## Derivative of $\ln (\sec x)$

Now let's use the chain rule to take the derivative of $\ln (\sec x))$.

$$
\begin{aligned}
\frac{d}{d x}(\ln (\sec x)) & =\frac{(\sec x)^{\prime}}{\sec x} \\
& =\frac{\sec x \tan x}{\sec x} \\
& =\tan x
\end{aligned}
$$

Oddly enough, this strange looking function is not only interesting as a review of the chain rule. The natural $\log$ was invented before the exponential function by a man named Napier, exactly in order to evaluate functions like this.

People cared about these functions a lot because they were used in navigation. In order to quickly and accurately multiply sines and cosines together for navigation, Napier used a logarithm. Logarithms were invented long before people knew about exponents, and it was a surprise when it was discovered that they were connected to exponents. The natural log was invented before the log base ten and everything else, exactly for this kind of purpose.

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