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$$\lim_{x \rightarrow 1} \frac{x^2 - 4x + 3}{x^2 - 1} = \frac{0}{0} \Rightarrow \frac{(x-1)(x-3)}{(x-1)(x+1)} \Rightarrow \frac{1}{2} \quad (1)$$

$$\text{Hop} \rightarrow \frac{1x - 4}{1x - 1} = \frac{1}{2}$$

$$\lim_{x \rightarrow \infty} \frac{|x-1| - |x+1|}{x} \rightarrow \frac{-x+1 - x-1}{x} = \frac{-2x}{x} = -2 \quad (2)$$

$$\lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0} \Rightarrow \frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} = 4 \quad (3)$$

$$\lim_{x \rightarrow 2} \frac{x - \sqrt{2x}}{x^2 - x - 4} = \frac{0}{0} \Rightarrow \frac{\sqrt{x}(\sqrt{x} - \sqrt{2})}{(\sqrt{x}-\sqrt{2})(\sqrt{x}+\sqrt{2})(x+2)} = \frac{\sqrt{x}}{\sqrt{x}+2} = \frac{1}{\sqrt{2}+2} \quad (4)$$

$$\text{Hop} \rightarrow \frac{1 - \frac{1}{\sqrt{2}} \times \sqrt{2}}{x+2} = \frac{1 - \frac{1}{\sqrt{2}}}{\sqrt{2}+2} = \frac{1}{\sqrt{2}+2}$$

$$\lim_{x \rightarrow 1} \frac{1-\sqrt{x}}{x-\sqrt{x}} = \frac{0}{0} \Rightarrow x \times \frac{1+\sqrt{x}}{1+\sqrt{x}} \times \frac{x+\sqrt{x}-1}{x+\sqrt{x}-1} = \frac{x-1}{x} = -1 \quad (5)$$

$$\frac{1-x}{x-1} = -1 \quad \text{Hop} \rightarrow \frac{1}{x} \times \frac{x-1}{x-1} = -1$$

$$\lim_{x \rightarrow 4} \frac{\sqrt{2x+6} - 4}{\sqrt{5x+2} - 2} = \frac{0}{0} \Rightarrow \frac{\frac{1}{\sqrt{2}} \times \sqrt{2} \times \sqrt{2x+6} - 4}{\frac{1}{\sqrt{5}} \times \sqrt{5} \times \sqrt{5x+2} - 2} = \frac{\sqrt{2x+6}}{\sqrt{5x+2}} = \frac{\sqrt{14}}{\sqrt{22}} = \frac{\sqrt{77}}{11} \quad (6)$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{x} + \sqrt{x} - 1}{\sqrt{x} - 1} = \frac{\sqrt{x} + \sqrt{x} + 1}{\sqrt{x} + \sqrt{x} + 1} \times \frac{\sqrt{x} + \sqrt{x} + 1}{\sqrt{x} + \sqrt{x} + 1} = \frac{x + \sqrt{x} + 1}{\sqrt{x} + \sqrt{x} + 1} \quad (\vee)$$

$$\frac{x}{x} \times \frac{\sqrt{x} + \sqrt{x} - 1}{x - 1} = \frac{x}{x} \times \frac{(\sqrt{x} - 1)(\sqrt{x} + 1)}{(\sqrt{x} - 1)(\sqrt{x} + 1)} = \frac{x}{x} \times \frac{1}{1} = \frac{1}{1} \quad (\vee)$$

$$\lim_{x \rightarrow \pi} \frac{1 + \cos^2 x}{\sin^2 x} = \frac{(\cos^2 \pi + 1)(\cos^2 x + 1 - \cos x)}{1 - \cos^2 x} = \frac{1 + 1 + 1}{1 - \cos^2 \pi} = \frac{3}{1} = 3 \quad (\vee)$$

$$\lim_{x \rightarrow \frac{\pi}{4}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{\cos x - \sin x}{\cos x} = \frac{1}{\cos x} = \frac{1}{\frac{\sqrt{2}}{2}} = \sqrt{2} \quad (9)$$

$$\lim_{x \rightarrow \frac{\pi}{4}} \frac{\tan^2 x - 1}{\cos^2 x} = \frac{\sin^2 x - \cos^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} = \frac{1}{\left(\frac{\sqrt{2}}{2}\right)^2} = \frac{1}{\frac{1}{2}} = 2 \quad (10)$$