2.1 Rigorous Study of Limits

Definition

To say that \( \lim_{x \to c} f(x) = L \) means that for every \( \varepsilon > 0 \) (no matter how small), there exists a corresponding \( \delta > 0 \) such that \( |f(x) - L| < \varepsilon \) provided that \( 0 < |x - c| < \delta \); that is, \( 0 < |x - c| < \delta \Rightarrow |f(x) - L| < \varepsilon \)
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EX 1 Prove that $\lim_{x \to 3} (2x-5) = 1$.

EX 2 Prove that $\lim_{x \to 0} \frac{\sin x}{x} = 1$. 
EX 3  Prove that \( \lim_{x \to c} \frac{1}{x-5} = \frac{1}{c-5} \) for all \( c \neq 5 \)