

1-24 even

26-38 even

39-44 even 49, 50, 58, 60-86 even, 89-92

In Exercises 5-10, find the slope of the tangent line to the graph of the function at the specified point.

5.  $f(x) = 3 - 2x$ ,  $(-1, 5)$

6.  $g(x) = \frac{3}{2}x + 1$ ,  $(-2, -2)$

7.  $g(x) = x^2 - 4$ ,  $(1, -3)$

8.  $g(x) = 5 - x^2$ ,  $(2, 1)$

9.  $f(t) = 3t - t^2$ ,  $(0, 0)$

10.  $h(t) = t^2 + 3$ ,  $(-2, 7)$

In Exercises 11-24, find the derivative by the limit process.

11.  $f(x) = 3$

13.  $f(x) = -5x$

15.  $h(s) = 3 + \frac{2}{3}s$

17.  $f(x) = 2x^2 + x - 1$

19.  $f(x) = x^3 - 12x$

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

23.  $f(x) = \sqrt{x+1}$

12.  $g(x) = -5$

14.  $f(x) = 3x + 2$

16.  $f(x) = 9 - \frac{1}{2}x$

18.  $f(x) = 1 - x^2$

20.  $f(x) = x^3 + x^2$

22.  $f(x) = \frac{1}{x^2}$

24.  $f(x) = \frac{4}{\sqrt{x}}$

In Exercises 25-32, (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.

25.  $f(x) = x^2 + 1$ ,  $(2, 5)$

26.  $f(x) = x^2 + 2x + 1$ ,  $(-3, 4)$

27.  $f(x) = x^3$ ,  $(2, 8)$

28.  $f(x) = x^3 + 1$ ,  $(1, 2)$

29.  $f(x) = \sqrt{x}$ ,  $(1, 1)$

30.  $f(x) = \sqrt{x-1}$ ,  $(5, 2)$

31.  $f(x) = x + \frac{4}{x}$ ,  $(4, 5)$

32.  $f(x) = \frac{1}{x+1}$ ,  $(0, 1)$

In Exercises 33-36, find an equation of the line that is tangent to the graph of  $f$  and parallel to the given line.

<u>Function</u>	<u>Line</u>
33. $f(x) = x^3$	$3x - y + 1 = 0$
34. $f(x) = x^3 + 2$	$3x - y - 4 = 0$

35. $f(x) = \frac{1}{\sqrt{x}}$	$x + 2y - 6 = 0$
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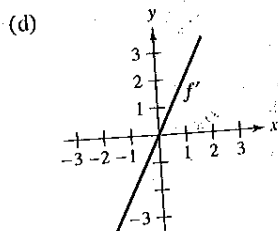
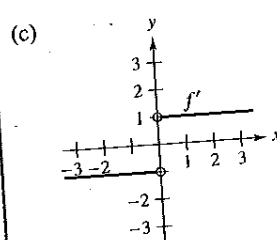
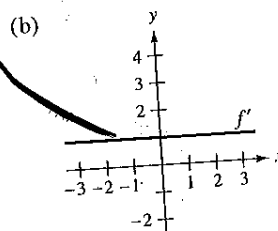
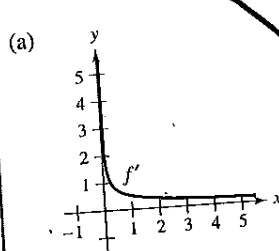
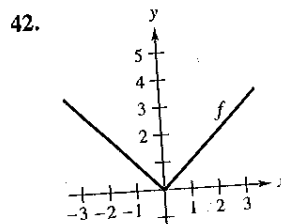
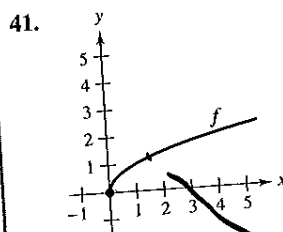
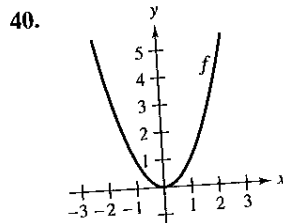
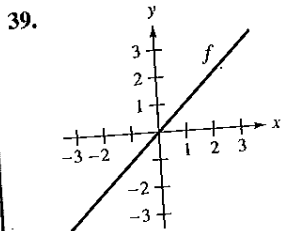
36. $f(x) = \frac{1}{\sqrt{x-1}}$	$x + 2y + 7 = 0$
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37. The tangent line to the graph of  $y = g(x)$  at the point  $(5, 2)$  passes through the point  $(9, 0)$ . Find  $g(5)$  and  $g'(5)$ .

38. The tangent line to the graph of  $y = h(x)$  at the point  $(-1, 4)$  passes through the point  $(3, 6)$ . Find  $h(-1)$  and  $h'(-1)$ .

### Getting at the Concept

In Exercises 39-42, the graph of  $f$  is given. Select the graph of  $f'$ .



43. Sketch a graph of a function whose derivative is always negative.

44. Sketch a graph of a function whose derivative is always positive.

45. Assume that  $f'(c) = 3$ . Find  $f'(-c)$  if (a)  $f$  is an odd function and if (b)  $f$  is an even function.

46. Determine whether the limit yields the derivative of differentiable function  $f$ . Explain.

(a)  $\lim_{\Delta x \rightarrow 0} \frac{f(x + 2\Delta x) - f(x)}{2\Delta x}$

(b)  $\lim_{\Delta x \rightarrow 0} \frac{f(x + 2) - f(x)}{\Delta x}$

(c)  $\lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x - \Delta x)}{2\Delta x}$

(d)  $\lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$