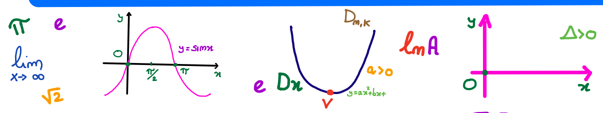
MATEMATICA A COLORI PER TUTTI

LA FANTASTICA REGOLA DI DE L'HOPITAL

FLIPPED MATH



WWW. CLAUDIODESIDERIO.WORDPRESS. COM

MATEMATICA A COLORI PER TUTTI
LA FANTASTICA REGOLA DI DE L'HOPITAL

FORME INDETERMINATE $\left[\frac{0}{0}\right]$ $\left[\frac{\infty}{\infty}\right]$

$$\lim_{x \to x^*} \frac{f(x)}{g(x)} = \left\langle \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix} \right\rangle \overset{H}{=} \lim_{x \to x^*} \frac{f'(x)}{g'(x)}$$

$x_0 \quad \infty$

SI DERIVANO NUMERATORE E DENOMINATORE

ALTRE FORME

$$[0 \cdot \infty] \left\langle \begin{matrix} \left[\dfrac{0}{\frac{1}{\infty}}\right] = \left[\frac{0}{0}\right] \\ \left[\dfrac{\infty}{\frac{1}{0}}\right] = \left[\frac{\infty}{\infty}\right] \end{matrix} \right.$$

$a \cdot b = \frac{b}{\frac{1}{a}}$

ANCHE LE FORME

$$[+\infty - \infty] \quad [0^0] \quad [1^\infty] \quad [\infty^0] \left\langle \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix} \right.$$

WWW. CLAUDIODESIDERIO.WORDPRESS. COM

MATEMATICA A COLORI PER TUTTI

LA FANTASTICA REGOLA DI DE L'HOPITAL

$$\lim_{x \to x^*} \frac{f(x)}{g(x)} = \left\langle \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix} \right\rangle \overset{H}{=} \lim_{x \to x^*} \frac{f'(x)}{g'(x)}$$

x_0 ∞

SI DERIVANO NUMERATORE E DENOMINATORE

ZERO SU ZERO

$$\lim_{x \to 2} \frac{x^2 - x - 2}{x^2 - 4} = \left[\frac{0}{0}\right] \overset{H}{=}$$

$$= \lim_{x \to 2} \frac{2x - 1}{2x} = \frac{4-1}{4} = \frac{3}{4}$$

$D x^m = m x^{m-1}$ $D k = 0$

LIMITI NOTEVOLI

$\cos 0 = 1$

$$\lim_{x \to 0} \frac{\sin 3x}{4x} = \left[\frac{0}{0}\right] \overset{H}{=} \lim_{x \to 0} \frac{\cos 3x \cdot 3}{4} = \frac{3}{4}$$

$$\lim_{x \to 0} \frac{\ln(1+3x)}{4x} = \left[\frac{0}{0}\right] \overset{H}{=} \lim_{x \to 0} \frac{\frac{3}{1+3x}}{4} = \frac{3}{4}$$

$D \sin kx = \cos kx \cdot k$ $D \ln g(x) = \frac{g'(x)}{g(x)}$

WWW. CLAUDIODESIDERIO.WORDPRESS.COM

MATEMATICA A COLORI PER TUTTI

LA FANTASTICA REGOLA DI DE L'HOPITAL

$$\lim_{x \to x^*} \frac{f(x)}{g(x)} = \left\langle \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix} \right\rangle \overset{H}{=} \lim_{x \to x^*} \frac{f'(x)}{g'(x)}$$

x_0 ∞

SI DERIVANO NUMERATORE E DENOMINATORE

INFINITO SU INFINITO

$$\lim_{x \to \infty} \frac{3x^2 - x - 2}{5x^2 - 4} = \left[\frac{\infty}{\infty}\right] \overset{H}{=} \lim_{x \to \infty} \frac{6x - 1}{10x} =$$

$$= \left[\frac{\infty}{\infty}\right] \overset{H}{=} \lim_{x \to \infty} \frac{6}{10} = \frac{6}{10} = \frac{3}{5}$$

$D x^m = m x^{m-1}$ $D k = 0$

INFINITO SU INFINITO

$$\lim_{x \to +\infty} \frac{3^x + \ln 5x}{x^2 - 4} = \left[\frac{\infty}{\infty}\right] \overset{H}{=} \lim_{x \to +\infty} \frac{3^x \ln 3 + \overset{\nearrow 0}{\frac{1}{x}}}{2x} =$$

$$= \left[\frac{\infty}{\infty}\right] \overset{H}{=} \lim_{x \to +\infty} \frac{3^x \ln 3 \cdot \ln 3}{2} = \left[\frac{3^{+\infty} \ln^2 3}{2}\right] = +\infty$$

$D 3^x = 3^x \ln 3$ $D \ln 5x = \frac{\cancel{5}}{\cancel{5}x}$

WWW. CLAUDIODESIDERIO.WORDPRESS.COM

MATEMATICA A COLORI PER TUTTI

LA FANTASTICA REGOLA DI DE L'HOPITAL

$$\lim_{\substack{x \to x^* \\ x_0\ \infty}} \frac{f(x)}{g(x)} = \left\langle \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix} \right\rangle \overset{H}{=} \lim_{x \to x^*} \frac{f'(x)}{g'(x)}$$

SI DERIVANO NUMERATORE E DENOMINATORE

[redacted]

ZERO X INFINITO $[0 \cdot \infty]$

$$\lim_{x \to 0^+} x \ln x = [0^+ \cdot +\infty] \qquad a \cdot b = \frac{b}{\frac{1}{a}}$$

$$= \lim_{x \to 0^+} \frac{\ln x}{\frac{1}{x}} = \left[\frac{\infty}{\infty}\right] \overset{H}{=} \lim_{x \to 0^+} \frac{\frac{1}{x}}{-\frac{1}{x^2}} =$$

$$= \lim_{x \to 0^+} \frac{-x^2}{x} = \lim_{x \to 0^+} -x = 0^-$$

+ INFINITO − INFINITO $[+\infty - \infty]$

$$\lim_{x \to +\infty} (\ln x - x) = [+\infty - \infty]$$

$$= \lim_{x \to +\infty} x\Big(\underbrace{\frac{\ln x}{x}}_{\to 0\ *} - 1\Big) \overset{*}{=} \lim_{x \to +\infty} -x = -\infty$$

X IN EVIDENZA

$$\lim_{x \to +\infty} \frac{\ln x}{x} \overset{H}{=} \lim_{x \to +\infty} \frac{\frac{1}{x}}{1} = 0 \quad *$$

WWW.CLAUDIODESIDERIO.WORDPRESS.COM

MATEMATICA A COLORI PER TUTTI

LA FANTASTICA REGOLA DI DE L'HOPITAL

FORME INDETERMINATE

$$[0^0] \quad [1^\infty] \quad [\infty^0] < \begin{matrix} \left[\frac{0}{0}\right] \\ \left[\frac{\infty}{\infty}\right] \end{matrix}$$

COME? $f(x)^{g(x)} = e^{g(x) \ln f(x)} = e^{\frac{\ln f(x)}{\frac{1}{g(x)}}}$

$$a \cdot b = \frac{b}{\frac{1}{a}}$$

$$\lim_{x \to 0^+} (x)^x = [0^0] = \lim_{x \to 0^+} e^{x \ln(x)} = e^{[0 \cdot \infty]} = \lim_{x \to 0^+} e^{\frac{\ln(x)}{\frac{1}{x}}} =$$

$$= e^{\left[\frac{\infty}{\infty}\right]} \overset{H}{=} \lim_{x \to 0^+} e^{\frac{\frac{1}{x}}{-\frac{1}{x^2}}} = \lim_{x \to 0^+} e^{-\frac{\cancel{x^2}}{\cancel{x}}} = e^0 = 1$$

[redacted]

WWW.CLAUDIODESIDERIO.WORDPRESS.COM