

## 3.3 Product and Quotient Rule and Higher-Order Derivatives

Name:

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**P 28.** Find the derivative.

$$f(x) = \frac{x^2 + 5x + 6}{x^2 - 4}$$

**P 34.** Find the derivative.

$$h(x) = (x^2 + 3)^3.$$

**P 36.** Find the derivative.

$$g(x) = x^2 \left( \frac{2}{x} - \frac{1}{x+1} \right).$$

**P 38.** Find the derivative.

$$f(x) = (x^3 - x)(x^2 + 2)(x^2 + x - 1)$$

**P 42.** Find the derivative.

$$f(\theta) = (\theta + 1) \cos \theta$$

**P 46.** Find the derivative.

$$y = e^x - \cot x$$

**P 48.** Find the derivative.

$$h(x) = \frac{1}{x} - 12 \sec x$$

**P 52.** Find the derivative.

$$y = x \sin x + \cos x$$

**P 63.** Find the derivative of  $y = \frac{1 + \csc x}{1 - \csc x}$  at  $(\pi/6, -3)$ .

**P 68.** Find an equation of the tangent line to the graph of  $f(x) = (x - 2)(x^2 + 4)$  at  $(1, -5)$ .

**P 74.** Find an equation of the tangent line to the graph of  $f(x) = \frac{e^x}{x + 4}$  at  $(0, 1/4)$ .

**P 80.** Determine the point(s) where  $f(x) = \frac{x^2}{x^2 + 1}$  has a horizontal tangent line.

**P 82.** Determine the point(s) where  $f(x) = e^x \sin x$  on  $[0, \pi]$  has a horizontal tangent line.

**P 112.** Let  $g(2) = 3$ ,  $g'(2) = -2$ ,  $h(2) = -1$ ,  $h'(2) = 4$ , and  $f(x) = 4 - h(x)$ . Find  $f'(2)$ .

**P 114.** Let  $g(2) = 3$ ,  $g'(2) = -2$ ,  $h(2) = -1$ ,  $h'(2) = 4$ , and  $f(x) = g(x) \cdot h(x)$ . Find  $f'(2)$ .