Problem 2. (4 points) Give a careful (ε - δ) proof of the following limit statement:

\[ \lim_{{x \to 3}} (x + 2) = 5 \]

**Scratch work:**

\[
\begin{align*}
\text{Want} & \quad |(x + 2) - 5| < \varepsilon \\
\text{when} & \quad |x - 3| < \delta. \\
\text{But} & \quad |(x + 2) - 5| = |x - 3| < \delta \\
\text{So let} & \quad \delta = \varepsilon
\end{align*}
\]

(1) Let \( \varepsilon > 0 \) be arbitrary. Then set \( \delta = \varepsilon \); we have \( 0 < |x - 3| < \delta \)

\[
\Rightarrow \quad |(x + 2) - 5| = |x - 3| < \delta = \varepsilon
\]

\( \varepsilon \) as desired.