1. Assuming the pattern of the first few terms continues, find a formula for the n^{th} term of the sequence. Classify each as arithmetic, geometric, or neither.

   (a) $\{3, 8, 13, 18, \ldots\}$

   (b) $\left\{-\frac{1}{4}, \frac{2}{9}, -\frac{3}{16}, \frac{4}{25}, \ldots\right\}$

   (c) $\{-1, 1, -1, 1, \ldots\}$

   (d) $\left\{\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots\right\}$

2. For each of the sequences above, determine whether the sequence converges or diverges. Why? If the sequence converges, what does the sequence converge to?

3. For which values of r does the sequence $\{a_n\}$ converge where $a_n = cr^n$ for $c \neq 0$?

4. Write the first four terms of the following sequences.

   (a) $\{a_n\}$ where $a_n = n(n+1)$

   (b) $\{b_n\}$ where $b_n = b_{n-1} + b_{n-2}$, $b_0 = 1$, $b_1 = 1$

   (c) $\{c_n\}$ that is arithmetic with common difference 2 and initial term 13

5. Suppose that $\{a_n\}$ is an increasing sequence with all values lying between -2 and 1. Does the sequence converge or diverge? If it converges, can you make any claims about the limit of the sequence?

6. Suppose that $\{b_n\}$ is an decreasing sequence with all values lying above 4. Does the sequence converge or diverge? If it converges, can you make any claims about the limit of the sequence?

7. Suppose that $\{c_n\}$ is a monotonic sequence with all values lying between 0 and π. Does the sequence converge or diverge? If it converges, can you make any claims about the limit of the sequence?