

### HW3

**1–14** Differentiate the function.

[2-3] 3

**3.**  $f(x) = x^{75} - x + 3$

[2-3] 7

**7.**  $f(x) = x^{3/2} + x^{-3}$

[2-3] 13

**13.**  $g(x) = \frac{1}{\sqrt{x}} + \sqrt[4]{x}$

**25–26** Find  $dy/dx$  and  $dy/dt$ .

[2-3] 26

**26.**  $y = \frac{t}{x^2} + \frac{x}{t}$

**29–32** Use the Product Rule to find the derivative of the function.

[2-3] 30

**30.**  $y = (10x^2 + 7x - 2)(2 - x^2)$

**33–36** Use the Quotient Rule to find the derivative of the function.

[2-3] 33

**33.**  $y = \frac{5x}{1 + x}$

**37–52** Differentiate.

[2-3] 45

**45.**  $J(u) = \left( \frac{1}{u} + \frac{1}{u^2} \right) \left( u + \frac{1}{u} \right)$

**59–60** Find an equation of the tangent line to the curve at the given point.

[2-3] 59

**59.**  $y = \frac{2x}{x + 1}, \quad (1, 1)$

**1–22** Differentiate.

[2-4] 1

**1.**  $f(x) = 3 \sin x - 2 \cos x$

[2-4] 7

**7.**  $y = \sec \theta \tan \theta$

[2-4] 15

**15.**  $y = \frac{x}{2 - \tan x}$

[2-4] 24

**24.** Show that  $\frac{d}{dx} (\sec x) = \sec x \tan x$ .

[2-4] 35

**35.** If  $g(\theta) = \frac{\sin \theta}{\theta}$ , find  $g'(\theta)$  and  $g''(\theta)$ .

**45–60** Find the limit.

[2-4] 45

**45.**  $\lim_{x \rightarrow 0} \frac{\sin 5x}{3x}$

[2-4] 51

$$51. \lim_{x \rightarrow 0} \frac{\tan 2x}{x}$$

**61–62** Find the given derivative by finding the first few derivatives and observing the pattern that occurs.

[2-4] 62

$$62. \frac{d^{35}}{dx^{35}} (x \sin x)$$

**1–6** Write the composite function in the form  $f(g(x))$ .

[Identify the inner function  $u = g(x)$  and the outer function  $y = f(u)$ .] Then find the derivative  $dy/dx$ .

[2-5] 3

$$3. y = \sin(\cos x)$$

[2-5] 6

$$6. y = \sin \sqrt{x}$$

**7–48** Find the derivative of the function.

[2-5] 18

**18.**  $f(t) = t \sin \pi t$

[2-5] 29

**29.**  $y = \cos(\sec 4x)$