MATH 310.1002: Quiz 1
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1. Prove using the definition that $\lim \frac{n-3}{5n-1} = \frac{1}{5}$. Write your work clearly, scan it in ONE pdf file and submit it here.

   Proof. Let $\epsilon > 0$. Then we must show that there exists a δ such that $0 < \delta < n$ implies $\left|\frac{n-3}{5n-1} - \frac{1}{5}\right| < \epsilon$. Rewriting the expression in absolute values gives us the following:

   $$\left|\frac{n-3}{5n-1} - \frac{1}{5}\right| = \left|\frac{5n-15-5n+1}{25n-5}\right| = \left|\frac{-14}{5(5n-1)}\right| = \frac{14}{5|5n-1|} < \frac{14}{5n-1} < \epsilon.$$

   If this is the case, then $\left|\frac{n-3}{5n-1} - \frac{1}{5}\right| < \epsilon$ when $\frac{14}{5n-1} < \epsilon$, or whenever $n > \frac{14}{5\epsilon} + 1$. Thus, we may choose $\delta = \frac{14}{5\epsilon} + 1$. □