Common Calculus Mistakes

Partial Derivative

The Goal

Find

$$\frac{\partial}{\partial y}\frac{3x^2}{x^3+y^2}$$

The Mistake

Find the mistake:

$$\frac{\partial}{\partial y}\frac{3x^2}{x^3+y^2}=\frac{0-2y3x^2}{(x^2+y^3)^2}=\frac{6x^2y}{(x^2+y^3)^2}$$

Need a hint? Look carefully at the red part:

$$\frac{\partial}{\partial y}\frac{3x^2}{x^3+y^2}=\frac{0-2y3x^2}{(x^2+y^3)^2}=\frac{6x^2y}{(x^2+y^3)^2}$$

The Correction

$$\frac{\partial}{\partial y}\frac{3x^2}{x^3+y^2}=\frac{0-2y3x^2}{(x^2+y^3)^2}=\frac{-6x^2y}{(x^2+y^3)^2}$$

An Explanation

Take care with negative signs, especially when using the quotient rule.