

27.2

$$\begin{aligned} \textcircled{3} \quad y &= \tan 5x \\ y' &= \sec^2 5x (5) \\ &= 5 \sec^2 5x \end{aligned}$$

$$\textcircled{5} \quad y = 5 \cot (0.25\pi - \theta)$$

$$\begin{aligned} \frac{dy}{d\theta} \text{ or } y' &= 5 [-\csc^2 (0.25\pi - \theta)] (-1) \\ &= 5 \csc^2 (0.25\pi - \theta) \end{aligned}$$

$$\textcircled{7} \quad u = 3 \sec 5r$$

$$\begin{aligned} \frac{du}{dr} \text{ or } u' &= 3 \sec 5r \tan 5r (5) \\ &= 15 \sec 5r \tan 5r \end{aligned}$$

$$(9) \quad y = -3 \csc \sqrt{2x+3}$$

$$y' = -3 \left[ -\csc \sqrt{2x+3} \cot \sqrt{2x+3} \right] \left[ \frac{1}{2} (2x+3)^{-1/2} (2) \right]$$
$$= \frac{3 \csc \sqrt{2x+3} \cot \sqrt{2x+3}}{\sqrt{2x+3}}$$

$$(13) \quad y = 2 \cot^4 \frac{x}{2}$$

$$y = 2 \left[ \cot \frac{x}{2} \right]^4$$

$$y' = 8 \left[ \cot \frac{x}{2} \right]^3 \left[ -\csc^2 \frac{x}{2} \left( \frac{1}{2} \right) \right]$$

$$= -4 \cot^3 \frac{x}{2} \csc^2 \frac{x}{2}$$

$$(21) \quad y = [4 \cos x] [\csc x^2]$$

$$y' = [4 \cos x] [-\csc x^2 \cot x^2 (2x)] + [\csc x^2] [-4 \sin x]$$

$$= -8x \cos x \csc x^2 \cot x^2 - 4 \sin x \csc x^2$$

$$\text{or } -4 \csc x^2 [2x \cos x \cot x^2 + \sin x]$$

$$(31) \quad y = [2x + \tan 4x]^{\frac{1}{2}}$$

$$y' = \frac{1}{2} [2x + \tan 4x]^{-\frac{1}{2}} [2 + \sec^2 4x (4)]$$

$$= \frac{2 + 4 \sec^2 4x}{2 \sqrt{2x + \tan 4x}}$$

$$= \frac{1 + 2 \sec^2 4x}{\sqrt{2x + \tan 4x}}$$

$$(33) \quad x \sec y - 2y = \sin 2x$$

$$\text{Take } \frac{d}{dx}: \quad x \left[ \sec y \tan y \frac{dy}{dx} \right] + (\sec y)(1) - 2 \frac{dy}{dx} = 2 \cos 2x$$

$$x \sec y \tan y \frac{dy}{dx} + \sec y - 2 \frac{dy}{dx} = 2 \cos 2x$$

$$[x \sec y \tan y - 2] \frac{dy}{dx} = 2 \cos 2x - \sec y$$

$$\frac{dy}{dx} = \frac{2 \cos 2x - \sec y}{x \sec y \tan y - 2}$$

$$(35) \quad y = 4 \tan^2 3x \quad \text{or} \quad y = 4 [\tan 3x]^2$$

$$\frac{dy}{dx} = 8 [\tan 3x] [\sec^2 3x (3)]$$

$$\frac{dy}{dx} = 24 \sec^2 3x \tan 3x$$

$$dy = 24 \sec^2 3x \tan 3x dx$$