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$$\frac{d}{dx}(\sin x)^2 = 2 \sin x \cos x$$

$$\frac{f'(g)}{f(g)}$$

$$y = \ln(x^4 \sin^2 x)$$

$$y' = \frac{1}{x^4 \sin^2 x} \cdot (4x^3 \sin^2 x + 2 \sin x \cos x \cdot x^4)$$

$$y' = \frac{4x^3 \sin^2 x + 2x^4 \sin x \cos x}{x^4 \sin^2 x}$$

or

$$y' = \frac{4x^3 \sin^2 x + 2x^4 \sin x \cos x}{x^4 \sin^2 x} + \frac{4x^3 \sin^2 x}{x^4 \sin^2 x}$$

$$y' = 2 \cos x + \frac{x}{\sin x}$$