

$$\lim_{n \rightarrow 1} \frac{5n^2 - 7n + 3}{2n^2 - 1n + 3} = \frac{0}{0} \rightarrow \text{فکتورگیری} \quad \lim_{n \rightarrow 1} \frac{(n-1)(5n-3)}{(n-1)(2n-3)} = \frac{5-3}{2-3} = \left(\frac{1}{-1}\right)$$

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1

$$\lim_{n \rightarrow 0} \frac{|3n-1| - |3n+1|}{n} = \frac{0}{0} \rightarrow \text{فکتورگیری} \quad \lim_{n \rightarrow 0} \frac{|3n-1| - |3n+1|}{n} = \frac{-3n+1 - (3n+1)}{n} = \frac{-6n}{n} = -6$$

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2

$$\lim_{n \rightarrow 4} \frac{n-4}{\sqrt{n}-2} = \frac{0}{0} \rightarrow \text{فکتورگیری} \quad \lim_{n \rightarrow 4} \frac{(\sqrt{n}-2)(\sqrt{n}+2)}{(\sqrt{n}-2)} = \lim_{n \rightarrow 4} \sqrt{n}+2 = 4+2 = 6$$

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3

$$\lim_{n \rightarrow 4} \frac{n - \sqrt{4n}}{n^2 - n - 4} = \frac{0}{0} \rightarrow \text{فکتورگیری} \quad \lim_{n \rightarrow 4} \frac{n - \sqrt{4n}}{n^2 - n - 4} \times \frac{n + \sqrt{4n}}{n + \sqrt{4n}} = \lim_{n \rightarrow 4} \frac{n^2 - 4n}{n^2 - n - 4} \times \frac{1}{n + \sqrt{4n}}$$

$$= \lim_{n \rightarrow 4} \frac{n(n-4)}{(n-4)(n+4)} \times \frac{1}{n + \sqrt{4n}} = \lim_{n \rightarrow 4} \frac{n}{n+4} \times \frac{1}{n + \sqrt{4n}} = \frac{4}{(4+4)} \times \frac{1}{4+4} = \left(\frac{1}{16}\right)$$

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4

$$\lim_{n \rightarrow 1} \frac{1 - \sqrt{n}}{4 - \sqrt{4-n}} = \frac{0}{0} \rightarrow \text{فکتورگیری} \quad \lim_{n \rightarrow 1} \frac{1 - \sqrt{n}}{4 - \sqrt{4-n}} \times \frac{1 + \sqrt{n}}{1 + \sqrt{n}} \times \frac{\sqrt{4-n}}{\sqrt{4-n}} = \lim_{n \rightarrow 1} \frac{(1-n)\sqrt{4-n}}{(4-n)(1+n)\sqrt{4-n}}$$

$$= \lim_{n \rightarrow 1} \frac{1-n}{(4-n)(1+n)} \times \sqrt{4-n} = \lim_{n \rightarrow 1} \frac{1-n}{n-1} \times 2 = -2$$

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5

$$\lim_{n \rightarrow F} \frac{\sqrt{Fn+F} - F}{\sqrt{Fn+V} - V} = \frac{0^+}{0^+} \xrightarrow{\text{L'Hôpital}} \lim_{n \rightarrow F} \frac{\sqrt{Fn+F} - F}{\sqrt{Fn+V} - V} \times \frac{(\sqrt{Fn+V})^2 + V}{(\sqrt{Fn+V})^2 + V} \times \frac{\sqrt{Fn+F} + F}{\sqrt{Fn+F} + F}$$

$$= \lim_{n \rightarrow F} \frac{Fn+F-V}{Fn+V-V} \times \frac{FV}{1} = \lim_{n \rightarrow F} \frac{F(n-F)}{n(F)} \times \frac{FV}{1} = \boxed{\frac{11}{F_0}} \quad (5)$$

$$\lim_{n \rightarrow 1} \frac{\sqrt{Fn+\sqrt{n}} - F}{\sqrt{n} - 1} = \frac{0^+}{0^+} \xrightarrow{\text{L'Hôpital}} \lim_{n \rightarrow 1} \frac{\sqrt{Fn+\sqrt{n}} - F}{\sqrt{n} - 1} \times \frac{\sqrt{Fn+\sqrt{n}} + F}{\sqrt{Fn+\sqrt{n}} + F} \times \frac{\sqrt{Fn+1} + \sqrt{n}}{\sqrt{Fn+1} + \sqrt{n}}$$

$$= \lim_{n \rightarrow 1} \frac{Fn+\sqrt{n}-F}{n-1} \times \frac{F}{F} = \lim_{n \rightarrow 1} \frac{(\sqrt{n}-1)(\sqrt{Fn}+F)}{(\sqrt{n}-1)(\sqrt{n}+1)} \times \frac{F}{F} = \frac{F+F}{1+1} \times \frac{F}{F} = \boxed{\frac{F}{1}} \quad (5)$$

$$\lim_{n \rightarrow \pi} \frac{1 + \cos^2 n}{\sin n} = \frac{0^+}{0^+} \xrightarrow{\text{L'Hôpital}} \lim_{n \rightarrow \pi} \frac{(1 + \cos^2 n)(1 + \cos^2 n - \cos n)}{(1 + \cos^2 n)(1 - \cos n)}$$

$$= \lim_{n \rightarrow \pi} \frac{1 + \cos^2 n - \cos n}{1 - \cos n} = \frac{1 + (-1)^2 - (-1)}{1 - (-1)} = \boxed{\frac{F}{F}} \quad (5)$$

$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{1 - \tan n}{\sin n - \cos n} = \frac{0^+}{0^+} \xrightarrow{\text{L'Hôpital}} \lim_{n \rightarrow \frac{\pi}{2}} \frac{1 - \frac{\sin n}{\cos n}}{\sin n - \cos n} = \lim_{n \rightarrow \frac{\pi}{2}} \frac{\cos n - \sin n}{\cos n (\sin n - \cos n)}$$

$$= \lim_{n \rightarrow \frac{\pi}{2}} \frac{1}{\cos n} = \frac{-1}{\frac{1}{\sqrt{2}}} = \boxed{-\sqrt{2}} \quad (5)$$

$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{\tan^2 n - 1}{\cos^2 n} = \frac{0^+}{0^+} \xrightarrow{\text{L'Hôpital}} \lim_{n \rightarrow \frac{\pi}{2}} \frac{\frac{\sin^2 n}{\cos^2 n} - 1}{\cos^2 n - \sin^2 n} = \lim_{n \rightarrow \frac{\pi}{2}} \frac{\sin^2 n - \cos^2 n}{\cos^2 n - \sin^2 n}$$

$$= \lim_{n \rightarrow \frac{\pi}{2}} \frac{-1}{\cos^2 n} = \frac{-1}{(-\frac{1}{\sqrt{2}})^2} = \boxed{-2} \quad (5)$$