

2.1 The Derivative and the Tangent Line Problem

Find the slope of the tangent line to the graph of the function at the given point.

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

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

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

Find the derivative by the limit process.

12. $g(x) = -5$

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

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

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

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

Find an equation of the tangent line to the graph of f at the given point.

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

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

Use the alternative form of the derivative to find the derivative at $x=c$ (if it exists).

72. $g(x) = x(x-1)$, $c = 1$

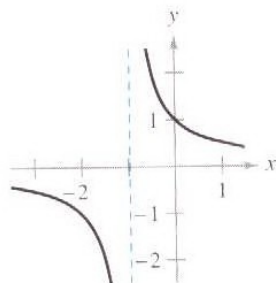
76. $g(x) = \frac{1}{x}$, $c = 3$

78. $g(x) = (x+3)^{1/3}$, $c = -3$

Describe the x-values at which f is differentiable.

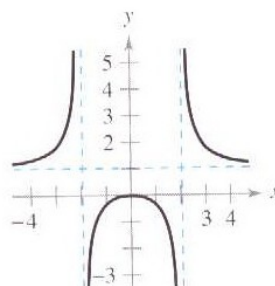
81.

$$f(x) = \frac{1}{x+1}$$



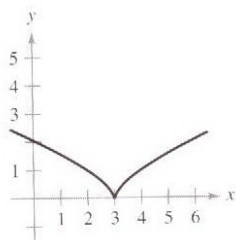
84.

$$f(x) = \frac{x^2}{x^2 - 4}$$



83.

$$f(x) = (x-3)^{2/3}$$



Find the derivatives from the left and from the right at $x=1$ (if they exist). Is the function differentiable at $x=1$?

91. $f(x) = |x-1|$

93. $f(x) = \begin{cases} (x-1)^3, & x \leq 1 \\ (x-1)^2, & x > 1 \end{cases}$