1. (a) What is a sequence?
(b) What does it mean to say that $\lim_{n\to\infty} a_n = 8$?
(c) What does it mean to say that $\lim_{n\to\infty} a_n = \infty$?

2. (a) What is a convergent sequence? Give two examples.
(b) What is a divergent sequence? Give two examples.

3–12 List the first five terms of the sequence.

3. $a_n = \dfrac{2n}{n^2+1}$

4. $a_n = \dfrac{3^n}{1+2^n}$

5. $a_n = \dfrac{(-1)^{n-1}}{5^n}$

6. $a_n = \cos\dfrac{n\pi}{2}$

1a. sequence - ordered list of numbers

b. As n becomes large, the terms a_n approach 8

c. As n becomes large, the terms a_n become large w/o bound

2a. convergent sequence .... $\lim_{n\to\infty} a_n$ exists
examples: $a_n = \frac{1}{n}$ and $a_n = \frac{1}{2^n}$

b. divergent sequence... $\lim_{n\to\infty} a_n = \infty$/DNE
examples: $a_n = n$ and $a_n = \sin(n)$

3. $\left\{1, \frac{4}{5}, \frac{3}{5}, \frac{8}{17}, \frac{5}{13} \ldots\right\}$

4. $\left\{1, \frac{9}{5}, 3, \frac{81}{17}, \frac{81}{11}, \ldots\right\}$

5. $= \left\{\frac{1}{5}, -\frac{1}{25}, \frac{1}{125}, -\frac{1}{625}, \frac{1}{3125}, \ldots\right\}$

6. $= \{0, -1, 0, 1, 0 \ldots\}$

13–18 Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues.

13. $\left\{1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}, \ldots\right\}$

14. $\left\{1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}, \ldots\right\}$

15. $\left\{-3, 2, -\frac{4}{3}, \frac{8}{9}, -\frac{16}{27}, \ldots\right\}$

13. $a_n = \dfrac{1}{2n-1}$

14. $a_n = \left(-\frac{1}{3}\right)^{n-1}$

15. $a_n = -3\left(-\frac{2}{3}\right)^{n-1}$