1 3.8: Higher Derivatives

Second derivative: derivative of the first derivative

What the second derivative tells us:

Examples:

Label each of the graphs below as the original function, first derivative, or second derivative.
Given $f(x) = \frac{1}{1+x}$, find a formula for $f^{(n)}(0)$ (the $n$th derivative at $x = 0$)
Given \( x^3 + y^3 = 1 \), find \( \frac{dy}{dx} \) and \( \frac{d^2 y}{dx^2} \).

(On your own): Find and simplify the first and second derivatives of \( f(x) = \sqrt{x^2 + 1} \)

\[
f'(x) = \frac{x}{\sqrt{x^2 + 1}}, \quad f''(x) = \frac{1}{(x^2 + 1)^{3/2}}
\]