

Chapter 1

Which algebraic expression models the given word phrase?

- 5 times the sum of a and b
 - $5a + b$
 - $5(a + b)$
 - $a + b$
 - $5(a - b)$
- You had \$199, but you are spending \$3 each day. What algebraic expression models this situation?
 - $199 - 3d$
 - $199 + 3d$
 - $196d$
 - $3 + 199d$
- Tickets to a concert are available online for \$25 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? Evaluate the function for 6 tickets.
 - $25t + 1.75$; \$151.75
 - $1.75t + 25$; \$151.75
 - $1.75t + 25$; \$35.50
 - $25t + 1.75$; \$35.50

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

- $-x^2 - 4x - 4$; $x = -3$
 - 3
 - 1
 - 11
 - 17

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

5. $-3(-4y + 3) + 7y$

Solve the equation.

6. $-5y - 9 = -(y - 1)$

Solve the equation or formula for the indicated variable.

7. $T = \frac{4U}{E}$, for U

Solve the inequality. Graph the solution set.

8. $2 - 2k \leq 8$

Solve the problem by writing an inequality.

9. If the perimeter of a rectangular picture frame must be less than 200 in., and the width is 36 in., what must the height h of the frame be?

Solve the compound inequality. Graph the solution.

10. $2x - 4 \geq -10$ and $2x - 4 < 10$

11. $4x - 5 < -17$ or $5x + 6 > 31$

Solve the absolute value equation.

12. $-2|4x - 5| - 2 = -4$

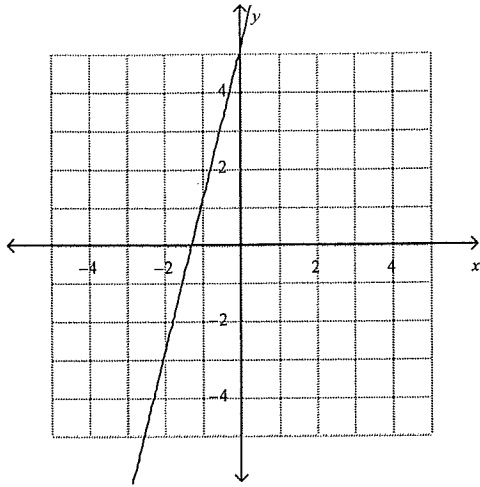
Solve the inequality. Graph the solution.

13. $|2x + 3| \geq 19$

14. $|2x + 10| \leq 26$

Chapter 2

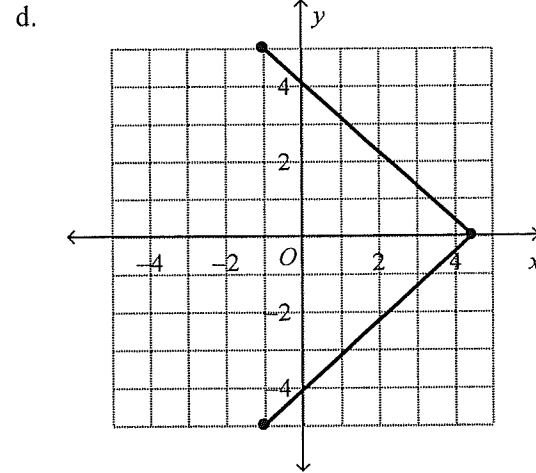
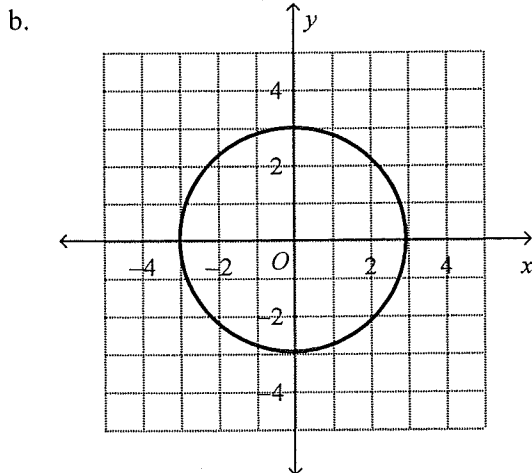
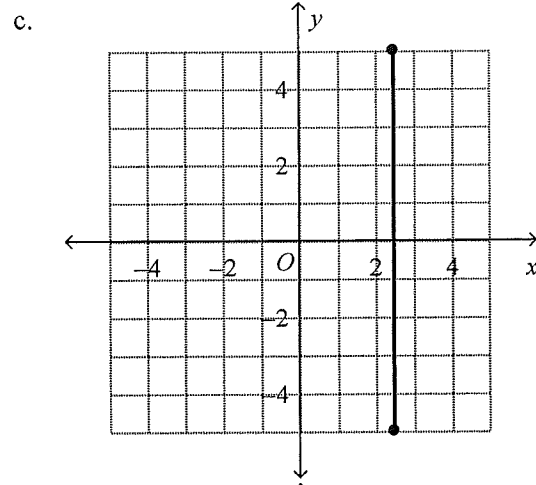
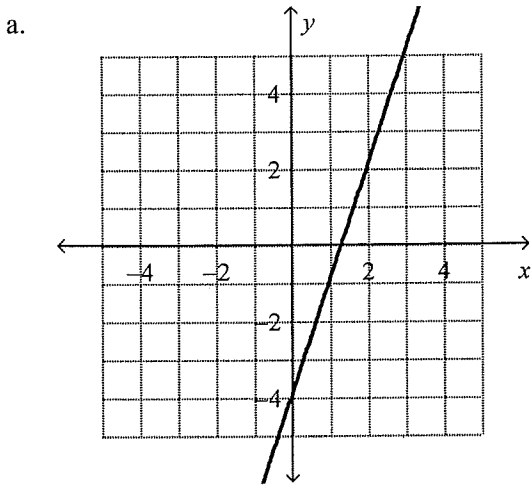
15. What is an equation of the line in slope intercept form?



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

- c. $y = 4x - 5$
 d. $y = 4x + 5$

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



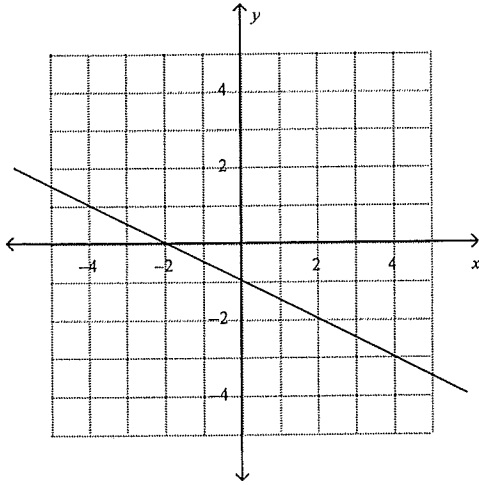
Write the equation in slope-intercept form. What are the slope and y-intercept?

17. $-5x - 8y = 1$

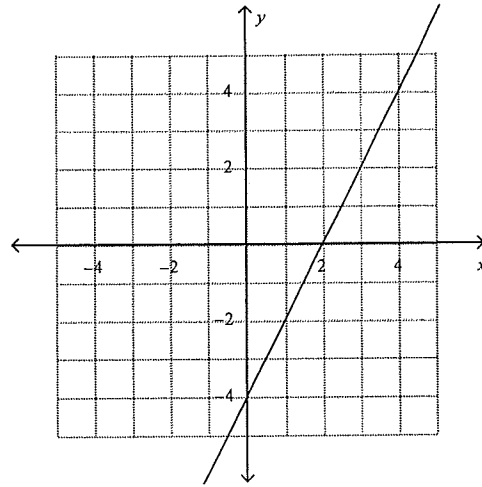
What is the graph of the equation?

18. $-2x - 4y = 4$

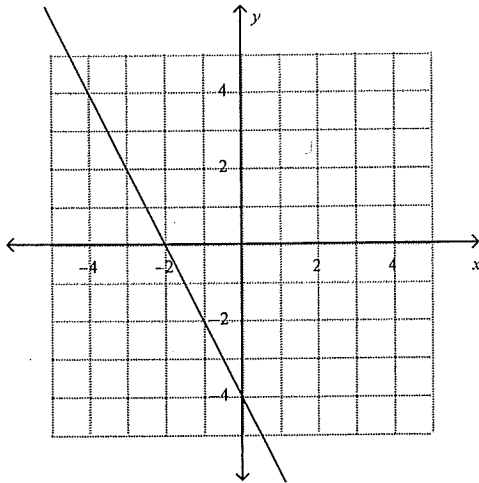
a.



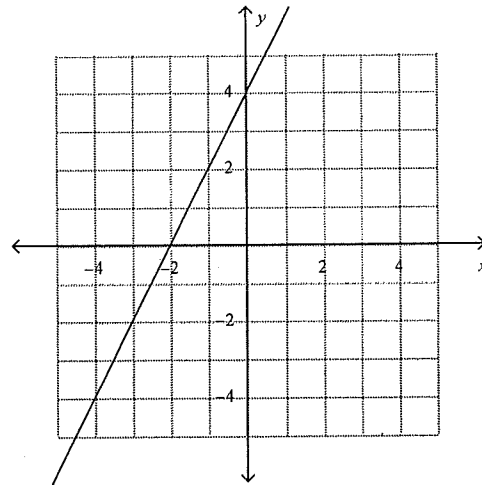
c.



b.



d.

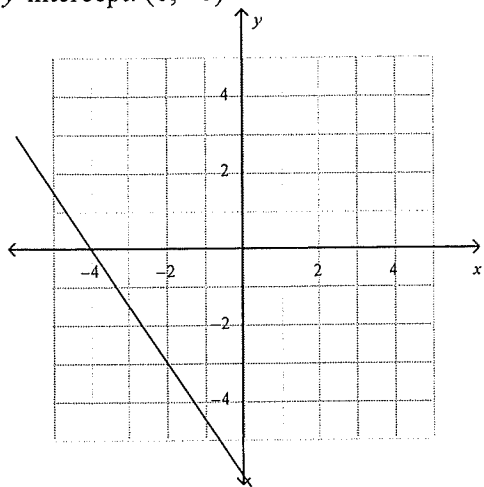


19. Write the equation of the line, in standard form, that passes through the points $(-2, -7)$ and $(4, -10)$.

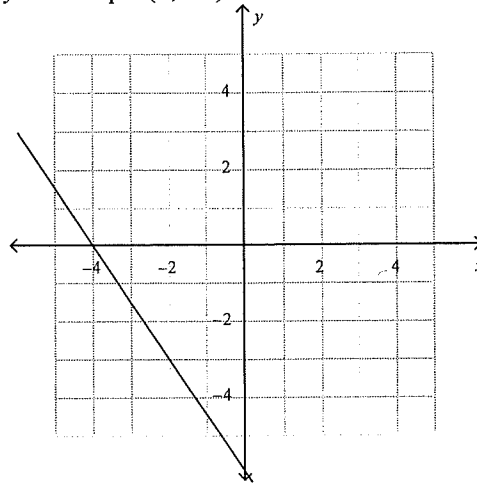
What are the intercepts of the equation? Graph the equation.

20. $-4x - 6y = 24$

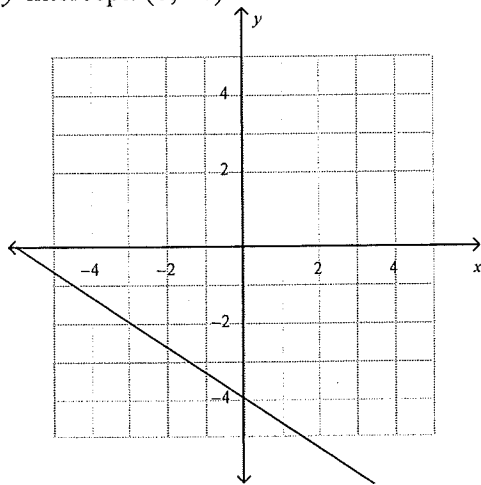
- a. x -intercept: $(-4, 0)$
 y -intercept: $(0, -6)$



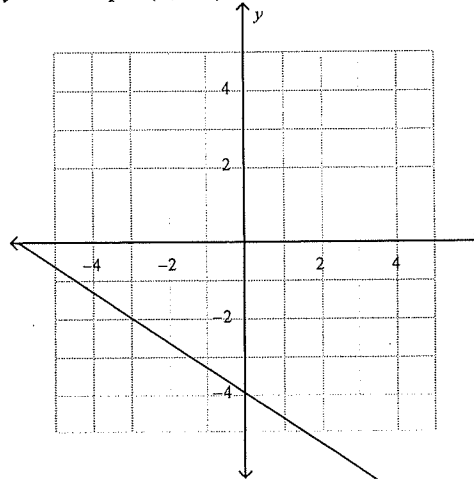
- c. x -intercept: $(-6, 0)$
 y -intercept: $(0, -4)$



- b. x -intercept: $(-4, 0)$
 y -intercept: $(0, -6)$



- d. x -intercept: $(-6, 0)$
 y -intercept: $(0, -4)$



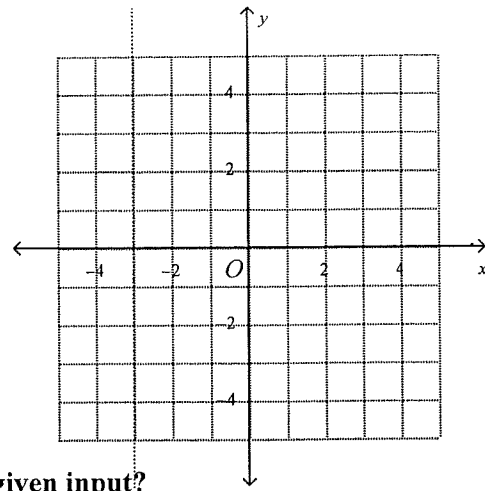
Write an equation of the line, in point-slope form, that passes through the two given points.

21. points: $(-5, 5)$, $(15, -5)$

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

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

23. Find the domain and range of the relation and determine whether it is a function.



For the function given, what is the output of the given input?

24. For $f(x) = -5x + 1$, find $f(3)$.

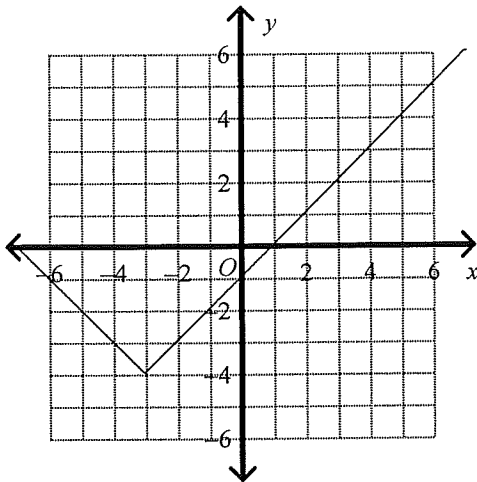
What transformations change the graph of $f(x)$ to the graph of $g(x)$?

25. $f(x) = -7x^2$ $g(x) = -35x^2 + 5$

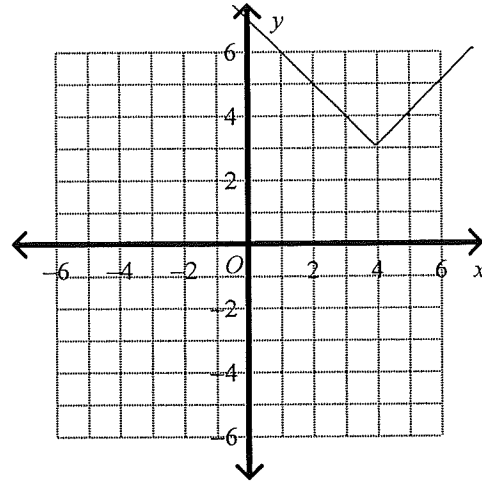
26. What is the graph of the absolute value equation?

$$y = |x + 3| - 4$$

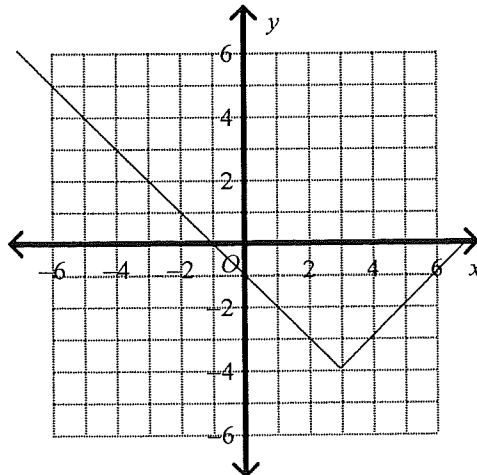
a.



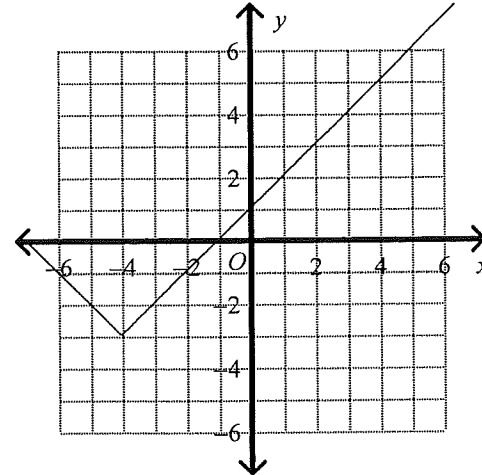
c.



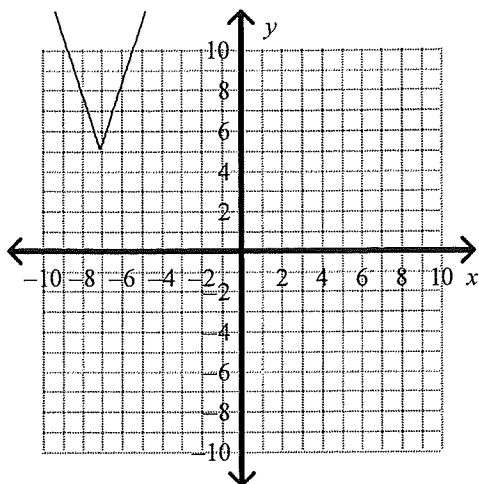
b.



d.



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



- a. $y = 3|-x - 7| + 5$
 b. $y = -3|x - 7| - 5$

- c. $y = -3|x + 7| - 5$
 d. $y = 3|x + 7| - 5$

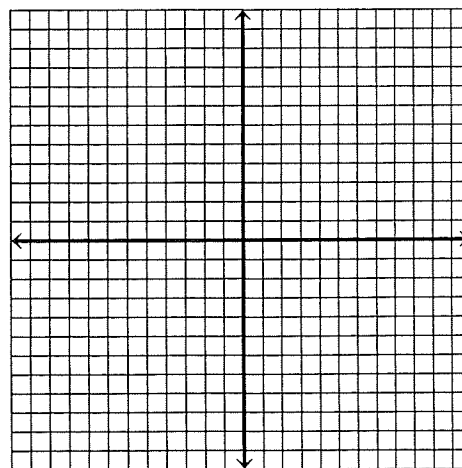
28. Without graphing, identify the vertex, write the equation for the axis of symmetry, and find the x- and y- intercepts if any, of the graph of $y = -3|x - 4| + 9$

vertex _____ AOS. _____
 x-int. _____ y-int. _____

Chapter 3

Solve the system by graphing.

29.
$$\begin{cases} -3x - y = -10 \\ 4x - 4y = 8 \end{cases}$$



Solve the system by substitution.

30.
$$\begin{cases} -2x - y = -14 \\ 3x - y = 11 \end{cases}$$

Solve the system using elimination.

$$31. \begin{cases} 7x + 2y = 11 \\ 4x - 7y = -10 \end{cases}$$

$$32. \begin{cases} 3x + 3y = -15 \\ 2x - 4y = -16 \end{cases}$$

What are the solutions of the following systems?

$$33. \begin{cases} -x + 2y = 10 \\ -3x + 6y = 11 \end{cases}$$

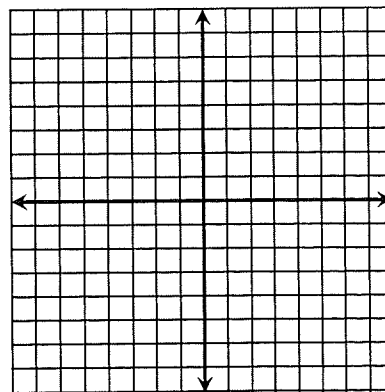
$$34. \begin{cases} x - 3y = 9 \\ -x + 3y = -9 \end{cases}$$

35. A group of 52 people attended a ball game. There were three times as many children as adults in the group. Set up a system of equations that represents the numbers of adults and children who attended the game and solve the system to find the number of children who were in the group.

Chapter 4

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

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



37. Identify the vertex and the axis of symmetry of the graph of the function $y = 2(x + 2)^2 - 4$.
vertex _____

Aos. _____

38. Identify the maximum or minimum value and the domain and range of the graph of the function

$y = 2(x + 2)^2 - 3$. max/min _____

domain: _____

range: _____

39. What steps transform the graph of $y = x^2$ to $y = -(x + 3)^2 + 5$?

40. Suppose a parabola has vertex $(-8, -7)$ and also passes through the point $(-7, -4)$. Write the equation of the parabola in vertex form.

What are the vertex and the axis of symmetry of the equation?

41. $y = 2x^2 + 4x - 10$ vertex _____

Aos. _____

What is the maximum or minimum value of the function? What is the range?

42. $y = -2x^2 + 20x - 2$ max/min _____

range: _____

What is the vertex form of the equation?

43. $y = x^2 + 8x - 6$

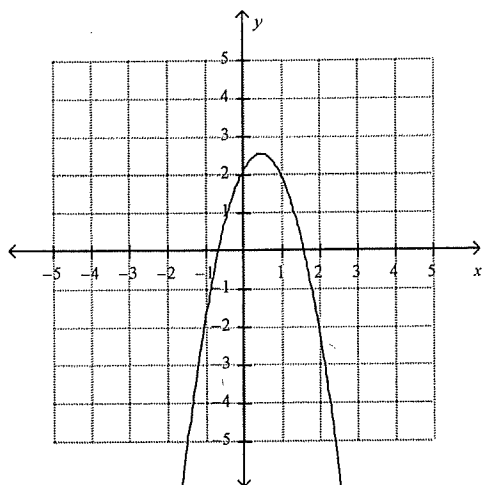
What is the expression in factored form?

44. $x^2 - 6x + 8$

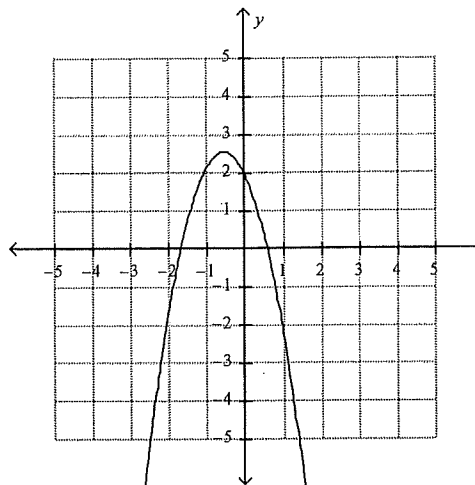
What is the graph of the equation?

45. $y = -2x^2 + 2x + 2$

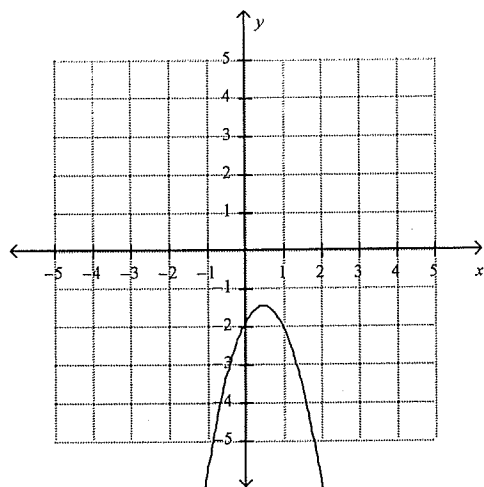
a.



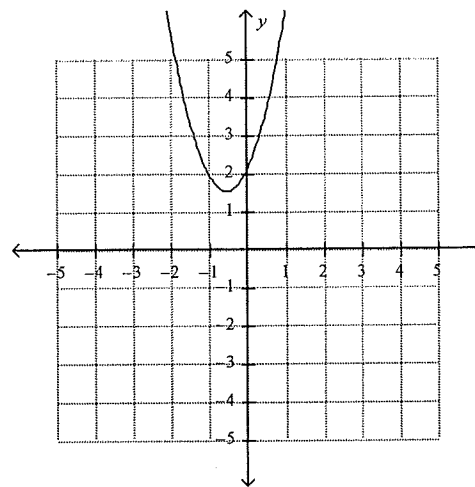
c.



b.



d.



What is the expression in factored form?

46. $-4x^2 + 16x + 48$

47. $5x^2 - 22x - 15$

48. $9x^2 - 18x + 9$

49. $16x^2 - 25$

What are the solutions of the quadratic equation?

50. $x^2 + 11x = -28$

51. $2x^2 + 5x - 3 = 0$

52. $6x^2 + 2x - 4 = 0$

What is the solution of each equation?

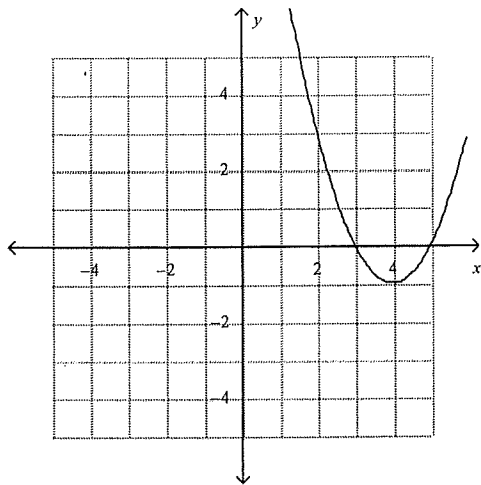
53. $108x^2 = 147$

54. $x^2 + 18x + 81 = 25$

Solve by graphing.

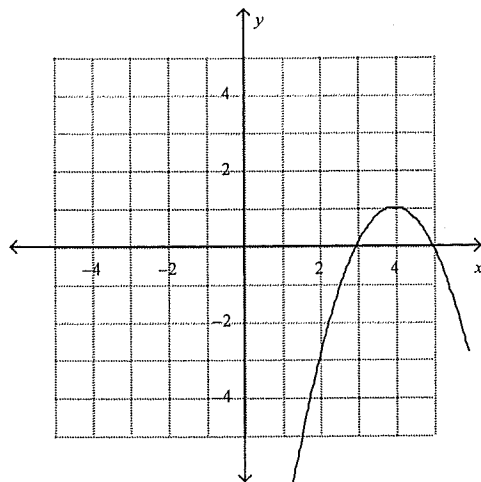
55. $x^2 + 8x + 15 = 0$

a.



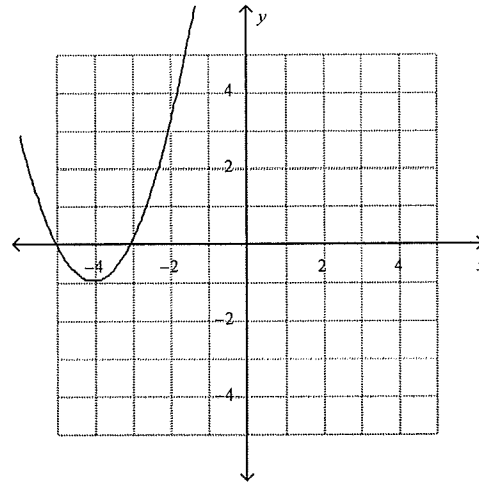
5, 3

b.



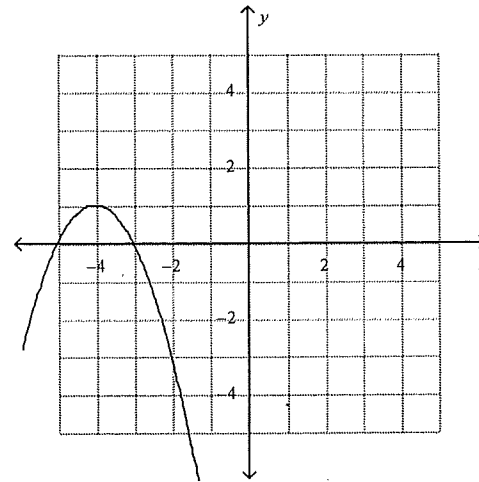
5, 3

c.



-5, -3

d.



-5, -3

What value completes the square for the expression?

56. $x^2 - 18x$

Solve the quadratic equation by completing the square.

57. $x^2 + 10x + 14 = 0$

Rewrite the equation in vertex form. Name the vertex and y -intercept.

58. $y = x^2 - 12x + 34$

59. $y = x^2 - 10x + 17$

Use the Quadratic Formula to solve the equation.

60. $-4x^2 + x = -4$

61. $-2x^2 - 9x = 5$

What is the number of x -intercepts?

62. $x^2 = -7x + 7$

63. 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)?

Simplify the number using the imaginary unit i .

64. $\sqrt{-360}$

Simplify the expression.

65. $(2 - 5i) - (3 + 4i)$

66. $\frac{-1 + 3i}{4 - i}$

What are the solutions?

67. $9x^2 + 16 = 0$

68. $\frac{1}{2}x^2 - x + 2 = 0$

Chapter 5

1. Write each polynomial in standard form, name it by degree and by the number of terms, describe the left- and right-end behavior, and state the maximum number of turning points, and state all of the possible number of turning points.

a. $y = 4(x^2 + 5x - 6) - 3(2x^3 + 4x - 5)$ b. $y = 5x^2(2x^2 - 3x + 4) + 2x(7x - 8)$

SF _____

name _____

end beh _____

max turns _____

poss. turns _____

SF _____

name _____

end beh. _____

max turns _____

poss. turns _____

2. Use **common differences** to determine the degree of the polynomial represented by each data set.

a.

x	y
-1	16
0	2
1	-2
2	4
3	20
4	46

b.

x	y
-2	4
-1	-2
0	-1
1	1
2	-2
3	-16

3. **Factor** each polynomial and state the **zeros**. Describe the **multiplicity**.

a. $y = x^4 - 6x^3 + 9x^2$

b. $y = 9x^5 + 3x^4 - 30x^3$

4. Write a polynomial that satisfies the given conditions. Write in **standard** form

a. Quintic
Zeros at 5, -4, and 0
 $x = 0$ has a multiplicity of 3.

b. Cubic
Zeros at 3, -2, and 1

5. **Solve** each polynomial equation.

a. $x^3 + 8x^2 - 20x = 0$

b. $27x^3 + 8 = 0$

c. $2x^3 + 4 = x^2 + 8x$

d. $20x^3 + 7x^2 = 3x$

e. $x^4 = 36$

f. $x^4 - 2x^2 - 48 = 0$

6. Divide using long division. $(12x^3 - 10x^2 + 22x - 15) \div (3x^2 - x + 5)$

7. Divide using synthetic division. $(3x^3 - 14x^2 - 25) \div (x - 5)$

8. Use synthetic division to find $P(-4)$ for $P(x) = x^4 - 3x^3 + 5x^2 - 7x + 2$

9. Use the Rational Root Theorem to list all possible roots of the polynomial equation.

$$4x^3 + 2x - 12 = 0$$

10. Find all the roots for the following polynomials.

a. $P(x) = x^3 + 3x^2 + 6x + 4$

b. $P(x) = 8x^3 + 2x^2 - 5x + 1$

11. A polynomial function with rational coefficients has roots of $4 + \sqrt{7}$ and $6i$. Find two additional roots.

12. **Write** a polynomial function with rational coefficients so that $P(x) = 0$ has the given roots.

a. -4 , and $2i$

b. $\sqrt{5}$, and $-3i$

13. Find all the complex roots of each equation.

a. $y = 2x^4 + 3x^3 - 17x^2 - 27x - 9$

b. $y = x^3 - 4x^2 + 4x - 3$

14. For the given equation, state the number of complex roots, the possible number of real roots, and the possible rational roots.

$$y = 2x^4 + 3x^3 - 17x^2 - 27x - 9$$

complex roots _____

poss. # real roots _____

poss. rational roots _____

Sections 6.1 and 6.2

1. Find ALL the real square roots of each number.

a. 0.01

2. Find ALL the real cube roots of each number.

a. -343

3. Find ALL the real fourth roots of each number.

a. -81

4. Simplify each radical expression.

a. $\sqrt[4]{512x^7y^9}$	b. $\sqrt[3]{\frac{64x^9}{343}}$
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5. Multiply, and then simplify.

a. $\sqrt{3x} \cdot \sqrt{6x^3}$	b. $\sqrt[3]{50x^2z^5} \cdot \sqrt[3]{15y^3z}$
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6. Simplify each expression. Rationalize denominators when necessary.

a. $\frac{\sqrt{2y}}{\sqrt{8x^3}}$	b. $\sqrt[3]{\frac{625x^{12}y^{16}}{5x^2y^4}}$
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Sections 6.3

7. Simplify, if possible.

a. $14x\sqrt{2} - 8x\sqrt{2}$	b. $2\sqrt{128} - \sqrt{50} + 3\sqrt{72}$
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8. Multiply each pair of radical binomials.

a. $(4 - \sqrt{5})(4 + \sqrt{5})$	b. $(4 + \sqrt{6})(7 - 2\sqrt{6})$
c. $(2 - \sqrt{7})^2$	

9. Rationalize each denominator.

a. $\frac{7 + \sqrt{3}}{5 - \sqrt{3}}$	b. $\frac{4 - 3\sqrt{2}}{6 + 3\sqrt{2}}$
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Section 6.4

10. Write each expression in simplest, radical form. Your answers should have **no negative or fractional exponents**, and **no radicals in the denominator**.

a. $(27x^{-3}y^9)^{\frac{1}{3}}$	b. $(4x^{\frac{3}{4}})(6x^{\frac{1}{3}})$
c. $(x^{\frac{1}{4}})^{-8}$	d. $\left(\frac{x^{\frac{2}{3}}}{x^{\frac{4}{3}}}\right)^{-9}$

Sections 6.5

11. Solve each equation. Be sure to check for extraneous solutions.

a. $4(x-2)^{\frac{1}{3}} - 15 = 5$	b. $\sqrt{3x+4} - 2 = 8$
c. $2(x-1)^{\frac{2}{3}} = 18$	d. $\sqrt{x+2} = x-6$

Section 6.6

12. Let $f(x) = 5x^2 - 17x - 12$ and $g(x) = 10x + 6$. Perform each function operation and then find the domain.

a. $(f + g)(x)$

b. $(g - f)(x)$

c. $(f \cdot g)(x)$

d. $\left(\frac{f}{g}\right)(x)$

13. Let $f(x) = 2x^2 - 3$ and $g(x) = 2x - 7$. Find each composition.

a. $(g \circ f)(-4)$

b. $(f \circ g)(x)$

Section 6.7-6.8

14. Find the inverse of each function. State whether the inverse is also a function. State the domain and range of the function and its inverse.

a. $y = \sqrt{x-5}$

inv: _____

function:

D: _____

R: _____

inverse:

D: _____

R: _____

b. $y = (x-3)^2$

inv: _____

function:

D: _____

R: _____

inverse:

D: _____

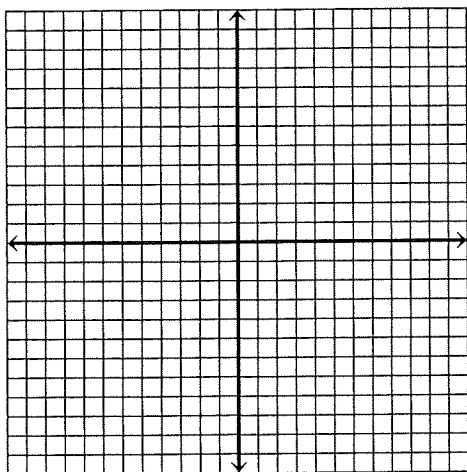
R: _____

15. Graph both the original function and the inverse on the same grid. State whether the inverse is also a function.

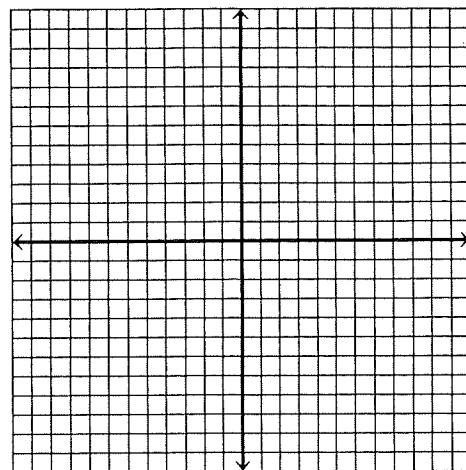
a. $y = \frac{1}{3}x - 4$ inv function: y or n

b. $y = 2(x-3)^2 - 1$ inv function: y or n

x	y



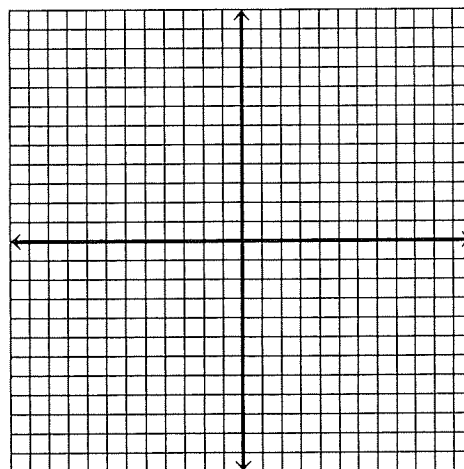
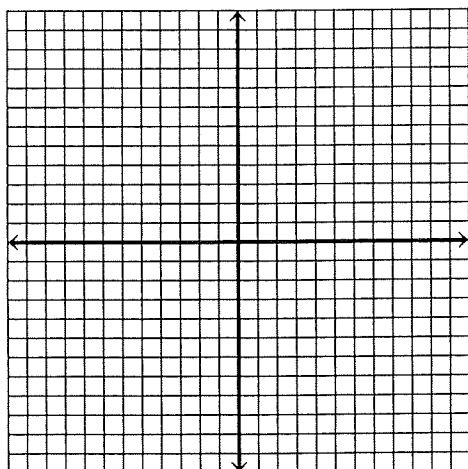
x	y



16. Graph each function using transformations. Label your graphs.

a. $y = -\sqrt[3]{x+4} - 1$

b. $y = 3\sqrt{x+2} - 1$



17. Rewrite each function so that it would be easier to name the transformations. Describe the transformations.

a. $y = \sqrt{4x+16} - 2$

b. $y = -\sqrt[3]{125x-250}$