

$$\textcircled{1} \lim_{x \rightarrow 1} \frac{x^2 - \sqrt{x+1}}{x^2 - \lambda x + \mu} = \frac{(x-1)(x+\mu)}{(x-1)(\lambda x - \mu)} = \frac{x+\mu}{\lambda x - \mu} = \frac{1}{\lambda}$$

$$\textcircled{2} \lim_{x \rightarrow 0} \frac{|x-1| - |x+1|}{x} = \frac{1 - x - x - 1}{x} = \frac{-2x}{x} = -2$$

$$\textcircled{3} \lim_{x \rightarrow 1} \frac{x-1}{\sqrt{x}-1} = \frac{(\sqrt{x+1})(\sqrt{x}-1)}{\sqrt{x}-1} = \sqrt{x+1} = \sqrt{2}$$

$$\textcircled{4} \lim_{x \rightarrow 1} \frac{x - \sqrt{x}}{x^2 - x - 4} = \frac{1 - \frac{1}{\sqrt{x}}}{x-1} = \frac{1 - \frac{1}{\sqrt{x}}}{x-1} = \frac{1}{2}$$

$$\textcircled{5} \lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{x - \sqrt{x}} = \frac{1 - \sqrt{x}}{\sqrt{x}(\sqrt{x} - 1)} = \frac{1 - \sqrt{x}}{\sqrt{x}(\sqrt{x} - 1)} = \frac{1}{\sqrt{x}}$$

$$\textcircled{6} \lim_{x \rightarrow 1} \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} = \frac{(\sqrt{x+1} - 1)(\sqrt{x+1} + 1)}{(\sqrt{x} - 1)(\sqrt{x} + 1)} = \frac{x+1 - 1}{x-1} = \frac{x}{x-1} = \frac{1}{0}$$

$$\textcircled{7} \lim_{x \rightarrow 1} \frac{\sqrt{x+1} + \sqrt{x} - 1}{\sqrt{x} - 1} = \frac{(\sqrt{x+1} + \sqrt{x} - 1)(\sqrt{x} + 1)}{(\sqrt{x} - 1)(\sqrt{x} + 1)} = \frac{(\sqrt{x+1} + \sqrt{x} - 1)(\sqrt{x} + 1)}{x-1}$$

$$\textcircled{8} \lim_{x \rightarrow \pi} \frac{1 + \cos x}{\sin x} = \frac{(\cos x + 1)(\cos x - 1)}{(1 - \cos x)(1 + \cos x)} = \frac{1 - 1}{1 - 1} = \frac{0}{0}$$

$$\textcircled{9} \lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{-\sin x + \cos x}{\cos x} = \frac{-1 + 0}{0} = \frac{-1}{0} = \infty$$

$$\textcircled{10} \lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan x - 1}{\cos x} = \frac{\frac{\sin x}{\cos x} - 1}{\cos x} = \frac{\sin x - \cos x}{\cos^2 x} = \frac{-1 - 0}{0} = \frac{-1}{0} = \infty$$