1.) Use $\varepsilon - \delta$ definition of limits to verify that $\lim\limits_{x \to 0} (x+1) \neq 2$

* $|x| < \delta = 0 < |x-0| < \delta$

$|x+1-2| < \varepsilon = |x-1| < \varepsilon$

$1-\varepsilon < x < 1+\varepsilon$ $\quad <=> \quad -\varepsilon < x-1 < \varepsilon$

* let $\varepsilon = \dfrac{1}{2} = 1 - \dfrac{1}{2} < x < 1 + \dfrac{1}{2}$

$\varepsilon = 0.5 \quad *$must be within $= \left(\dfrac{1}{2} < x < \dfrac{3}{2} \right)$

$\quad *$ $x+1$ never gets close enough to 2 when x near 0.

$\quad *\ \lim\limits_{x \to 0} (x+1) \neq 2$