1. For each of the following series: first compute S_2 and S_5. Then decide whether the series converges or diverges. For those that converge, find the sum of the series. For those that diverge, explain how you know they diverge.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{3}{10^n}$

   (b) $\displaystyle\sum_{n=1}^{\infty} (-2)^n$

2. Determine whether the following series converge or diverge. For those that do converge, find the value of their sum. For those that do not, explain how you know they diverge.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{2^{n-1}}{3^n}$

   (c) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{\pi}{e}\right)^n$

   (b) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{e}{\pi}\right)^n$

   (d) $\displaystyle\sum_{n=1}^{\infty} 2^{\frac{1}{n}}$

(e) $\displaystyle\sum_{n=1}^{\infty} \sqrt{2}^{1-n}$

(g) $\displaystyle\sum_{n=1}^{\infty} \frac{1+2^n+3^n}{5^n}$

(f) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{10n+17}$

(h) $\displaystyle\sum_{n=1}^{\infty} \frac{1+2^n+5^n}{3^n}$

3. Find the rational number representing the given repeating decimal:

   (a) 0.474747...

   (b) 0.123123123...

4. Use the nth term test to determine whether the following series diverge or would require further investigation:

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{\ln(n+1)}{n}$

(b) $\displaystyle\sum_{n=1}^{\infty} n \sin\left(\frac{1}{n}\right)$

5. Use the method of Example 1 in section 11.2 of your text to compute the sum of the following series:

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{4n^2-1}$

(b) $\displaystyle\sum_{n=1}^{\infty} \ln\left(\frac{n+1}{n}\right)$

6. Suppose that the federal government has passed an economic stimulus package which will distribute \$145 billion in tax refunds. Further suppose that each recipient spends 90% of the dollars they they receive. In turn, the secondary recipients spend 90% of the dollars they receive, and so on. How much total spending will result from the original injection of \$145 billion into the economy?

7. Suppose two cyclists are 40 miles apart and riding toward each other and each one is cycling at exactly 20 mph. A fly starts at one cyclist and flies toward the other at 60 mph. When it reaches the second cyclist, it turns around and flies back to the first bike. The fly continues flying back and forth in this fashion until the cyclists meet.

   (a) Find the distance traveled by the fly on the nth leg of its journey.

   (b) Find the total distance flown by the fly by finding the sum of a geometric series.

   (c) Verify the sum you found in part (b) by finding the total distance traveled by the fly in a much easier way.