Homework Set 12

(sect 8.1: Sequences)

Find the next term in the sequence.

1. $\{0, 1, 2, 3, 4, \dots\}$ $a_6 =$

2. $\{6, -18, 54, -162, 486, \dots\}$ $a_6 =$

3. $\{1, 8, 27, 64, 125, \dots\}$ $a_6 =$

4. $\{2, 3, 5, 8, 12, \dots\}$ $a_6 =$

5. $\{1, 3, 7, 13, 21, \dots\}$ $a_6 =$

Find a closed formula for the general term a_n, assuming that the pattern of the first terms continues. Be sure you indicate whether you assume that the sequence starts at a_0 or a_1 or at some other index. (Note: a recursive formula for the general term a_n will only give you have credit.)

6. $\{7, 11, 15, 19, 23, \dots\}$ $a_n =$

7. $\left\{\frac{3}{4}, \frac{4}{9}, \frac{5}{16}, \frac{6}{25}, \dots\right\}$ $a_n =$

8. $\left\{1, -\frac{2}{7}, \frac{4}{49}, -\frac{8}{343}, \dots\right\}$ $a_n =$

List the first 4 terms of the given sequence. Assume that the first term is a_1.

9. $a_k = k + \frac{1}{k}$

10. $a_n = \frac{(-1)^n 2^n}{4-3n}$

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

11. $a_n = \frac{3n^2-1}{2n^3+1}$

12. $a_n = \frac{\sqrt{n}-1}{5\sqrt{n}}$

13. $a_k = 2^k 3^{-k}$

14. $a_k = \frac{(k+1)!}{7k!}$

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

16. Determine whether the sequence $a_n = \frac{2n^2}{n^2+1}$ is increasing, decreasing, or not monotonic. Is the sequence bounded?