9.053
1959	17.837
1996	58.395

Use a cubic model to estimate milk production in 1978.

a. 30.4

c. 36.4

b. 33.4

d. 66.7

_____ 89. $\begin{bmatrix} -9 & -1 & 7 \\ 0 & 9 & 2 \end{bmatrix} + \begin{bmatrix} -2 & 0 & 7 \\ -3 & 5 & -1 \end{bmatrix}$

a. $\begin{bmatrix} -11 & 1 & 14 \\ -3 & 14 & 1 \end{bmatrix}$

c. $\begin{bmatrix} -11 & 1 & 14 \\ -3 & 14 & -1 \end{bmatrix}$

b. $\begin{bmatrix} -11 & -1 & 14 \\ -3 & 14 & 1 \end{bmatrix}$

d. $\begin{bmatrix} -11 & -1 & 14 \\ 3 & -14 & 1 \end{bmatrix}$

Find the values of the variables.

_____ 90. $\begin{bmatrix} -12 & -w^2 \\ 2f & 3 \end{bmatrix} = \begin{bmatrix} 2k & -81 \\ -14 & 3 \end{bmatrix}$

a. $f = -7, k = 6, w = 9$ or -9

c. $f = -7, k = -6, w = 81$ or -81

b. $f = -7, k = -6, w = 9$ or -9

d. $f = -7, k = -6, w = 9$

_____ 91. $\begin{bmatrix} 15 & 8 \\ 4x & 0 \end{bmatrix} - \begin{bmatrix} 2 & 5 \\ x & 3y+6 \end{bmatrix} = \begin{bmatrix} 13 & 3 \\ 12 & 4y+8 \end{bmatrix}$

a. $x = -4$ and $y = 2$

c. $x = 4$ and $y = -2$

b. $x = 5$ and $y = -1$

d. $x = -5$ and $y = 1$

_____ 92. Find $-3A + 6B$.

$A = \begin{bmatrix} -3 & 5 & -6 \\ 9 & -5 & 3 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 6 & 7 \\ 2 & -1 & -6 \end{bmatrix}$

a. $\begin{bmatrix} 21 & 12 & -24 \\ -15 & 9 & 36 \end{bmatrix}$

c. $\begin{bmatrix} 21 & 12 & 60 \\ -15 & -27 & 36 \end{bmatrix}$

b. $\begin{bmatrix} -3 & 21 & 60 \\ 48 & -27 & 36 \end{bmatrix}$

d. $\begin{bmatrix} -3 & 21 & 60 \\ -15 & 9 & -45 \end{bmatrix}$

Solve the matrix equation.

_____ 93. $X - \begin{bmatrix} 2 & -8 \\ -4 & 2 \end{bmatrix} = \begin{bmatrix} 4 & -6 \\ 2 & -8 \end{bmatrix}$

a.
$$\begin{bmatrix} 6 & -14 \\ -2 & -6 \end{bmatrix}$$

c.
$$\begin{bmatrix} 6 & -14 \\ 6 & -10 \end{bmatrix}$$

b.
$$\begin{bmatrix} 2 & -14 \\ -2 & -10 \end{bmatrix}$$

d.
$$\begin{bmatrix} 6 & 2 \\ 6 & -6 \end{bmatrix}$$

Find the product.

_____ 94.
$$\begin{bmatrix} 5 & 5 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} -4 & 9 \\ 8 & 7 \end{bmatrix}$$

a.
$$\begin{bmatrix} 20 & 80 \\ 32 & 3 \end{bmatrix}$$

c.
$$\begin{bmatrix} -20 & 40 \\ 45 & 35 \end{bmatrix}$$

b.
$$\begin{bmatrix} 20 & 80 \\ 3 & 32 \end{bmatrix}$$

d.
$$\begin{bmatrix} 8 & 24 \\ -18 & 21 \end{bmatrix}$$

Determine whether the product is defined or undefined. If defined, give the dimensions of the product matrix.

_____ 95.
$$\begin{bmatrix} 1 & 1 & -4 \\ 5 & 6 & 0 \end{bmatrix}\begin{bmatrix} 9 \\ 1 \\ -7 \end{bmatrix}$$

a. defined; 3×3
b. defined; 2×1

c. defined; 2×3
d. undefined

Are matrices A and B inverses?

_____ 96. $A = \begin{bmatrix} -5 & -18 \\ 2 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 18 \\ -2 & -5 \end{bmatrix}$

a. yes

b. no

Evaluate the determinant of the matrix.

_____ 97.
$$\begin{bmatrix} -4 & 5 & 6 \\ 0 & 4 & 4 \\ -2 & -5 & 4 \end{bmatrix}$$

a. −104
b. −72
c. −136
d. 136

_____ 98.
$$\begin{bmatrix} -9 & -9 \\ -6 & 6 \end{bmatrix}$$

a. −108
b. 108
c. 0
d. 0

Does the given matrix, A, have an inverse? If it does, what is A^{-1}?

_____ 99. $A = \begin{bmatrix} 0 & 19 \\ 0 & 1 \end{bmatrix}$

a. $\begin{bmatrix} 0 & 19 \\ 0 & 0 \end{bmatrix}$

c. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

b. $\begin{bmatrix} 0 & 19 \\ 0 & 1 \end{bmatrix}$

d. does not exist

What is the solution of the matrix equation?

_____ 100. $\begin{bmatrix} 5 & -2 \\ 2 & -1 \end{bmatrix} X = \begin{bmatrix} 2 \\ -4 \end{bmatrix}$

a. $\begin{bmatrix} 2 \\ -4 \end{bmatrix}$

b. $\begin{bmatrix} -10 \\ -24 \end{bmatrix}$

c. $\begin{bmatrix} -10 \\ 24 \end{bmatrix}$

d. $\begin{bmatrix} 10 \\ 24 \end{bmatrix}$