Using L'Hôpital's rule

Remember $f(n) = n, g(n) = e^n$.
Note:

- $\lim_{n\to\infty} f(n) = \lim_{n\to\infty} g(n) = \infty$.
- $f'(n) = 1$ and $g'(n) = e^n$.
- $\lim_{n\to\infty} \frac{f'(n)}{g'(n)} = \lim_{n\to\infty} \frac{1}{e^n} = 0$

Hence, by L'Hôpital's Rule, $\lim_{n\to\infty} \frac{f(n)}{g(n)} = \lim_{n\to\infty} \frac{f'(n)}{g'(n)} = 0$

Therefore, $f(n) \leq g(n)$ for all "large enough n", and so f is $O(g)$.