

Summary: Leibniz notation

Why Leibniz notation?

Why do we like to use Leibniz notation?

The biggest reason is that it reminds us what the input variable is. The derivative is measuring the instantaneous rate of change of the output variable of a function with respect to the input variable. Sometimes, if there are lots of quantities that have variables representing them, it's easy to lose track of what is what; Leibniz notation helps to remind us.

Properties of Leibniz notation

- **Units:** If P has units of pressure, and t has units of *time*, then $\frac{dP}{dt}$ has units of pressure per time.
- **Evaluating at points:** If we want to take the derivative at a particular point $x = 3$, then we use the notation $\left. \frac{df}{dx} \right|_{x=3}$. The bar is read as “evaluated at”.
- **Derivatives act on functions:**
 - We can write $\frac{d(x^2)}{dx}$ for the derivative of x^2 .
 - If a formula is long, we can write $\frac{d}{dy} (y^3 + 2y^2)$.