SAMPLE SOLUTION OF
QUIZ 4

Question: Evaluate

\[ \lim_{x \to 0} \frac{x^5 + \ln(x+1)}{e^{3x} - 5^x}. \]

Solution:

\[
\lim_{x \to 0} \frac{x^5 + \ln(x+1)}{e^{3x} - 5^x} = \lim_{x \to 0} \frac{25x^4 + \frac{1}{x+1}}{3e^{3x} - 5^x \ln 5}
\]

use 1st Hospital's rule

\[
= \frac{0+1}{3-\ln 5}
\]

since each limit exists

\[= \frac{1}{3-\ln 5}. \]