

Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

Student's Name: _____

Instructor's name: _____

Do the following series converge or diverge?

1.

$$\sum_{n=3}^{\infty} \frac{e^{4n}}{(n-2)!}$$

$$\begin{aligned} L &= \lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = \lim_{n \rightarrow \infty} \left| a_{n+1} \frac{1}{a_n} \right| = \lim_{n \rightarrow \infty} \left| \frac{e^{4(n+1)}}{(n+1-2)!} \frac{(n-2)!}{e^{4n}} \right| \\ &= \lim_{n \rightarrow \infty} \left| \frac{e^{4n+4}}{(n-1)!} \frac{(n-2)!}{e^{4n}} \right| = \lim_{n \rightarrow \infty} \left| \frac{e^{4n+4}}{(n-1)(n-2)!} \frac{(n-2)!}{e^{4n}} \right| = \lim_{n \rightarrow \infty} \left| \frac{e^4}{n-1} \right| = 0 \end{aligned}$$

We can see that $L = 0 < 1$ thus by the Ratio Test the series converges.