In Exercises 3–24, find the derivative of the function.

3. $y = 8$
4. $f(x) = -2$
5. $y = x^6$
6. $y = x^8$
7. $y = \dfrac{1}{x^7}$
8. $y = \dfrac{1}{x^8}$
9. $f(x) = \sqrt[5]{x}$
10. $g(x) = \sqrt[4]{x}$
11. $f(x) = x + 1$
12. $g(x) = 3x - 1$
13. $f(t) = -2t^2 + 3t - 6$
14. $y = t^2 + 2t - 3$
15. $g(x) = x^2 + 4x^3$
16. $y = 8 - x^3$
17. $s(t) = t^3 - 2t + 4$
18. $f(x) = 2x^3 - x^2 + 3x$

In Exercises 31–38, find the slope of the graph of the function at the indicated point. Use the *derivative* feature of a graphing utility to confirm your results.

Function	*Point*
31. $f(x) = \dfrac{3}{x^2}$	$(1, 3)$
32. $f(t) = 3 - \dfrac{3}{5t}$	$(\frac{3}{5}, 2)$
33. $f(x) = -\frac{1}{2} + \frac{7}{5}x^3$	$(0, -\frac{1}{2})$
34. $y = 3x^3 - 6$	$(2, 18)$
35. $y = (2x + 1)^2$	$(0, 1)$
36. $f(x) = 3(5 - x)^2$	$(5, 0)$
37. $f(\theta) = 4 \sin \theta - \theta$	$(0, 0)$
38. $g(t) = 2 + 3 \cos t$	$(\pi, -1)$

In Exercises 39–52, find the derivative of the function.

39. $f(x) = x^2 + 5 - 3x^{-2}$
40. $f(x) = x^2 - 3x - 3x^{-2}$
41. $g(t) = t^2 - \dfrac{4}{t^3}$
42. $f(x) = x + \dfrac{1}{x^2}$
43. $f(x) = \dfrac{x^3 - 3x^2 + 4}{x^2}$
44. $h(x) = \dfrac{2x^2 - 3x + 1}{x}$
45. $y = x(x^2 + 1)$
46. $y = 3x(6x - 5x^2)$
47. $f(x) = \sqrt{x} - 6\sqrt[3]{x}$
48. $f(x) = \sqrt[3]{x} + \sqrt[5]{x}$
49. $h(s) = s^{4/5} - s^{2/3}$
50. $f(t) = t^{2/3} - t^{1/3} + 4$
51. $f(x) = 6\sqrt{x} + 5 \cos x$
52. $f(x) = \dfrac{2}{\sqrt[3]{x}} + 3 \cos x$

In Exercises 53–56, (a) find an equation of the tangent line to the graph of f at the indicated point, (b) use a graphing utility to graph the function and its tangent line at the point, and (c) use the *derivative* feature of a graphing utility to confirm your results.

Function	*Point*
53. $y = x^4 - 3x^2 + 2$	$(1, 0)$
54. $y = x^3 + x$	$(-1, -2)$
55. $f(x) = \dfrac{2}{\sqrt[4]{x^3}}$	$(1, 2)$
56. $y = (x^2 + 2x)(x + 1)$	$(1, 6)$

In Exercises 57–62, determine the point(s) (if any) at which the graph of the function has a horizontal tangent line.

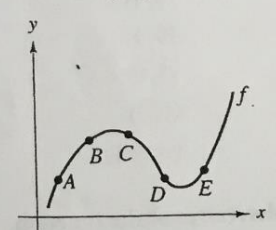
57. $y = x^4 - 8x^2 + 2$
58. $y = x^3 + x$
59. $y = \dfrac{1}{x^2}$
60. $y = x^2 + 1$
61. $y = x + \sin x, \quad 0 \le x < 2\pi$
62. $y = \sqrt{3}x + 2 \cos x, \quad 0 \le x < 2\pi$

In Exercises 63–66, find k such that the line is tangent to the graph of the function.

Function	*Line*
63. $f(x) = x^2 - kx$	$y = 4x - 9$
64. $f(x) = k - x^2$	$y = -4x + 7$
65. $f(x) = \dfrac{k}{x}$	$y = -\frac{3}{4}x + 3$
66. $f(x) = k\sqrt{x}$	$y = x + 4$

Getting at the Concept

67. Use the graph of f to answer each question. To print an enlarged copy of the graph, go to the website *www.mathgraphs.com.*



(a) Between which two consecutive points is the average rate of change of the function greatest?

(b) Is the average rate of change of the function between A and B greater than or less than the instantaneous rate of change at B?

(c) Sketch a tangent line to the graph between C and D such that the slope of the tangent line is the same as the average rate of change of the function between C and D.

68. Sketch the graph of a function f such that $f' > 0$ for all x and the rate of change of the function is decreasing.