Ficha de trabalho 1

1) $\frac{\partial^2 w}{\partial x \partial y} = \frac{\partial^2 w}{\partial y \partial x}$

a) ① $w = x^4 e^y + y\cos(x)$

$\boxed{\frac{\partial^2 w}{\partial x \partial y}} = \frac{\partial}{\partial x}\left(\frac{\partial w}{\partial y}\right) =$

$= \frac{\partial}{\partial x}\left(\frac{\partial}{\partial y}\left(x^4 e^y + y\cos(x)\right)\right)$

$\frac{\partial}{\partial x}\left(e^y x^4 + \cos(x)\right)$

$\frac{\partial}{\partial x}\left(e^y x^4 + \cos(x)\right)$

$= \boxed{4x^3 e^y - \operatorname{sen}(x)}$

② $\frac{\partial^2 w}{\partial y \partial x} = \frac{\partial}{\partial y}\left(\frac{\partial w}{\partial x}\right)$

$= \frac{\partial}{\partial y}\left(\frac{\partial}{\partial x}\left(x^4 e^y - y\operatorname{sen}(x)\right)\right)$

$\frac{\partial}{\partial y}\left(4x^3 e^y - y\operatorname{sen}(x)\right)$

$= \boxed{e^y 4x^3 - \operatorname{sen}(x)}$

① e ② são iguais

Logo $\boxed{\frac{\partial^2 w}{\partial x \partial y}} = \boxed{\frac{\partial^2 w}{\partial y \partial x}}$