1. Find the value of the convergent infinite series $\sum_{n=3}^{\infty} \frac{4}{n^2 + 6n + 8}$ by using partial fractions to rewrite it as a telescoping series.
2. Use the Integral Test to decide whether the infinite series

\[ \sum_{n=1}^{\infty} \frac{2n}{n^2 + 1} \, dx \]

converges or diverges. DO NOT attempt to find the exact value of the series!
3. Using either the Comparison Test or Limit Comparison Test, decide whether the infinite series
\[ \sum_{n=1}^{\infty} \frac{3^n - 2}{4^n + 5} \, dx \]
converges or diverges. DO NOT attempt to find the exact value of the series!
4. (a) Use the Alternating Series Test to decide whether the infinite series

\[ \sum_{n=1}^{\infty} (-1)^n \frac{1}{n!} \, dx \]

converges or diverges. DO NOT attempt to find the exact value of the series!

(b) Give a partial sum which approximates the infinite series from (a) to within \( \frac{1}{100} \). (A basic calculator may be useful for this!)