Self-Quiz on Section 8.2

1. Determine whether each of the following series converges or diverges. If it converges, find its sum.

(a) \( \sum_{n=0}^{\infty} 3 \left( -\frac{1}{5} \right)^n \)

(b) \( \sum_{n=0}^{\infty} \frac{1}{3} \left( \frac{3}{2} \right)^n \)

(c) \( \sum_{n=0}^{\infty} \frac{n + 3}{4n + 7} \)

(d) \( \sum_{n=0}^{\infty} \frac{4 + 2^n}{5^n} \)

(e) \( \sum_{n=0}^{\infty} \frac{n^2}{2n + 1} \)

(f) \( \sum_{n=1}^{\infty} \frac{5}{n} \)

2. Express \( 5.4123 \) as a ratio of two integers.

3. Let \( \sum_{n=1}^{\infty} a_n \) be an infinite series whose \( n \)th partial sum is \( s_n = 4 + \frac{1}{n^2} \).

(a) Find the value of \( \sum_{n=1}^{6} a_n \).

(b) Find the value of \( a_3 \).

(c) Find the value of the sum \( \sum_{n=1}^{\infty} a_n \).

4. Suppose that \$1000 is deposited every year into a savings account that earns 5% in interest per year, compounded annually\(^*\). Find a formula for the amount of money in savings account immediately after the \( n \)th deposit. Use this formula to find the amount in the savings account after the 10th deposit.

**Hint.** Remember (from the handout on geometric series) that the \( n \)th partial sum of a geometric series can be written as \( s_n = \frac{a(1 - r^n)}{1 - r} \).

\(^*\) If interest is compounded annually, then the interest is computed and added to the savings account \( once \) per year.