In this section, we will learn the derivative of $\ln x$ and how to apply it using the properties of logarithms.

$$\frac{d}{dx}[\ln(\text{argument})] = \frac{1}{\text{argument}} \cdot \frac{d(\text{argument})}{dx}$$

Using this fact, the chain rule and the properties of logs, differentiate the following equations.

1. $f(x) = \ln(2x)$
2. $f(x) = \ln(x^2 + 1)$
3. $f(x) = x\ln x$
4. $f(x) = (\ln x)^3$
5. $f(x) = \ln \sqrt{x + 1}$
6. $f(x) = \ln \frac{x(x^2 + 1)^2}{\sqrt{2x^3} - 1}$
7. \[ y = \frac{(x - 2)^2}{\sqrt{x^2 + 1}} \]