

$$\textcircled{3} \quad \lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} - \sqrt{1 + \cos x}}$$

$$= \lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} - \sqrt{2} \frac{x}{2}} \quad \left(1 + \cos x = 2 \cos^2 \frac{x}{2} \right)$$

$$= \lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} \left(1 - \cos \frac{x}{2} \right)}$$

$$= \lim_{x \rightarrow 0} \frac{\sin^2 x}{\sqrt{2} \cdot 2 \sin^2 \frac{x}{4}}$$

$$= \lim_{x \rightarrow 0} \frac{\sin^2 x \cdot x^2}{2\sqrt{2} \cdot x^2 \cdot \sin^2 \frac{x}{4} \cdot \left(\frac{x}{4} \right)^2}$$

$$= \frac{1}{2\sqrt{2}} \lim_{x \rightarrow 0} \frac{\sin^2 x \cdot x^2 \cdot 16}{x^2 \cdot \sin^2 \frac{x}{4} \cdot x^2}$$

$$= \frac{16}{2\sqrt{2}} = \frac{8}{\sqrt{2}} = 4\sqrt{2}$$

Solⁿ:

a) $2\sqrt{2}$

c) $8\sqrt{2}$

b) $4\sqrt{2}$

d) $\sqrt{2}$