

9.1 Sequences HomeworkProblems 1 – 6, find the first five terms and the 20th term of each explicitly-defined sequence.

1. $a_n = n^2 + 1$	2. $a_n = \frac{n}{n+2}$
3. $a_n = \frac{(-1)^n}{(n+1)(n+2)}$	4. $a_n = \frac{2^n}{n}$
5. $a_n = \frac{(-1)^{n+1}}{2^n - 1}$	6. $a_n = \left(\frac{1}{2}\right)^n$

Problems 7 – 12, find the n th term of each infinitely-defined sequence.

7. 1, 4, 7, 10, 13, ...	8. 0, 3, 8, 15, 24, ...
9. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \dots$	10. $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \dots$

11. $1, -1, 1, -1, 1, \dots$	12. $\frac{1}{2}, \frac{-1}{4}, \frac{1}{8}, \frac{-1}{16}, \dots$
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Problems 13 – 16, write the first five terms of the recursively defined sequence.

13. $a_1 = 3; a_n = 5 - a_{n-1}$	14. $a_1 = 5; a_n = 2a_{n-1}$
15. $a_1 = K; a_n = a_{n-1} + d$	16. $a_1 = 243; a_n = \frac{a_{n-1}}{3}$

Problems 17 – 22, determine whether the sequence converges or diverges. If it converges, give the limit.

17. $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \dots$	18. $1, 4, 9, 16, \dots$
19. $\left\{ \frac{2n-3}{n+1} \right\}$	20. $a_n = \left(\frac{3}{2} \right)^n$
21. $a_1 = 2; a_{n+1} = a_n + 3$ for $n \geq 1$	22. $\left\{ \frac{2n-3}{1-4n} \right\}$

Problems 23 – 26, the sequences are arithmetic. Find (A) the recursive rule for the n th term, and (B) an explicit rule for the n th term.

23. 2, 5, 8, 11, 14, ...	24. -13, -9, -5, -1, -3, ...
25. 25, 23, 21, 19, 17, ...	26. 3.5, 4, 4.5, 5, 5.5, ...

Problems 27 – 30, the sequences are geometric. Find (A) the recursive rule for the n th term, and (B) an explicit rule for the n th term.

27. 2, 6, 18, 54, 162, ...	28. 5, -5, 5, -5, 5, ...
29. -1, -2, -4, -8, -16, ...	30. $\frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \frac{32}{243}, \dots$

Problems 31 – 35, solve.

31. The fifth and ninth terms of an arithmetic sequence are -9 and -25 , respectively. Find the first term and a recursive rule for the n th term.

32. The second and eighth terms of a geometric sequence are 6 and 384 , respectively. Find the first term, common ratio, and an explicit rule for the n th term.

33. The first row of seats in Section G of a baseball stadium has 5 seats. There are a total of 20 rows of seats in the section. If each row contains two more seats than the row preceding it, how many total seats are in Section G?

34. Find x , so that x , $x + 2$, and $x + 3$ are consecutive terms of a geometric sequence.

35. A new piece of equipment costs $\$15,000$. Your accountant says the equipment can be depreciated each year by 8% for tax purposes. What value will the company show on the tax return after 5 years?