Derivatives By the Limit Process #6-38 even

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

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

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

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

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

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

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

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

11. $f(x) = 3$

12. $g(x) = -5$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Function	Line
33. $f(x) = x^3$	$3x - y + 1 = 0$
34. $f(x) = x^3 + 2$	$3x - y - 4 = 0$
35. $f(x) = \dfrac{1}{\sqrt{x}}$	$x + 2y - 6 = 0$
36. $f(x) = \dfrac{1}{\sqrt{x-1}}$	$x + 2y + 7 = 0$

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 $h'(-1)$.