(3) $$\lim_{x \to 0} \frac{\sqrt{\frac{1}{2}(1-\cos^2 x)}}{x}$$

$$= \lim_{x \to 0} \frac{1}{\sqrt{2}} \cdot \frac{|\sin x|}{x}$$

At $x = 0$ $\quad RHL = \lim_{h \to 0} \frac{1}{\sqrt{2}} \frac{\sin h}{h} = \frac{1}{\sqrt{2}}$

and $LHL = \lim_{h \to 0} \frac{1}{\sqrt{2}} \cdot \frac{\sin h}{-h} = -\frac{1}{\sqrt{2}}$

$RHL \neq LHL$

Limit does not exist