MATH 230
11.1

Directions: Show all work on a separate sheet of paper for full credit.

1. List the first five terms of the sequence.
   a) $a_n = \dfrac{2^n}{2n+1}$
   b) $a_n = \cos(\dfrac{n\pi}{2})$
   c) $a_n = \dfrac{1}{(n+1)!}$
   d) $a_1 = 2$, $a_{n+1} = \dfrac{a_n}{1+a_n}$
   e) $a_n = \dfrac{(-1)^{n-1}}{5^n}$

2. Find a formula for the general term a_n of the sequence $\{\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, ...\}$, assuming that the pattern of the first few terms continues.

3. Find a formula for the general term a_n of the sequence $\{\frac{1}{2}, \frac{-4}{3}, \frac{9}{4}, \frac{-16}{5}, \frac{25}{6}, ...\}$, assuming that the pattern of the first few terms continues.

4. Find a formula for the general term a_n of the sequence $\{4, -1, \frac{1}{4}, -\frac{1}{16}, \frac{1}{64}, ...\}$, assuming that the pattern of the first few terms continues.

5. Find a formula for the general term a_n of the sequence $\{5, 8, 11, 14, 17, ...\}$, assuming that the pattern of the first few terms continues.

6. Determine whether the sequence converges or diverges. If it converges, find the limit.

   (a) $a_n = \dfrac{3+5n^2}{n+n^2}$
   (b) $a_n = 1 + \dfrac{10^n}{9^n}$
   (c) $a_n = 2 + (0.86)^n$
   (d) $a_n = \dfrac{\tan^{-1} n}{n}$
   (e) $a_n = 3^n 7^{-n}$
   (f) $a_n = \dfrac{3\sqrt{n}}{\sqrt{n}+2}$
   (g) $a_n = e^{-1/\sqrt{n}}$
   (h) $a_n = \dfrac{(2n-1)!}{(2n+1)!}$
   (i) $a_n = \arctan(\ln(n))$
   (j) $a_n = \dfrac{\cos^2 n}{2^n}$
   (k) $a_n = \left(1 + \dfrac{2}{n}\right)^n$
   (l) $a_n = \sqrt{\dfrac{1+4n^2}{1+n^2}}$