

Derivative

`d(f,x)` returns the derivative of f with respect to x .

`d(x^2,x)`

$2x$

Extend the argument list for multiderivatives.

`f = 1 / (x + y)`

`d(f,x,y)`

$$\frac{2}{(x+y)^3}$$

`d(sin(x),x,x)`

$-\sin(x)$

Another syntax for n th derivative.

`d(sin(x),x,2)`

$-\sin(x)$

The gradient of f is returned for vector x in `d(f,x)`.

`r = sqrt(x^2 + y^2)`

`d(r,(x,y))`

$$\begin{bmatrix} \frac{x}{(x^2+y^2)^{1/2}} \\ \frac{y}{(x^2+y^2)^{1/2}} \end{bmatrix}$$

The f in `d(f,x)` can be a vector or higher rank function. Gradient increases rank by one.

`F = (x^2,y^2)`

`X = (x,y)`

`d(F,X)`

$$\begin{bmatrix} 2x & 0 \\ 0 & 2y \end{bmatrix}$$