

مشتق

14,8

$$\lim_{x \rightarrow 1} \frac{x^m - vx + p}{2x^r - ax + p} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{(m-1)(x-1)}{(2r-1)(2x-p)} = \frac{x-1}{2x-p} = -1$$

1/2

$$\lim_{x \rightarrow 0} \frac{|3x-1| - |3x+1|}{x} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{-3 - 3}{1} = -6$$

$$\frac{|3x-1| - |3x+1|}{x} \times \frac{|3x-1| + |3x+1|}{|3x-1| + |3x+1|} = \frac{(3x-1)^2 - (3x+1)^2}{2x} = \frac{-12x}{2x} = -6$$

$$\lim_{x \rightarrow 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{1}{\frac{1}{2\sqrt{x}}} = (1 \times 2) \times (\sqrt{x}-2) = 2 \times 2 = 4$$

= 4

$$\lim_{x \rightarrow 4} \frac{x - \sqrt{2x}}{x^2 - x - 4} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{1 - \frac{1}{\sqrt{2x}}}{2x - 1} \times \frac{x + \sqrt{2x}}{x + \sqrt{2x}} = \frac{x(2-x)}{x^2 - 2x} = \frac{x}{x-2} = 2$$

1, 20

$$\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{x - \sqrt{a-x}} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{-\frac{1}{2\sqrt{x}}}{1 - \frac{1}{2\sqrt{a-x}}} \times \frac{1 - \sqrt{x}}{1 - \sqrt{x}} \times \frac{1 + \sqrt{x}}{1 + \sqrt{x}} = \frac{1 - \sqrt{x}}{2\sqrt{x}(1 - \sqrt{x})} = \frac{1}{2\sqrt{x}}$$

$$\frac{(1-x) \times 2}{(2 - a + x) \times 2} = \frac{(1-x) \times 2}{(2-1) \times 2} = 1$$

$$\lim_{x \rightarrow 4} \frac{\sqrt{x+4} - 4}{\sqrt{4x+4} - 4} = \frac{0}{0} \xrightarrow{\text{ل'Hôpital}} \frac{\frac{1}{2\sqrt{x+4}}}{\frac{2}{\sqrt{4x+4}}} = \frac{\frac{1}{2}}{2} = \frac{1}{4}$$

Handwritten title: Handwritten

$$\lim_{n \rightarrow 1} \frac{\sqrt{4n+5n} - 3}{\sqrt{n} - 1} = \frac{0}{0} \xrightarrow{\text{hop}} \frac{3 + \frac{1}{\sqrt{2n}}}{\frac{1}{\sqrt{2n}}} = \frac{3 + \frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = -1$$

$$\lim_{n \rightarrow \pi} \frac{1 + \cos^n x}{\sin^n x} = \frac{0}{0} \xrightarrow{\text{Polynom}} \frac{(1 + \cos^n x)(1 - \cos^n x - \cos^n x)}{(1 - \cos^n x)(1 + \cos^n x)} = -1$$

$$\left. \frac{1}{\sqrt{x}} \right\}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{0}{0} \xrightarrow{\text{Polynom}} \frac{1 - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\cos x - \sin x}{\cos x (\sin x - \cos x)} = \frac{-1}{\cos x}$$

$$\left. \frac{1}{\sqrt{x}} = \frac{1}{\sqrt{x}} = \sqrt{\frac{1}{x}} \right\}$$

$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{\tan^n x - 1}{\cos^n x} = \frac{0}{0} \xrightarrow{\text{Polynom}} \frac{\frac{\sin^n x}{\cos^n x} - 1}{\cos^n x} = \frac{\sin^n x - \cos^n x}{\cos^n x (\cos^n x - \sin^n x)} = -1$$

$$\left. \frac{1}{\sqrt{x}} = \frac{1}{\sqrt{x}} = -1 \right\}$$