1. (5 points) Evaluate the following limit:

\[
\lim_{x \to 0} \frac{e^{2x} - 1}{\sin(4x)}
\]

\[
\lim_{x \to 0} \frac{e^{2x} - 1}{\sin(4x)} = \frac{e^0 - 1}{\sin(0)} = \frac{0}{0} \quad \text{indeterminate}
\]

\[
L'Hopital's \quad \lim_{x \to 0} \frac{2e^{2x}}{4\cos(4x)} = \frac{2}{4} = \frac{1}{2}
\]

Please show all work.
2. (5 points) Evaluate the following limit:

\[ \lim_{x \to \infty} \frac{\ln(4x + 1)}{3x + 1} \]

\[ = \frac{\ln(\infty)}{\infty} = \frac{\infty}{\infty} \quad \text{indeterminate} \]

\[ = \frac{1}{y} \cdot \frac{1}{4x + 1} = \frac{1}{3} \cdot \frac{4}{3} = 0 \]