Link to the textbook!

All pink questions have video solutions in the textbook.

Odd problems have answers at the end of the textbook in the Appendix.

Section 1.1 ~ Quadrants of the Cartesian Plane, Pythagorean Theorem, Distance and Midpoint Formulas

Determining Quadrant(s) for a Point **In Exercises 9–14, determine the quadrant(s) in which (x, y) could be located.**

9. $x > 0$ and $y < 0$

11. $x = -4$ and $y > 0$

Verifying a Polygon **In Exercises 25–28, show that the points form the vertices of the polygon.**

25. Right triangle: $(4, 0), (2, 1), (-1, -5)$

Plotting, Distance, and Midpoint **In Exercises 29–36, (a) plot the points, (b) find the distance between the points, and (c) find the midpoint of the line segment joining the points.**

33. $(-1, 2), (5, 4)$

Section 1.2 ~ Solutions to Equations, x-intercepts and y-intercepts

Determining Solution Points **In Exercises 7–14, determine whether each point lies on the graph of the equation.**

Equation	Points	
8. $y = \sqrt{5 - x}$	(a) $(1, 2)$	(b) $(5, 0)$

Finding x- and y-Intercepts **In Exercises 23–32, find the x- and y-intercepts of the graph of the equation.**

25. $y = \sqrt{x + 4}$

29. $y = 2x^3 - 4x^2$

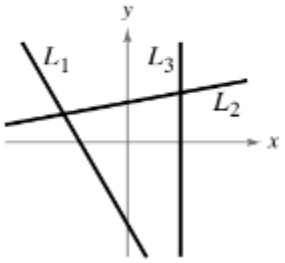
Section 1.3 ~ Slope Formula, Slope Intercept Form and Point Slope Form, Parallel and Perpendicular Lines

Identifying Lines **In Exercises 9 and 10, identify the line that has each slope.**

9. (a) $m = \frac{2}{3}$

(b) m is undefined.

(c) $m = -2$



Finding the Slope of a Line Through Two Points **In Exercises 25–34, find the slope of the line passing through the pair of points.**

27. $(-3, -2), (1, 6)$

Finding an Equation of a Line **In Exercises 55–64, find an equation of the line passing through the pair of points. Sketch the line.**

57. $(-7, 2), (-7, 5)$

Finding Parallel and Perpendicular Lines **In Exercises 73–80, find equations of the lines that pass through the given point and are (a) parallel to and (b) perpendicular to the given line.**

77. $y + 5 = 0, \quad (-2, 4)$

79. $x - y = 4, \quad (2.5, 6.8)$

Section 1.4 ~ Definition of a Function, Function Notation, Domain, Difference Quotient

Testing for Functions **In Exercises 5–8, determine whether the relation represents y as a function of x.**

7.

Input, x	10	7	4	7	10
Output, y	3	6	9	12	15

Testing for Functions Represented Algebraically **In Exercises 11–18, determine whether the equation represents y as a function of x.**

13. $y = \sqrt{16 - x^2}$

Evaluating a Function **In Exercises 19–30, find each function value, if possible.**

21. $g(t) = 4t^2 - 3t + 5$

(a) $g(2)$ (b) $g(t - 2)$ (c) $g(t) - g(2)$

29. $f(x) = \begin{cases} 2x + 1, & x < 0 \\ 2x + 2, & x \geq 0 \end{cases}$

Finding the Domain of a Function **In Exercises 47–56, find the domain of the function.**

55. $f(x) = \dfrac{x - 4}{\sqrt{x}}$

Evaluating a Difference Quotient **In Exercises 73–80, find the difference quotient and simplify your answer.**

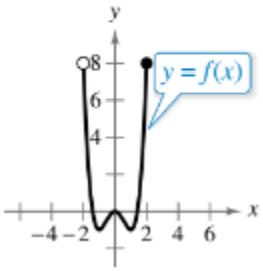
73. $f(x) = x^2 - 2x + 4, \quad \dfrac{f(2 + h) - f(2)}{h}, \quad h \neq 0$

Section 1.5 ~ Domain and Range, Vertical Line Test, Zeros of a Function, Increasing/Decreasing Intervals, Relative Maxima and Minima, Average Rate of Change, Even and Odd Functions

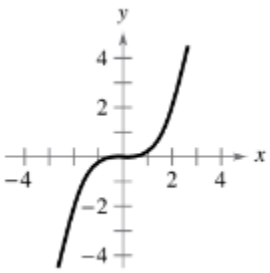
Domain, Range, and Values of a Function **In Exercises 7–10, use the graph of the function to find the domain and range of f and each function value.**

Vertical Line Test for Functions **In Exercises 11–14, use the Vertical Line Test to determine whether the graph represents y as a function of x. To print an enlarged copy of the graph, go to *MathGraphs.com*.**

7. (a) $f(-1)$ (b) $f(0)$
(c) $f(1)$ (d) $f(2)$



11.



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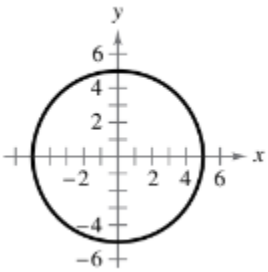


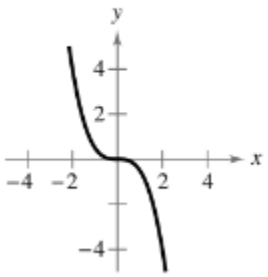
Finding the Zeros of a Function **In Exercises 15–26, find the zeros of the function algebraically.**

21. $f(x) = \frac{1}{3}x^3 - 2x$

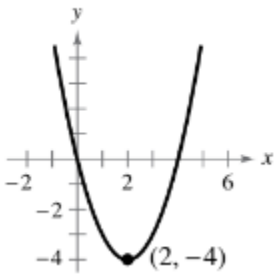
25. $f(x) = \sqrt{2x} - 1$

Describing Function Behavior **In Exercises 33–40, determine the open intervals on which the function is increasing, decreasing, or constant.**

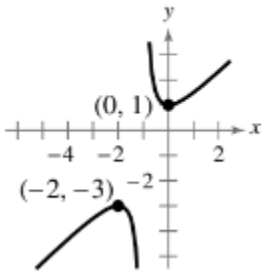
33. $f(x) = -\frac{1}{2}x^3$



34. $f(x) = x^2 - 4x$



38. $f(x) = \dfrac{x^2 + x + 1}{x + 1}$



Approximating Relative Minima or Maxima **In Exercises 49–54, use a graphing utility to approximate (to two decimal places) any relative minima or maxima of the function.**

Average Rate of Change of a Function **In Exercises 61–64, find the average rate of change of the function from x_1 to x_2.**

Function **x-Values**

51. $h(x) = x^3 - 6x^2 + 15$

63. $f(x) = x^3 - 3x^2 - x \qquad x_1 = -1, x_2 = 2$

Even, Odd, or Neither? **In Exercises 71–76, determine whether the function is even, odd, or neither. Then describe the symmetry.**

71. $f(x) = x^6 - 2x^2 + 3$

Even, Odd, or Neither? **In Exercises 77–82, sketch a graph of the function and determine whether it is even, odd, or neither. Verify your answer algebraically.**

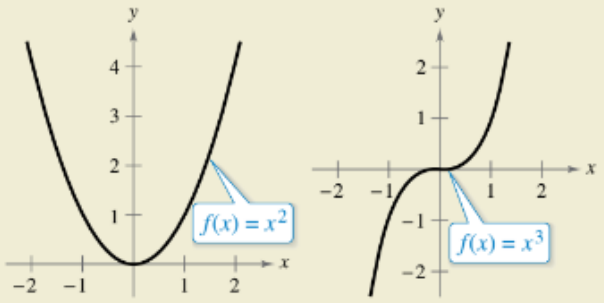
79. $f(x) = -|x - 5|$

Section 1.6 ~ Parent Functions, Piece-wise Functions

Graphing a Piecewise-Defined Function **In Exercises 35–40, sketch the graph of the function.**

37. $f(x) = \begin{cases} 1 - (x - 1)^2, & x \le 2 \\ \sqrt{x - 2}, & x > 2 \end{cases}$

48. HOW DO YOU SEE IT? For each graph of f shown below, answer parts (a)–(d).



(a) Find the domain and range of f.

(b) Find the x- and y-intercepts of the graph of f.

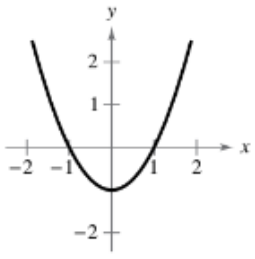
(c) Determine the open intervals on which f is increasing, decreasing, or constant.

(d) Determine whether f is even, odd, or neither. Then describe the symmetry.

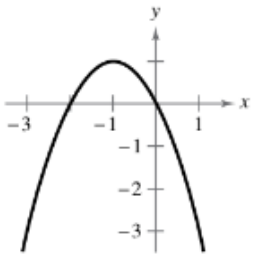
Section 1.7 ~ Horizontal and Vertical Shifts, Horizontal and Vertical Stretches and Compressions, Reflections

11. Writing Equations from Graphs Use the graph of $f(x) = x^2$ to write an equation for the function represented by each graph.

(a)



(b)



Describing Transformations **In Exercises 21–38, g is related to one of the parent functions described in Section 1.6. (a) Identify the parent function f. (b) Describe the sequence of transformations from f to g. (c) Sketch the graph of g. (d) Use function notation to write g in terms of f.**

25. $g(x) = -3 - (x + 1)^2$

27. $g(x) = |x - 1| + 2$

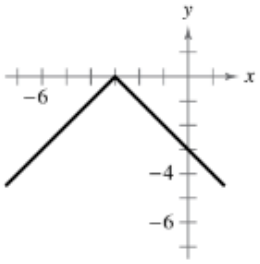
29. $g(x) = 2\sqrt{x}$

33. $g(x) = |2x|$

35. $g(x) = -2x^2 + 1$

13. Writing Equations from Graphs Use the graph of $f(x) = |x|$ to write an equation for the function represented by each graph.

(a)



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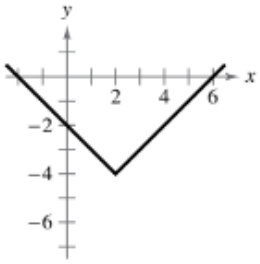
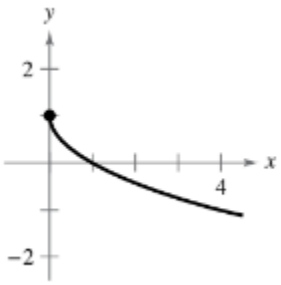


Writing Equations from Graphs **In Exercises 15–20, identify the parent function and the transformation represented by the graph. Write an equation for the function represented by the graph.**

19.



Section 1.8 ~ Addition/Subtraction/Multiplication/Division of Functions with Domains, Function Composition with Domains

Finding Arithmetic Combinations of Functions **In Exercises 5–12, find (a) $(f + g)(x)$, (b) $(f - g)(x)$, (c) $(fg)(x)$, and (d) $(f/g)(x)$. What is the domain of f/g?**

11. $f(x) = \dfrac{x}{x + 1}, \quad g(x) = x^3$

Evaluating an Arithmetic Combination of Functions **In Exercises 13–24, evaluate the function for $f(x) = x + 3$ and $g(x) = x^2 - 2$.**

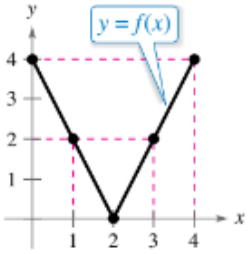
13. $(f + g)(2)$

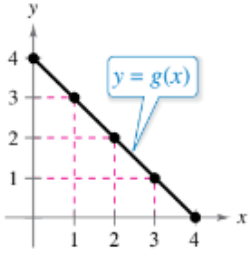
Finding Domains of Functions and Composite Functions **In Exercises 35–42, find (a) $f \circ g$ and (b) $g \circ f$. Find the domain of each function and of each composite function.**

35. $f(x) = \sqrt{x + 4}, \quad g(x) = x^2$

39. $f(x) = |x|, \quad g(x) = x + 6$

Evaluating Combinations of Functions **In Exercises 45–48, use the graphs of f and g to evaluate the functions.**





46. (a) $(f - g)(1)$ (b) $(fg)(4)$

Section 1.9 ~ One-to-One Functions and Horizontal Line Test, Finding Inverse Functions, Verifying Inverse Functions

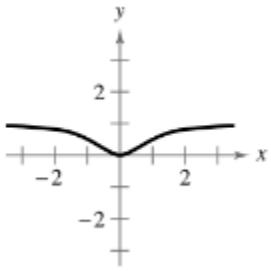
Using a Table to Determine an Inverse Function **In Exercises 33 and 34, does the function have an inverse function?**

33.

x	−1	0	1	2	3	4
$f(x)$	−2	1	2	1	−2	−6

Applying the Horizontal Line Test **In Exercises 37–40, does the function have an inverse function?**

39.



Finding and Analyzing Inverse Functions **In Exercises 45–54, (a) find the inverse function of f, (b) graph both f and f^{-1} on the same set of coordinate axes, (c) describe the relationship between the graphs of f and f^{-1}, and (d) state the domains and ranges of f and f^{-1}.**

45. $f(x) = x^5 - 2$

49. $f(x) = \dfrac{4}{x}$

Verifying Inverse Functions **In Exercises 15–18, verify that f and g are inverse functions algebraically.**

17. $f(x) = \dfrac{x^3}{4}, \quad g(x) = \sqrt[3]{4x}$

Verifying Inverse Functions **In Exercises 21–32, verify that f and g are inverse functions (a) algebraically and (b) graphically.**

31. $f(x) = \dfrac{x-1}{x+5}, \quad g(x) = -\dfrac{5x+1}{x-1}$

Section 2.1 ~ Vertex Form of a Quadratic, Completing the Square to Find the Vertex/Intercepts/Axis of Symmetry of a Parabola

Using Standard Form to Graph a Parabola **In Exercises 13–26, write the quadratic function in standard form and sketch its graph. Identify the vertex, axis of symmetry, and x-intercept(s).**

17. $f(x) = x^2 - 6x + 2$

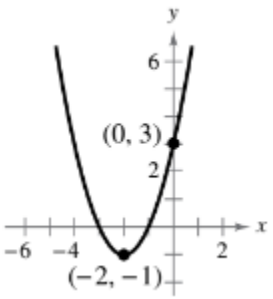
19. $f(x) = x^2 - 8x + 21$

21. $f(x) = x^2 - x + \frac{5}{4}$

23. $f(x) = -x^2 + 2x + 5$

Writing a Quadratic Function **In Exercises 35 and 36, write the standard form of the quadratic function whose graph is the parabola shown.**

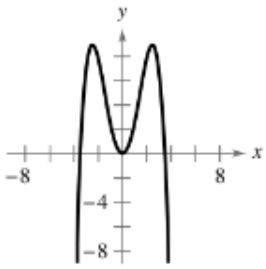
35.



Section 2.2 ~ Degree of a Polynomial, 4 Types of End Behavior of Polynomials, Leading Term Test, Repeated Zeros and Multiplicity

Matching **In Exercises 9–14, match the polynomial function with its graph. [The graphs are labeled (a), (b), (c), (d), (e), and (f).]**

(a)



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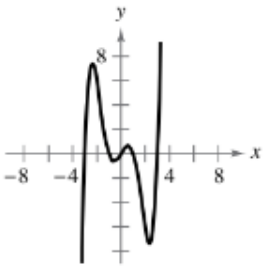
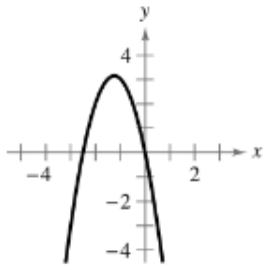
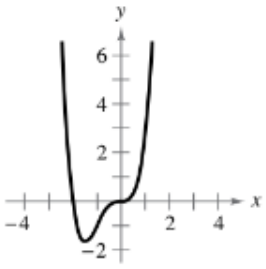


(c)



(d)



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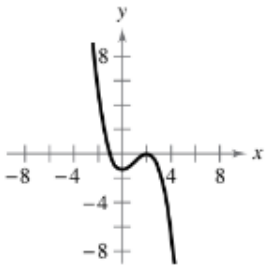
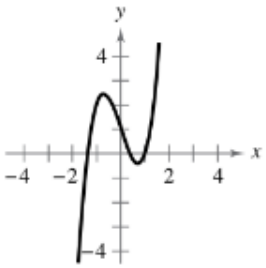


(f)



11. $f(x) = -\frac{1}{4}x^4 + 3x^2$

13. $f(x) = x^4 + 2x^3$

Applying the Leading Coefficient Test **In Exercises 19–28, describe the left-hand and right-hand behavior of the graph of the polynomial function.**

23. $h(x) = 6x - 9x^3 + x^2$

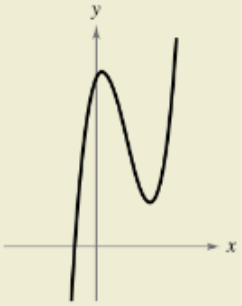
Sketching the Graph of a Polynomial Function **In Exercises 71–84, sketch the graph of the function by (a) applying the Leading Coefficient Test, (b) finding the real zeros of the polynomial, (c) plotting sufficient solution points, and (d) drawing a continuous curve through the points.**

79. $f(x) = -5x^2 - x^3$

83. $g(t) = -\frac{1}{4}(t - 2)^2(t + 2)^2$

106. HOW DO YOU SEE IT? For each graph, describe a polynomial function that could represent the graph. (Indicate the degree of the function and the sign of its leading coefficient.)

(a)



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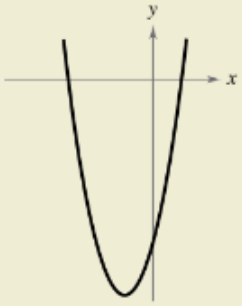

(c)

(d)