

③

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$$

$$= \lim_{x \rightarrow 0} \frac{2 \sin^2 x/2}{x^2}$$

$$\left[ 1 - \cos 2A = 2 \sin^2 A \right]$$

$$= \lim_{x \rightarrow 0} 2 \frac{\sin x/2}{x/2} \cdot \frac{\sin x/2}{x/2} \cdot \frac{1}{4}$$

$$= \frac{1}{2} \lim_{x \rightarrow 0} \frac{\sin x/2}{x/2} \cdot \frac{\sin x/2}{x/2}$$

$$\left[ \begin{array}{l} \text{As } x \rightarrow 0 \\ \text{so } \frac{x}{2} \rightarrow 0 \end{array} \right]$$

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