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$$\lim_{x \rightarrow 0} \left(\frac{\sin x + 2}{\cos x + 1} \right)^{\frac{x^2 + \sin^3 x}{x^3 + 2x^4}}$$

$$= \frac{x^2 + \sin^3 x}{x^3 + 2x^4} \log \frac{\sin x + 2}{\cos x + 1}$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{x^2 + \sin^3 x}{x^3 + 2x^4} \log \left[1 + \left(\frac{\sin x + 2}{\cos x + 1} - 1 \right) \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{x^2 + \sin^3 x}{x^3 + 2x^4} \left(\frac{\sin x + 2}{\cos x + 1} - 1 \right) \log \left[1 + \left(\frac{\sin x + 2}{\cos x + 1} - 1 \right) \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{x^2 + \sin^3 x}{x^3 + 2x^4} \frac{\sin x - \cos x + 1}{1 + \cos x} \log \left[1 + \left(\frac{\sin x + 2}{\cos x + 1} - 1 \right) \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{x^2 + \sin^3 x}{x^3 + 2x^4} \frac{\sin x + 1 - \cos x}{1 + \cos x} \log \left[1 + \frac{\sin x + 2}{\cos x + 1} - 1 \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{x^2 \left(1 + \frac{\sin^3 x}{x^3} \right)}{x^3 (1 + 2x)} \log \frac{\sin x + 1 - \cos x}{1 + \cos x} \left[1 + \frac{\sin x + 2}{\cos x + 1} - 1 \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$\frac{1 + \frac{\sin^3 x}{x^3}}{1 + 2x} \frac{\sin x + 1 - \cos x}{1 + \cos x} \log \left[1 + \frac{\sin x + 2}{\cos x + 1} - 1 \right]$$

$$= \lim_{x \rightarrow 0} L$$

$$1 \cdot \frac{1}{2} \cdot 1$$

$$= \frac{1}{2}$$