

$$\begin{aligned} \mathbf{124. (a)} \quad \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} &= \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} \cdot \frac{1 + \cos x}{1 + \cos x} \\ &= \lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x^2(1 + \cos x)} \\ &= \lim_{x \rightarrow 0} \frac{\sin^2 x}{x^2} \cdot \frac{1}{1 + \cos x} \\ &= (1) \left(\frac{1}{2} \right) = \frac{1}{2} \end{aligned}$$