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1. Use the formal definition of limit of a sequence to prove the following.

   (a) $\lim_{n\to\infty} \frac{2n+1}{n+1} = 2$

   (b) $\lim_{n\to\infty} \frac{1}{3n-1} = 0$

2. Prove the following proposition.

Let $x, y \in \mathbb{R}$. Then $x = y$ if and only if $\forall \varepsilon > 0$, $|x - y| < \varepsilon$.

   Hint: For the direction " If $\forall \varepsilon > 0$, $|x-y| < \varepsilon$, then $x = y$," prove the contrapositive statement. Take $\varepsilon = \frac{x-y}{2}$, assuming, without loss of generality, that $x > y$.