

# Derivada de funcao composta de 2 variaveis

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## Enunciado

Seja  $f(x, y) = \frac{\arctan(y + \sqrt{x}) \log(3y + x^2)}{2}$ . Calcule a derivada parcial  $\frac{\partial^2 f}{\partial x \partial y}$ .

## Sugestion

## Resolution

Utilizando regra de cadeia obtemos

$$\frac{\partial^2 f}{\partial x \partial y} = \frac{(-y - \sqrt{x}) \log(3y + x^2)}{2\sqrt{x} \left( (y + \sqrt{x})^2 + 1 \right)^2} - \frac{3x \arctan(y + \sqrt{x})}{(3y + x^2)^2} + \frac{x}{(3y + x^2) \left( (y + \sqrt{x})^2 + 1 \right)} + \frac{3}{4\sqrt{x} (3y + x^2) \left( (y + \sqrt{x})^2 + 1 \right)}.$$

## Result

## Obs

## Random choices

```
F | atan(u) | atan(u)
aux5 | v2(x,y):=#v1 | v2(x,y):=sqrt(3*y+x^2)
def_e | e :: %e | e
aux1 | FF(u):=#F | FF(u):=atan(u)
DD | diff(#HH,x,1,y,1) | -(y+sqrt(x))*log(3*y+x^2)/(2*sqrt(x)*((y+sqrt(x))^2+1)^2)
-3*x*atan(y+sqrt(x))/(3*y+x^2)^2+x/((3*y+x^2)*((y+sqrt(x))^2+1))
+3/(4*sqrt(x)*(3*y+x^2)*((y+sqrt(x))^2+1))
aux2 | GG(v):=#G | GG(v):=log(v)
u1 | sqrt(x)+y | y+sqrt(x)
v1 | sqrt(x^2+3*y) | sqrt(3*y+x^2)
aux3 | H(u,v):=FF(u)*GG(v) | H(u,v):=FF(u)*GG(v)
HH | H(u2(x,y),v2(x,y)) | atan(y+sqrt(x))*log(3*y+x^2)/2
G | log(v) | log(v)
aux4 | u2(x,y):=#u1 | u2(x,y):=y+sqrt(x)
```