

## CHAPTER 4

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### section 4.2

$$4) \ y' = 2x^9 + 1$$

$$25) \ \frac{d}{dx} (fg) |_{x=-2} = 24$$

$$\frac{d}{dx} \left( \frac{f}{g} \right) |_{x=-2} = \frac{18}{49}$$

$$\frac{d}{dx} \left( \frac{g}{f} \right) |_{x=-2} = -18$$

$$\frac{d}{dx} (2f - 3g) |_{x=-2} = -3$$

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### section 4.4

$$20) \ y'' = \frac{2}{x^3}$$

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### section 4.5

$$10) \ y' = \frac{5}{4} \sec^{\frac{5}{4}}(x+5) \tan(x+5)$$

19) using the logarithmic differentiation

$$y' = \left( \frac{x^2 - 1}{x^3 + 1} \right)^4 \left( \frac{8x}{x^2 - 1} - \frac{12x^2}{x^3 + 1} \right)$$

using chain rule and quotient rule

$$\begin{aligned} y' &= 4 \left( \frac{x^2 - 1}{x^3 + 1} \right)^3 \left( \frac{-x^4 + 3x^2 + 2x}{(x^3 + 1)^2} \right) \\ &= \frac{4(x^2 - 1)^3 (-x^4 + 3x^2 + 2x)}{(x^3 + 1)^5} \end{aligned}$$

## section 4.6

**25)** The equation of the tangent line is

$$y = 4x + 8$$

The equation of the normal line is

$$y = -\frac{1}{4}x + \frac{15}{4}$$

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## section 4.7

**20)**  $y' = x^x (1 + \ln x)$

$$\text{21)} \quad y' = \left( \frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \right) \left( 2 \cot x + 4 \cot x \sec^2 x - \frac{4x}{x^2 + 1} \right)$$

$$\text{24)} \quad y' = x^{\cos x} \left( \frac{\cos x - x \ln x \sin x}{x} \right)$$

$$\text{26)} \quad y' = (\sin x)^x (x \cot x + \ln(\sin x))$$

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