In Exercises 11–20, determine whether the sequence converges or diverges. If it converges, give the limit.

11. $1, 4, 9, 16, \ldots, n^2, \ldots$

12. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots, \frac{1}{2^n}, \ldots$

13. $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \ldots$

14. $\{3n - 1\}$

15. $\left\{\frac{3n - 1}{2 - 3n}\right\}$

16. $\left\{\frac{2n - 1}{n + 1}\right\}$

In Exercises 21–24, the sequences are arithmetic. Find

(a) the common difference,

(b) the tenth term,

(c) a recursive rule for the nth term, and

(d) an explicit rule for the nth term.

21. 6, 10, 14, 18, . . .

22. $-4, 1, 6, 11, \ldots$

In Exercises 25–28, the sequences are geometric. Find

(a) the common ratio,

(b) the eighth term,

(c) a recursive rule for the nth term, and

(d) an explicit rule for the nth term.

25. 2, 6, 18, 54, . . .

27. 1, −2, 4, −8, 16, . . .

39. Arena Seating The first row of seating in section J of the Athena Arena has 7 seats. In all, there are 25 rows of seats in section J, each row containing two more seats than the row preceding it. How many seats are in section J?

40. Patio Construction Pat designs a patio with a trapezoid-shaped deck consisting of 16 rows of congruent slate tiles. The numbers of tiles in the rows form an arithmetic sequence. The first row contains 15 tiles and the last row contains 30 tiles. How many tiles are used in the deck?

45. Multiple Choice The first two terms of an arithmetic sequence are 2 and 8. The fourth term is

(A) 20. **(B)** 26. **(C)** 64. **(D)** 128. **(E)** 256.

46. Multiple Choice Which of the following sequences is divergent?

(A) $\left\{\frac{n + 100}{n}\right\}$ **(B)** $\{\sqrt{n}\}$ **(C)** $\{\pi^{-n}\}$ **(D)** $\left\{\frac{2n + 2}{n + 1}\right\}$ **(E)** $\{n^{-2}\}$

47. Multiple Choice A geometric sequence $\{a_n\}$ begins 2, 6, ... What is $\frac{a_6}{a_2}$?

(A) 3 **(B)** 4 **(C)** 9 **(D)** 12 **(E)** 81