

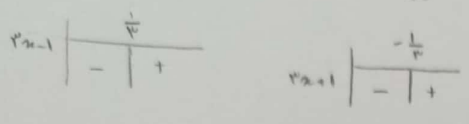
$$\lim_{x \rightarrow 1} \frac{ax^2 - \sqrt{x+3}}{ax^2 - 1x + 3} \Rightarrow \frac{(x - \frac{1}{a})(x+3)}{(x - \frac{1}{a})(x+3)} = \frac{x - \frac{1}{a}}{x - \frac{1}{a}} = \frac{\frac{1}{a}}{\frac{1}{a}} = 1$$

6

9

$$\lim_{x \rightarrow 0} \frac{|3x-1| - |3x+1|}{x} \Rightarrow \frac{(-3+1) - (3+1)}{x} = \frac{-3x+1 - 3x-1}{x} = \frac{-6x}{x} = -6$$

9



$$\lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x}-4} \Rightarrow \frac{(\sqrt{x}-4)(\sqrt{x}+4)}{\sqrt{x}-4} = \sqrt{x}+4 = \sqrt{4}+4 = 6$$

5

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

5

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

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$$\lim_{x \rightarrow 4} \frac{\sqrt{3x+5} - 5}{\sqrt{2x+1} - 4} \Rightarrow \frac{3x+5-25}{2x+1-16} \times \frac{1}{1} = \frac{3x-20}{2x-15} \times \frac{1}{1} = \frac{3(4)-20}{2(4)-15} = \frac{12-20}{8-15} = \frac{-8}{-7} = \frac{8}{7}$$

9

$$\lim_{x \rightarrow 1} \frac{\sqrt{3x} + \sqrt{x} - 4}{\sqrt{x} - 1} \Rightarrow \frac{3x+x-16}{x-1} \times \frac{1}{1} = \frac{4x-16}{x-1} \times \frac{1}{1} = \frac{4(x-4)}{x-1} \times \frac{1}{1} = \frac{4(1-4)}{1-1} = \frac{4(-3)}{0} = \text{undefined}$$

9

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

5

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

9



$$\lim_{x \rightarrow \frac{\pi}{4}} \frac{\tan^2 x - 1}{\cos^2 x} = \frac{\tan^2 x - 1}{1 + \tan^2 x} = \frac{(\tan x - 1)(\tan x + 1)}{-(\tan x - 1)} = -(\tan x + 1) = -\frac{1}{\cos^2 x} = -\frac{1}{\frac{1 + \cos^2 x}{2}} = -\frac{2}{1 + \cos^2 x}$$

$$-\frac{2}{1 + \cos^2 \frac{\pi}{4}} = -\frac{2}{1 + \cos^2 \frac{\pi}{4}} = -2$$

$$-(\tan^2 \frac{\pi}{4} + 1) = -2$$

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