

$$\lim_{x \rightarrow 1} \frac{2x^2 - 7x + 3}{5x^2 - 11x + 3} \stackrel{\text{HOP}}{\Rightarrow} \frac{1 - 7}{1 - 11} = \frac{1}{2}$$

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

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$$\lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x}-2} \times \frac{\sqrt{x}+2}{\sqrt{x}+2} = \frac{x-4}{x-4} \times \frac{4}{1} = \frac{4}{1}$$

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$$\lim_{x \rightarrow 2} \frac{x-\sqrt{2}x}{x^2-x-6} \times \frac{x+\sqrt{2}x}{x+\sqrt{2}x} = \frac{x^2-2x}{x^2-x-6} \times \frac{1}{x} \stackrel{\text{HOP}}{\Rightarrow} \frac{2x-2}{x^2-x-6} \times \frac{1}{x} = \frac{2}{x} \times \frac{1}{x} = \frac{2}{x^2} = \frac{2}{4} = \frac{1}{2}$$

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$$\lim_{x \rightarrow 1} \frac{1-\sqrt{x}}{2-\sqrt{4-x}} \times \frac{1+\sqrt{x}}{1+\sqrt{x}} \times \frac{2+\sqrt{4-x}}{2+\sqrt{4-x}} = \frac{1-x}{4-x+2x} \times \frac{4}{2} = \frac{1-x}{4-x+2x} \times 2 = -\frac{2}{3}$$

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$$\lim_{n \rightarrow \infty} \frac{\sqrt{3n+4} - 4}{\sqrt{5n+7} - 3} \xrightarrow[\text{Hôpital}]{\substack{\text{قرب در صورت} \\ \text{قرب در مخرج}}} \frac{3}{5} \times \frac{2\sqrt{3}}{2\sqrt{5}} = \frac{3\sqrt{3}}{5\sqrt{5}}$$

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$$\lim_{n \rightarrow 1} \frac{\sqrt{3n+\sqrt{n}} - 2}{\sqrt{n} - 1} \times \frac{3n+\sqrt{n}-4}{3n+\sqrt{n}-4} \times \frac{3n+\sqrt{n}-4}{3n+\sqrt{n}-4} = \frac{3n+\sqrt{n}-4}{n-1} \times \frac{3}{3} \xrightarrow{\text{Hôpital}} \frac{3+\frac{1}{2\sqrt{n}}}{1} \times \frac{3}{2}$$

$$= 3 + \frac{1}{2} \times \frac{3}{2} = \frac{6}{2} + \frac{3}{4} = \frac{15}{4}$$

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$$\lim_{n \rightarrow \infty} \frac{1 + \cos^n n}{2n^n} = \frac{(1 + \cos n)(1 + \cos^n n - \cos n)}{(1 + \cos n)(1 - \cos n)} = \frac{1 + \cos n - 1}{+2} = \frac{1}{2}$$

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$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{1 - \tan n}{\sin n - \cos n} \xrightarrow{\text{Hôpital}} \frac{-(1 + \tan^2 n)}{\cos n + \sin n} = \frac{-(1+1)}{\frac{\sqrt{2}}{\sqrt{2}}} = \frac{-2}{\sqrt{2}} = -\sqrt{2}$$

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$$\lim_{n \rightarrow \frac{\pi}{4}} \frac{\tan^n n - 1}{\cos n} \xrightarrow{\text{Hôpital}} \frac{(1 + \tan^2 n)^n}{-2 \sin n} = \frac{(1+1)^n}{-2 \times 1} = \frac{2^n}{-2} = -\frac{2^{n-1}}{1}$$

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