INDUCTION PROBLEMS:
1. Prove that 4 is a factor of \(7^n - 3^n\) for every positive number \(n\).
2. Prove that 64 is a factor of \(9^n - 8n - 1\) for \(n \geq 0\).
3. Let \(B\) be a set of \(n\) elements.
   (a) If \(n \geq 2\), prove that the number of two element subsets of \(B\) is \(n(n-1)/2\).
   (b) If \(n \geq 3\), prove that the number of three element subsets of \(B\) is \(n(n-1)(n-2)/3!\).
   (c) Make a conjecture about the number of \(k\) element subsets of \(B\) and prove your conjecture.

SERIES PROBLEMS:
1. Sum the following Geometric series:
   (a) \(\sum_{n=0}^{\infty} \frac{(-1)^n}{4^n}\)
   (b) \(\sum_{n=4}^{\infty} \frac{5}{4^n}\)
   (c) \(\sum_{n=0}^{\infty} \frac{5}{2^n}\)
   (d) \(\sum_{n=0}^{\infty} \frac{(2^{n+1})}{3^n}\)
   (e) \(\sum_{n=0}^{\infty} \left(\frac{1}{3^n} + \frac{(-1)^n}{5^n}\right)\)

2. Use geometric series to find the rational representation of 34.2123123123....

“Algebra is but written geometry
and geometry is but figured algebra.”

Sophie Germain

THE END