Problem Definition

Problem 11. Find the derivative of the function.

$$y = \frac{1}{2} ln^6(x) = \frac{1}{2}(ln(x))^6$$

Solution Step 1:

To compute the derivative rule, we need to use the generalized power rule and the derivative of the natural logarithm as follows.

$$\begin{aligned}
\frac{dy}{dx} &= \frac{d}{dx}\left(\frac{1}{2}(ln(x))^6\right) \\
&= \frac{1}{2}\frac{d}{dx}\left((ln(x))^6\right) \\
&= \frac{1}{2}(6)(ln(x))^5\frac{d}{dx}\left(ln(x)\right) \\
&= \frac{6}{2}(ln(x))^5\frac{1}{x} \\
&= \frac{3\ (ln(x))^5}{x} = \frac{3\ ln^5(x)}{x}
\end{aligned}$$