L’Hôpital’s Rule Problems

1. What is \( \lim_{x \to 0} \frac{e^x - \sin x - \cos x}{x^2} \)?

2. What is \( \lim_{x \to -\infty} \frac{10x^3}{e^x} \)?

3. What is \( \lim_{x \to 0} \frac{e^x - 1}{x \sin x} \)?

4. What is \( \lim_{x \to 2} \frac{x^4 - 5x^2 + x + 2}{x^3 - 8} \)?
Series Evaluation Problems

Evaluate the following series

1. What is \( \sum_{n=1}^{\infty} \frac{3^{n-1}}{7^{n-1}} \)?

2. What is \( \sum_{n=1}^{\infty} \frac{1}{4^n} \)?

3. What is \( \frac{5}{8} + \frac{3}{8} + \frac{9}{40} + \frac{27}{200} + \cdots \)?

4. What is \( \sum_{n=1}^{\infty} \frac{1}{n^2+5n+6} \)?

5. What is \( \sum_{n=1}^{\infty} \frac{1}{n^2+3n} \)?