1. Solve the exponential equation using the method of relating bases.

\[ \frac{1}{e^{x+1}} = \frac{\sqrt{e^x}}{e^3} \]

**Solution**

\[
\begin{align*}
\frac{1}{e^{x+1}} &= \frac{\sqrt{e^x}}{e^3} \\
\frac{1}{e^{x+1}} &= \frac{e^{x/2}}{e^3} \\
e^{-(x+1)} &= \frac{e^{x/2-3}}{x} \\
-x - 1 &= \frac{x}{2} - 3 \\
-x - \frac{x}{2} &= -2 \\
-\frac{3x}{2} &= -2 \\
x &= \frac{4}{3}
\end{align*}
\]
2. Use the properties of logarithms and the logarithm property of equality to solve the logarithmic equation.

\[ 2 \log(x + 5) = \log 32 + \log 2 \]

\[
\begin{align*}
2 \log(x + 5) &= \log 32 + \log 2 \\
\log((x + 5)^2) &= \log 64 \\
(x + 5)^2 &= 64 \\
x + 5 &= \pm 8 \\
x &= 3, \quad x = -13
\end{align*}
\]

Plugging those numbers back in the original equation however, we see that only \( x = 3 \) is a solution, since we can only use strictly positive numbers inside a logarithm.