

Cálculo 1

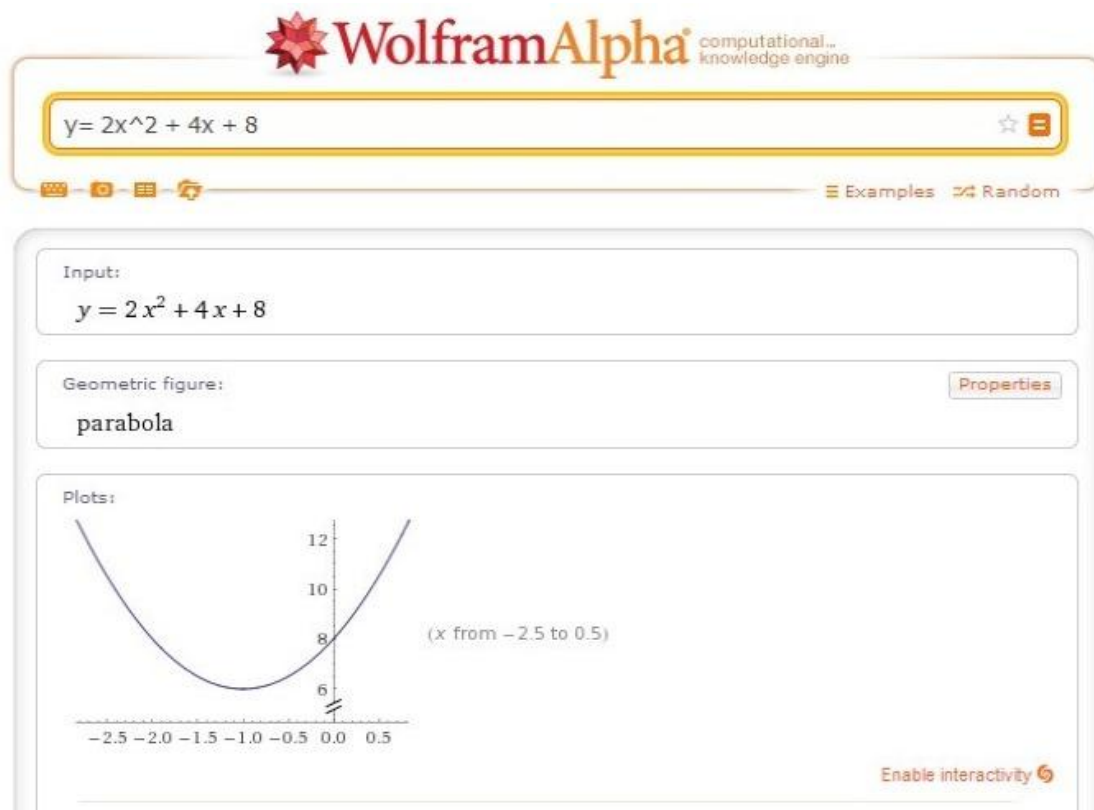
No site **WolframAlpha** podemos resolver os mais variados tipos de expressões matemáticas e também realizar buscas!

Página inicial: <http://www.wolframalpha.com>

Uma função, por exemplo:

$$y = 2x^2 + 4x + 8$$

O site nos retorna: O gráfico da função, a figura geométrica, formas alternativas, as raízes, as derivadas implícitas e o máximo e mínimo...



Veja a página completa em:

<http://www.wolframalpha.com/input/?i=y%3D+2x%5E2+%2B+4x+%2B+8>

Para cálculos específicos:

Limite:

Utiliza-se "lim" ou "limit"

Exemplos:

$$\lim_{x \rightarrow 0} \frac{\text{sen}(x) - x}{x^3}$$

No WolframAlpha fica da seguinte forma:

lim (sin x - x)/x^3 as x->0

computational...
knowledge engine

lim (sin x - x)/x^3 as x->0

Examples Random

Limit: [Approximate form](#) [Step-by-step solution](#)

$$\lim_{x \rightarrow 0} \frac{\sin(x) - x}{x^3} = -\frac{1}{6}$$

Plot:

(x from -2 to 2)

Series expansion at x=0: [More terms](#)

$$-\frac{1}{6} + \frac{x^2}{120} - \frac{x^4}{5040} + O(x^6)$$

Computed by [Wolfram Mathematica](#) [Download page](#)

Limites laterais:

$$\lim_{x \rightarrow 0^+} \frac{x}{|x|}$$

No WolframAlpha:

lim x/|x| as x->0+

The screenshot shows the WolframAlpha interface. At the top, the WolframAlpha logo is displayed with the tagline "computational knowledge engine". Below the logo is a search bar containing the input "lim x/|x| as x->0+". The search bar includes a star icon and a search button. Below the search bar are several icons for additional features and a link to "Examples" and a "Random" button. The main content area is divided into three sections: "Limit:" showing the result $\lim_{x \rightarrow 0^+} \frac{x}{|x|} = 1$; "Limit from opposite direction:" showing $\lim_{x \rightarrow 0^-} \frac{x}{|x|} = -1$; and "Plot:" showing a graph of the function $y = x/|x|$ for x from -2 to 2. The graph shows a horizontal line at $y = 1$ for $x > 0$ and a horizontal line at $y = -1$ for $x < 0$. At the bottom of the interface, it says "Computed by Wolfram Mathematica" and a "Download page" button.

Outra forma:

$$\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x$$

No WolframAlpha:

limit (1+1/x)^x as x->infinity

limit $(1+1/n)^n$ as $n \rightarrow \infty$

Limit:

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e$$

[Approximate form](#)

[Step-by-step solution](#)

Series expansion at $n = \infty$:

$$e - \frac{e}{2n} + \frac{11e}{24n^2} - \frac{7e}{16n^3} + \frac{2447e}{5760n^4} + O\left(\frac{1}{n}\right)^5$$

[More terms](#)

Computed by **Wolfram Mathematica**

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Uma função é contínua? Encontre a resposta no WolframAlpha com:

“is (.....) continuous”

is $\sin(x)/(x^2)$ continuous

is $\sin(x)/(x^2)$ continuous

Input interpretation:

is $y = \frac{\sin(x)}{x^2}$ continuous?

Result:

$y = \frac{\sin(x)}{x^2}$ is **not continuous**

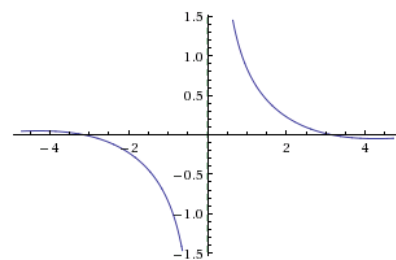
(assuming a function from reals to reals)

Discontinuities:

$x = 0$ (infinite discontinuity) (left limit: $-\infty$ | right limit: ∞)

[Hide limits](#)

Plots:

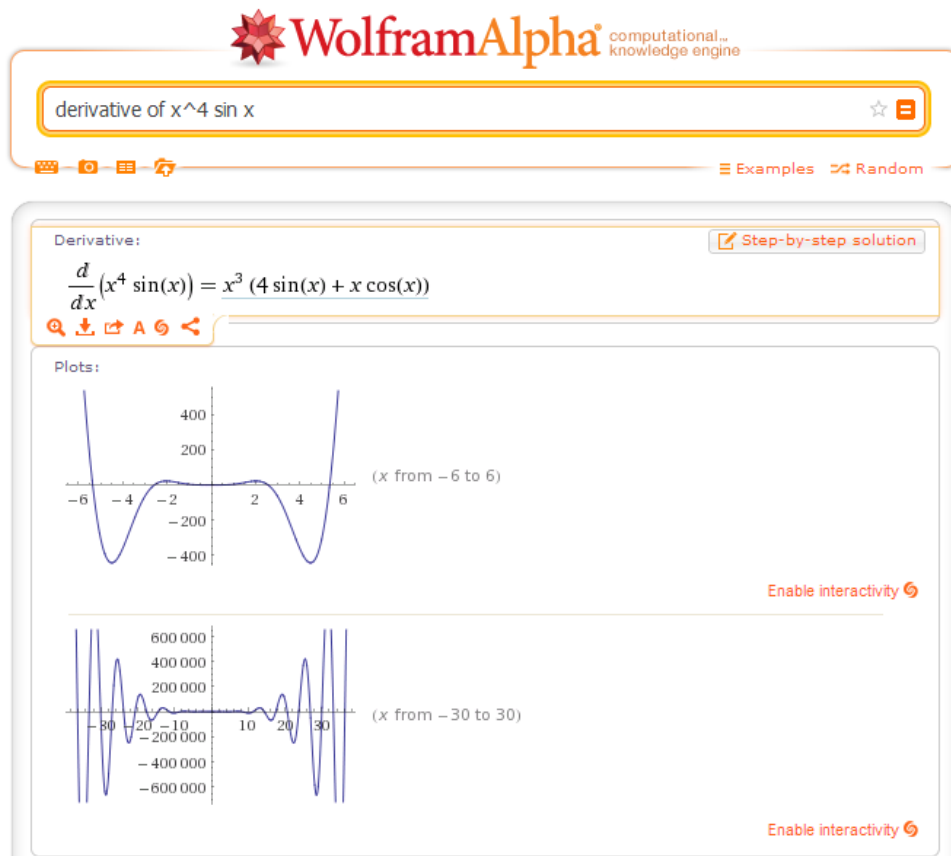


Derivada:

"derivative of"

Exemplos:

derivative of $x^4 \sin x$



Página completa: <http://www.wolframalpha.com/input/?i=derivative+of+x%5E4+sin+x>

Derivada segunda:

second derivative of $\sin(2x)$

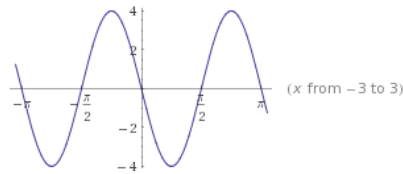
second derivative of sin(2x)

Derivative:

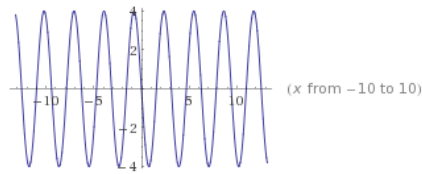
$$\frac{d^2}{dx^2} (\sin(2x)) = -4 \sin(2x)$$

Step-by-step solution

Plots:



Enable interactivity



Enable interactivity

Integral:

"integrate" ou "int"

Integral indefinida:

integrate $x^2 \sin^3 x \, dx$

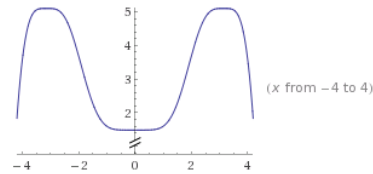
integrate $x^2 \sin^3 x \, dx$

Examples Random

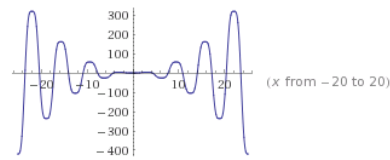
Indefinite integral: Approximate form Step-by-step solution

$$\int x^2 \sin^3(x) \, dx = \frac{1}{108} (-81(x^2 - 2) \cos(x) + (9x^2 - 2) \cos(3x) - 6x(\sin(3x) - 27 \sin(x))) + \text{constant}$$

Plots of the integral:



Enable interactivity



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Integral definida:

integrate $\sin x \, dx$ from $x=0$ to π

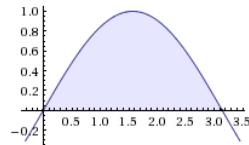
integrate $\sin x \, dx$ from $x=0$ to π

Examples Random

Definite integral:

$$\int_0^{\pi} \sin(x) \, dx = 2$$

Visual representation of the integral:



Riemann sums: More cases

left sum $\frac{\pi \cot(\frac{\pi}{2n})}{n} = 2 - \frac{\pi^2}{6n^2} + O\left(\frac{1}{n^4}\right)$

$\cot(x)$ is the cotangent function »

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Indefinite integral: Step-by-step solution

$$\int \sin(x) \, dx = -\cos(x) + \text{constant}$$