$$f(x,y) = x^2y - y^3x + 5x$$

$$\frac{\partial f}{\partial x} = 2x\cdot y - y^3 + 5$$

$$\frac{\partial f}{\partial y} = x^2\cdot 1 - 3y^2\cdot x + 0$$

$(x^2\cdot 5)' = 2x\cdot 5$

$(x^2\cdot y)' = 2x\,y$

$(2^3x)' = 2^3$

$(y^3x)' = y^3$

$(x^3)' = 3x^2$

$y^3 = 3y^2$

$(k\cdot f)' = k\,f'$

$(f+k)' = f' + 0$

$(fg)' = f'g + fg'$

$$f(x,y) = \sin(\underbrace{x+y}_{(x+y)'\,1+0}) \cdot \log(\underbrace{xy}_{xy})$$

$xy > 0$

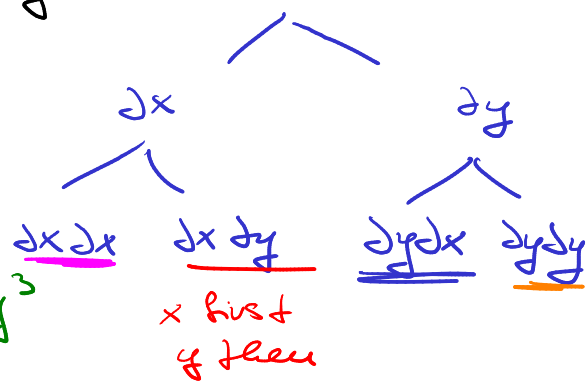
$$\frac{\partial f}{\partial x} = \cos(x+y)\cdot(1+0)\cdot\log(xy) + \sin(x+y)\cdot\frac{1}{xy}\cdot(1\cdot y)$$

$$\frac{\partial f}{\partial y} = \cos(x+y)\cdot(0+1)\cdot\log(xy) + \sin(x+y)\cdot\frac{1}{xy}\cdot(x\cdot 1)$$

$$f(x,y) = x^3y^2 - 7x + 8y^2 - y^4x$$

$$\frac{\partial f}{\partial x} = 3x^2y^2 - 7\cdot 1 + 0 - y^4\cdot 1$$
$$= 3x^2y^2 - 7 - y^4$$

$$\frac{\partial f}{\partial y} = x^3\,2y + 0 + 8\cdot 2y - x\cdot 4y^3$$
$$= 2yx^3 + 16y - 4xy^3$$



$$\frac{\partial^2 f}{\partial x^2} = 3\cdot 2x\cdot y^2 + 0 + 0$$

$$\frac{\partial^2 f}{\partial x\,\partial y} = 3x^2\cdot 2y + 0 - 4y^3$$

$$\frac{\partial^2 f}{\partial y\,\partial x} = 2y\cdot 3x^2 + 0 - 4y^3\cdot 1$$

} the same

$$\frac{\partial^2 f}{\partial y^2} = 2x^3 + 16 - 4x\cdot 3y^2$$