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$$\begin{split} \frac{d}{dx}(\sin x) &= \lim_{h \to 0} \frac{\sin(x+h) - \sin x}{h} = \lim_{h \to 0} \frac{\sin x \cos h + \cos x \sin h - \sin x}{h} \\ &= \lim_{h \to 0} \left\{ \sin x \cdot \frac{\cos h - 1}{h} + \cos x \cdot \frac{\sin h}{h} \right\} \\ &= \lim_{h \to 0} \left\{ \sin x \cdot \frac{\cos h - 1}{h} \times \frac{\cos h + 1}{\cos h + 1} + \cos x \cdot \frac{\sin h}{h} \right\} \\ &= \lim_{h \to 0} \left\{ \sin x \cdot \frac{\cos^2 h - 1}{h(\cos h + 1)} + \cos x \cdot \frac{\sin h}{h} \right\} \\ &= \lim_{h \to 0} \left\{ \sin x \cdot \frac{-\sin^2 h}{h(\cos h + 1)} + \cos x \cdot \frac{\sin h}{h} \right\} \end{split}$$

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