derivative

Examples Random

Assuming "derivative" refers to a computation | Use as a general topic or referring to a mathematical definition or a word instead

function to differentiate: x^(x^2)

Also include: differentiation variable

Derivative:

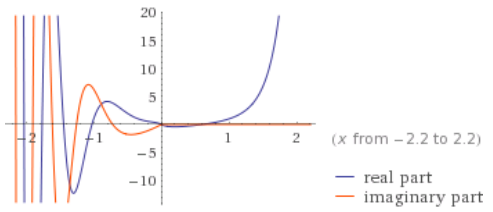
Step-by-step solution

$$\frac{d}{dx}\left(x^{x^2}\right) = x^{x^2}\,(x + 2\,x\log(x))$$

$\log(x)$ is the natural logarithm

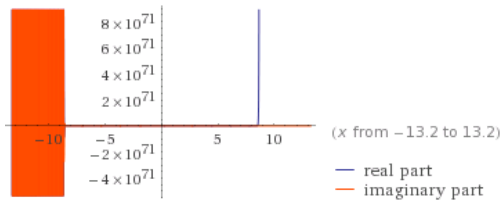
Plots:

Complex-valued plot ▼



Enable interactivity

Complex-valued plot ▼



Enable interactivity

Alternate form:

$$x^{x^2+1}\,(2\log(x) + 1)$$

Expanded form:

$$x^{x^2+1} + 2\,x^{x^2+1}\log(x)$$

Root:

Approximate form Step-by-step solution

$$x = \frac{1}{\sqrt{e}}$$

Properties as a real function:

Exact forms

Domain:

$\{x \in \mathbb{R} : x > 0\}$ (all positive real numbers)

Range:

$\{y \in \mathbb{R} : y \geq -0.416128\}$

$\mathbb{R}$ is the set of real numbers

Series expansion at x=0:

$$x\,(2\log(x)+1)+x^3\left(2\log^2(x)+\log(x)\right)+O\left(x^4\right)$$

(generalized Puiseux series)

Big-O notation »

Indefinite integral:

Step-by-step solution

$$\int x^{x^2}\,(x+2\,x\log(x))\,dx = x^{x^2} + \text{constant}$$

Differential geometric curves:

(requires interactivity)

Enable Interactivity

POWERED BY THE **WOLFRAM LANGUAGE**

Standard computation time exceeded...

Try again with additional computation time »

Related Queries:

- = osculating circle of x^(x^2)
- = integrate x^(x^2) dx
- = polar plot abs(theta^(theta^2))
- = d^2/dx^2 x^(x^2)