

Exercises

Step-by-Step Solutions begin on page R29.

Find the next four terms of each sequence. (Example 1)

1. 1, 8, 15, 22, ...
2. 3, -6, 12, -24, ...
3. 81, 27, 9, 3, ...
4. 1, 3, 7, 13, ...
5. -2, -15, -28, -41, ...
6. 1, 4, 10, 19, ...

Find the first four terms of each sequence. (Example 1)

7. $a_n = n^2 - 1$
8. $a_n = -2^n + 7$
9. $a_n = \frac{n+7}{9-n}$
10. $a_n = (-1)^{n+1} + n$

11. **AUTOMOBILE LEASES** Lease agreements often contain clauses that limit the number of miles driven per year by charging a per-mile fee over that limit. For the car shown below, the lease requires that the number of miles driven each year must be no more than 15,000. (Example 2)



- a. Write the sequence describing the maximum number of allowed miles on the car at the end of every 12 months of the lease if the car has 1350 miles at the beginning of the lease.
- b. Write the first 4 terms of the sequence that gives the cumulative cost of the lease for a given month.
- c. Write an explicit formula to represent the sequence in part b.
- d. Determine the total amount of money paid by the end of the lease.

Find the specified term of each sequence. (Example 2)

12. 4th term, $a_1 = 5, a_n = -3a_{n-1} + 10, n \geq 2$
13. 7th term, $a_1 = 14, a_n = 0.5a_{n-1} + 3, n \geq 2$
14. 4th term, $a_1 = 0, a_n = 3^{a_{n-1}}, n \geq 2$
15. 3rd term, $a_1 = 3, a_n = (a_{n-1})^2 - 5a_{n-1} + 4, n \geq 2$

16. **WEB SITE** Khari, the student from the beginning of the lesson, had great success expanding her Web site. Each student who received a referral developed a Web page and referred five more students to Khari's site. (Example 3)

- a. List the first five terms of a sequence modeling the number of new Web pages created through Khari's site.
- b. Suppose the school has 1576 students. After how many

17. **BEEs** Female honeybees come from fertilized eggs (male and female parent), while male honeybees come from unfertilized eggs (only one female parent). (Example 3)

- a. Draw a family tree showing the 3 previous generations of a male honeybee (parents only).
- b. Determine the number of parent bees in the 11th previous generation of a male honeybee.

Determine whether each sequence is *convergent* or *divergent*. (Example 4)

18. $a_1 = 4, 1.5a_{n-1}, n \geq 2$
19. $a_n = \frac{5}{10^n}$
20. $a_n = -n^2 - 8n + 106$
21. $a_1 = -64, \frac{3}{4}a_{n-1}, n \geq 2$
22. $a_1 = 1, a_n = 4 - a_{n-1}, n \geq 2$
23. $a_n = n^2 - 3n + 1$
24. $a_n = \frac{n^2 + 4}{3 + n}$
25. $a_1 = 9, a_n = \frac{a_{n-1} + 3}{2}, n \geq 2$
26. $a_n = \frac{5n + 6}{n}$
27. $a_n = \frac{5n}{5^n} + 1$

Find the indicated sum for each sequence. (Example 5)

28. 5th partial sum of $a_n = n(n-4)(n-3)$
29. 6th partial sum of $a_n = \frac{-5n+3}{n}$
30. S_8 of $a_1 = 1, a_n = a_{n-1} + (18-n), n \geq 2$
31. S_4 of $a_1 = 64, a_n = -\frac{3}{4}a_{n-1}, n \geq 2$
32. 11th partial sum of $a_1 = 4, a_n = (-1)^{n-1}(|a_{n-1}| + 3), n \geq 2$
33. S_9 of $a_1 = -35, a_n = a_{n-1} + 8, n \geq 2$
34. 4th partial sum of $a_1 = 3, a_n = (a_{n-1} - 2)^3, n \geq 2$
35. S_4 of $a_n = \frac{(-3)^n}{10}$

Find each sum. (Example 6)

36. $\sum_{n=1}^8 (6n - 11)$
37. $\sum_{n=4}^{11} (30 - 4n)$
38. $\sum_{n=1}^7 [n^2(n-5)]$
39. $\sum_{n=2}^7 (n^2 - 6n + 1)$
40. $\sum_{n=8}^{15} \left(\frac{n}{4} - 7\right)$
41. $\sum_{n=1}^{10} [(n-4)^2(n-5)]$
42. $\sum_{n=0}^6 [(-2)^n - 9]$
43. $\sum_{n=1}^3 7\left(\frac{1}{10}\right)^{2n}$
44. $\sum_{n=1}^{\infty} 5\left(\frac{1}{10^n}\right)$
45. $\sum_{n=1}^{\infty} \frac{8}{10^n}$

46. **FINANCIAL LITERACY** Jim's bank account had an initial deposit of \$380, earning 3.5% interest per year compounded annually.

- a. Find the balance each year for the first five years.
- b. Write a recursive and an explicit formula defining his account balance.
- c. For very large values of n , which formula gives a more accurate balance? Explain.