Math 121 – Quiz 4 Solution

1. Find the exact value of each logarithm without using a calculator.
   (a) $\log_3 9$
   (b) $\log \sqrt{10}$
2. Find the **exact** solution(s) to the following equation:

$$\ln(x+1) - \ln x = 2$$

Solution:

1. (a) $\log_3 9 = \log_3 3^2 = 2\log_3 3 = 2$
   (b) $\log \sqrt{10} = \log 10^{1/2} = \frac{1}{2}\log 10 = \frac{1}{2}$
2.

$$\begin{aligned}
\ln(x+1) - \ln x &= 2 \\
\ln\left(\frac{x+1}{x}\right) &= 2 \\
\frac{x+1}{x} &= e^2 \\
x+1 &= e^2 x \\
e^2 x - x &= 1 \\
x(e^2-1) &= 1 \\
x &= \frac{1}{e^2-1}
\end{aligned}$$