(a) Find the limit of the following sequence or explain why it does not exist.

\[ a_n = n \cos(1/n) - 1 \quad n = 1, 2, \ldots \]

As \( n \to \infty \), \( \cos(1/n) \to 1 \) so \( a_n \) approaches to an indeterminate form \( \infty \cdot 0 \). In order to deal with such a case, we rewrite \( a_n \) as

\[ a_n = \frac{\cos(1/n) - 1}{1/n}. \]

Thus, using L'Hôpital's rule, we get

\[ \lim_{n \to \infty} a_n = \lim_{n \to \infty} -\frac{\sin(1/n) \cdot (-1/n^2)}{(-1/n^2)} = 0. \]

Hence, the sequence \( \{a_n\} \) converges to 0.

(b) Determine whether the following infinite series converges or diverges. If it converges, evaluate the infinite series.

\[ \sum_{n=3}^{\infty} 2 \left( \frac{e}{\pi} \right)^n \]

This is a geometric series with first term \( a = 2 \left( \frac{e}{\pi} \right)^3 \) and common ratio \( r = \frac{e}{\pi} < 1 \). Thus, the infinite series converges and is given by

\[ \sum_{n=3}^{\infty} 2 \left( \frac{e}{\pi} \right)^n = \frac{a}{1 - r} = \frac{2e^3}{\pi^2(\pi - e)}. \]