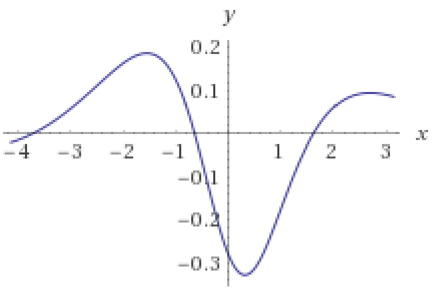
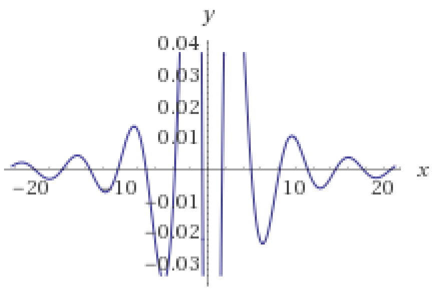
Derivative

$$\frac{d}{dx}\left(\frac{\cos(x+1)}{x^2+3}\right) = -\frac{(x^2+3)\sin(x+1)+2\,x\cos(x+1)}{(x^2+3)^2}$$

Plots



(x from -4.1 to 3.1)



(x from -22.3 to 21.3)

Alternate forms

$$\frac{x^2\,(-\sin(x+1)) - 3\sin(x+1) - 2\,x\cos(x+1)}{(x^2+3)^2}$$

$$-\frac{x^2\sin(x+1)+3\sin(x+1)+2\,x\cos(x+1)}{(x^2+3)^2}$$

$$-\frac{\frac{1}{2}\,i\left(e^{-i\,x-i}-e^{i\,x+i}\right)(x^2+3)+\left(e^{-i\,x-i}+e^{i\,x+i}\right)x}{(x^2+3)^2}$$

Expanded form

$$-\frac{x^2\sin(x+1)}{(x^2+3)^2}-\frac{3\sin(x+1)}{(x^2+3)^2}-\frac{2\,x\cos(x+1)}{(x^2+3)^2}$$

Series expansion at x=0

$$-\frac{\sin(1)}{3}-\frac{5}{9}\,x\cos(1)+\frac{1}{2}\,x^2\sin(1)+\frac{23}{54}\,x^3\cos(1)-\frac{7}{24}\,x^4\sin(1)+O(x^5)$$

(Taylor series)

Indefinite integral

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