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: sin2x+cos 2x

Also include: differentiation variable

Derivative: Step-by-step solution

$$\frac{d}{dx}(\sin(2x)+\cos(2x)) = 2(\cos(2x)-\sin(2x))$$

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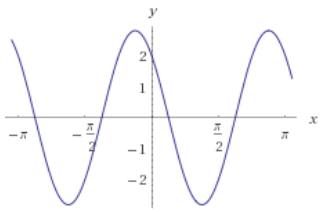
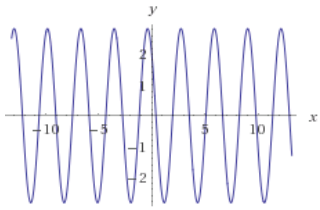
Plots:



(x from −3.3 to 3.3)

Enable interactivity



(x from −13.2 to 13.2)

Enable interactivity

Alternate forms: More

$$2\cos(2x) - 2\sin(2x)$$

$$2\sqrt{2}\,\sin\left(\frac{\pi}{4} - 2x\right)$$

$$-2\sin^2(x) + 2\cos^2(x) - 4\sin(x)\cos(x)$$

Root: Approximate form Step-by-step solution

$$x = \frac{\pi n}{2} - \frac{3\pi}{8}, \quad n \in \mathbb{Z}$$

$\mathbb{Z}$ is the set of integers

Properties as a real function: Approximate forms

Domain:

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

Range:

$$\{y \in \mathbb{R} : -2\sqrt{2} \le y \le 2\sqrt{2}\}$$

Periodicity:

Series expansion at x=0:

$$2 - 4x - 4x^2 + \frac{8x^3}{3} + \frac{4x^4}{3} + O(x^5)$$

(Taylor series)

Big-O notation »

Indefinite integral:

Step-by-step solution

$$\int 2(\cos(2x) - \sin(2x))\,dx = \sin(2x) + \cos(2x) + \text{constant}$$

Global maxima:

Approximate form

$$\max\{2(\cos(2x) - \sin(2x))\} = 2\sqrt{2} \text{ at } x = n\pi + \tan^{-1}\left(1 - \sqrt{2}\right) \text{ for integer } n$$

$\tan^{-1}(x)$ is the inverse tangent function

Global minima:

Approximate form

$$\min\{2(\cos(2x) - \sin(2x))\} = -2\sqrt{2} \text{ at } x = n\pi + \tan^{-1}\left(1 + \sqrt{2}\right) \text{ for integer } n$$

Definite integral over a half-period:

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

Differential geometric curves:

(requires interactivity)

Enable Interactivity

Differential equation solution curve families:

(requires interactivity)

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Standard computation time exceeded...

Try again with additional computation time »