
Common Calculus Mistakes

Partial Derivative of Tangent

The Goal

Find

$$\frac{\partial}{\partial x} \tan(xy)$$

The Mistake

Find the mistake:

$$\frac{\partial}{\partial x} \tan(xy) = \sec^2(xy)$$

Need a hint? Look carefully at the red part:

$$\frac{\partial}{\partial x} \tan(xy) = \sec^2(xy)$$

The Correction

$$\frac{\partial}{\partial x} \tan(xy) = y \sec^2(xy)$$

An Explanation

This derivative requires the use of the *chain rule*. The derivative of $\tan(xy)$ with respect to x is $\sec^2(xy)$ times the partial derivative of xy with respect to x , which is y .