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: 3^(2x+4)

Also include: differentiation variable

Derivative:

Approximate form Step-by-step solution

$$\frac{d}{dx}\left(3^{2x+4}\right) = 9^{x+2}\log(9)$$

log(x) is the natural logarithm

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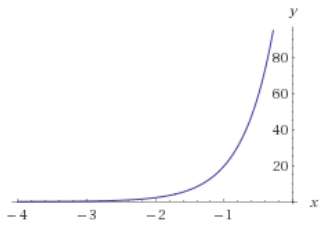
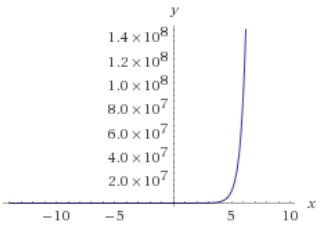
Plots:



(x from −4 to 0)

Enable interactivity



(x from −14 to 10)

Enable interactivity

Alternate form assuming x>0:

$$2 \times 9^{x+2}\log(3)$$

Roots: Step-by-step solution

(no roots exist)

Properties as a real function:

Domain:

$\mathbb{R}$ (all real numbers)

Range:

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

Injectivity:

injective (one-to-one) on its domain

ℝ is the set of real numbers

Periodicity: Approximate form

periodic in x with period $\frac{2i\pi}{\log(9)}$

Series expansion at x=0:

$$81\log(9) + 81\,x\log^2(9) + \frac{81}{2}\,x^2\log^3(9) + \frac{27}{2}\,x^3\log^4(9) + \frac{27}{8}\,x^4\log^5(9) + \frac{27}{40}\,x^5\log^6(9) + O\left(x^6\right)$$

(Taylor series)

Big-O notation »

Indefinite integral:

Step-by-step solution

$$\int 9^{2+x}\log(9)\,dx = 9^{x+2} + \text{constant}$$

Limit:

$$\lim_{x\to-\infty} 9^{2+x}\log(9) = 0$$

Definite integral over a half-period:

$$\int_0^{\frac{i\pi}{\log(9)}} 9^{2+x}\log(9)\,dx = -162$$

Differential geometric curves:

(requires interactivity)

Enable Interactivity

Inverse iterations:

(requires interactivity)

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POWERED BY THE **WOLFRAM LANGUAGE**

Related Queries:

- = series (f(x+eps)/f(x))^(1/eps) at eps = 0
- = d^2/dx^2 (3^(2 x+4))
- = oxidation states of chromium(III) chloride
- = d/dx(3^(2 x+4))^(3^(2 x+4))