(a) Determine whether the following infinite sequence \( \{a_n\} \) converges or diverges. If it converges, find its limit.

\[
a_n = \frac{n \ln n}{(n + 1)^2}
\]

As \( n \to \infty \), \( n \ln n \to \infty \) and \( (n + 1)^2 \to \infty \). It follows from L'Hôpital’s Rule that

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

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

(b) Evaluate the following infinite series if it converges.

\[
\sum_{j=1}^{\infty} 2 \left( \frac{3}{\pi} \right)^j
\]

This is a geometric series where the first term is \( a = 2 \left( \frac{3}{\pi} \right) \) and the common ratio is \( r = \left( \frac{3}{\pi} \right) \). Since \( 3 < \pi \), \( r < 1 \). Thus the geometric series converges to \( \frac{a}{1-r} \) or

\[
\sum_{j=1}^{\infty} 2 \left( \frac{3}{\pi} \right)^j = \frac{2 \left( \frac{3}{\pi} \right)}{1 - \frac{3}{\pi}} = \frac{6}{\pi - 3}.
\]