1a. Determine whether the sequence $\left\{e^{1/n^2}\right\}_{n=1}^{\infty}$ converges or diverges.

$$\lim_{n\to\infty} e^{1/n^2} = e^{\lim_{n\to\infty}\frac{1}{n^2}} = e^0 = 1$$

$\left\{e^{1/n^2}\right\}_{n=1}^{\infty}$ converges.

1b. Determine whether the series $\sum_{n=1}^{\infty} e^{1/n^2}$ converges or diverges.

By Part a, $\lim_{n\to\infty} e^{1/n^2} = 1 \neq 0$.

Hence $\sum_{n=1}^{\infty} e^{1/n^2}$ diverges by n^{th} Term Test.

1c. Determine whether the series $\sum_{n=1}^{\infty}(e^{1/n^2} - 1)$ converges or diverges.

$$c = \lim_{n\to\infty} \frac{e^{1/n^2}-1}{\frac{1}{n^2}} = \lim_{x\to\infty} \frac{e^{1/x^2}-1}{\frac{1}{x^2}} \overset{\text{L'H}}{\downarrow}{=} \lim_{x\to\infty} \frac{e^{1/x^2}\cdot(-2/x^3)}{(-2/x^3)} = \lim_{x\to\infty} e^{1/x^2} = 1$$

Since $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges (p-series with $p=2>1$) and

$c = 1 < \infty$, $\sum_{n=1}^{\infty} (e^{1/n^2}-1)$ converges by Limit Comparison Test.