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III. $y = \frac{1}{x^6} - \cos 5x$

$$y = x^{-6} - \cos 5x$$

$$\frac{dy}{dx} = x^{-6} + 5 \sin 5x$$

IV. $y = e^{2x} \sin 3x$

$$\frac{du}{dx} = 2e^{2x} \quad \frac{dv}{dx} = 3 \cos 3x$$

$$\frac{dy}{dx} = (e^{2x})(3 \cos 3x) + (2e^{2x})(\sin 3x)$$

V. $y = \frac{\tan 7x}{\sin x}$

$$\frac{du}{dx} = 7 \sec^2 7x \quad \frac{dv}{dx} = \cos x$$

$$\frac{dy}{dx} = (\sin x)(7 \sec^2 7x) - (\tan 7x)(\cos x)$$