Section 9.3: Infinite Series

Warm-Up:

Problem 1 *Given a sequence $\{a_k\}_{k\geq 1}$, explain how the sequence $\{s_k\}_{k\geq 1}$ of partial sums can be used to determine if the series $\displaystyle\sum_{k=1}^{\infty} a_k$ converges or diverges.*

Hint: *Recall that by definition $s_n = \displaystyle\sum_{k=1}^{n} a_k$*

Group work:

Problem 2 *Determine if the following series converge or diverge. If they converge, find the sum.*

(a) $e + 1 + e^{-1} + e^{-2} + e^{-3} + \dots$

(b) $\displaystyle\sum_{k=0}^{99} 2^k + \sum_{k=100}^{\infty} \frac{1}{2^k}$

(c) $\displaystyle\sum_{k=0}^{\infty} (\cos(1))^k$

(d) $\displaystyle\sum_{k=4}^{\infty} \frac{5 \cdot 4^{k+3}}{7^{k-2}}$

(e) $\displaystyle\sum_{k=0}^{\infty} e^{5-2k}$

(f) $\displaystyle\sum_{i=1}^{\infty} \left(\frac{2}{i^2+2i}\right)$ *Hint:* $\dfrac{2}{i^2+2i} = \dfrac{1}{i} - \dfrac{1}{i+2}$ *by partial fractions*

Learning outcomes: