

$$(4) \quad \lim_{x \rightarrow \infty} \sqrt{\frac{x - \sin x}{x + \cos^2 x}}$$

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

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

$$= \frac{1 - 0}{1 + 0}$$

$$= 1$$