Parametric Equations and Calculus

If a smooth curve C is given by the equations $x = f(t)$ and $y = g(t)$, then

the slope of C at the point (x, y) is given by $\dfrac{dy}{dx} = \dfrac{\dfrac{dy}{dt}}{\dfrac{dx}{dt}}$ where $\dfrac{dx}{dt} \neq 0$, and

the second derivative is given by $\dfrac{d^2 y}{dx^2} = \dfrac{d}{dx}\left[\dfrac{dy}{dx}\right] = \dfrac{\dfrac{d}{dt}\left[\dfrac{dy}{dx}\right]}{\dfrac{dx}{dt}}$.