

Sec. 3.2

p. 139 # 7-10, 15, 17, 18, 23, 35

$$\textcircled{7} \frac{d}{dx} x^4 = 4x^3 \Big|_{x=-2} \quad 4(-2)^3 = 4 \cdot -8 = -32$$

$$\textcircled{8} \frac{d}{dt} t^{-3} = -3t^{-4} \Big|_{t=4} \quad \frac{-3}{t^4} = \frac{-3}{4^4} = \frac{-3}{256}$$

$$\textcircled{9} \frac{d}{dt} t^{2/3} = \frac{2}{3} t^{-1/3} \Big|_{t=8} \quad \frac{2}{3\sqrt[3]{t}} = \frac{2}{3\sqrt[3]{8}} = \frac{2}{3 \cdot 2} = \frac{1}{3}$$

$$\textcircled{10} \frac{d}{dt} t^{-2/5} = \frac{-2}{5} t^{-7/5} \Big|_{t=1} \quad \frac{-2}{5t^{7/5}} = \frac{-2}{5(1)^{7/5}} = \frac{-2}{5}$$

$$\textcircled{15} f(x) = x^4 \quad a=2$$

pt (2, 16) $f'(x) = 4x^3$
 slope 32 $f'(2) = 4(2)^3 = 32$

$$\boxed{y - 16 = 32(x - 2)}$$

$$\textcircled{17} f(x) = 5x - 32\sqrt{x} \quad a=4$$

pt (4, -44) $f'(x) = 5 - 32 \cdot \frac{1}{2\sqrt{x}} = 5 - \frac{16}{\sqrt{x}} \Big|_{x=4} = 5 - 8$
 slope -3

$$\boxed{y + 44 = -3(x - 4)}$$

$$\textcircled{18} f(x) = \sqrt[3]{x} \quad a=8 \quad x^{1/3}$$

pt (8, 2) $f'(x) = \frac{1}{3} x^{-2/3} = \frac{1}{3\sqrt[3]{x^2}} = \frac{1}{3\sqrt[3]{8^2}} = \frac{1}{48}$
 slope $\frac{1}{48}$

$$y - 2 = \frac{1}{48}(x - 8)$$

$$(23) f(x) = 4x^{\frac{5}{3}} - 3x^{-2} - 12$$

$$f'(x) = \frac{20}{3}x^{\frac{2}{3}} + 6x^{-3} \quad \text{or} \quad \frac{20}{3}x^{\frac{2}{3}} + \frac{6}{x^3}$$

$$(25) g(x) = \frac{x^2 + 4x^{\frac{1}{2}}}{x^2} = \frac{x^2}{x^2} + \frac{4x^{\frac{1}{2}}}{x^2} = 1 + \frac{4}{x^{\frac{3}{2}}}$$

$$g(x) = 1 + 4x^{-\frac{3}{2}} \quad g'(x) = \frac{-12}{2}x^{-\frac{5}{2}} \quad \text{or} \quad \frac{-6}{x^{\frac{5}{2}}}$$