12 CHAPTER TEST

Tell whether the sequence is *arithmetic, geometric,* or *neither. Explain.*

1. 5, 9, 13, 17, . . . **2.** 3, 6, 12, 24, . . . **3.** 40, 10, $\frac{5}{2}$, $\frac{5}{8}$, . . . **4.** 4, 7, 12, 19, . . .

Write the first six terms of the sequence.

5. $a_n = 6 - n^2$ **6.** $a_n = 7n^3$ **7.** $a_1 = 4$, $a_n = 5a_{n-1}$ **8.** $a_1 = -1$, $a_n = a_{n-1} + 6$

Write the next term of the sequence, and then write a rule for the *n*th term.

9. 5, 11, 17, 23, . . . **10.** 3, 15, 75, 375, . . . **11.** $\frac{6}{5}$, $\frac{7}{10}$, $\frac{8}{15}$, $\frac{9}{20}$, . . . **12.** 1.6, 3.2, 4.8, 6.4, . . .

Find the sum of the series.

13. $\sum_{i=1}^{48} i$ **14.** $\sum_{n=1}^{28} n^2$ **15.** $\sum_{i=1}^{10} (4i - 9)$ **16.** $\sum_{i=1}^{19} (2i + 5)$

17. $\sum_{i=1}^{5} 9(2)^{i-1}$ **18.** $\sum_{i=1}^{6} 12\left(\frac{1}{3}\right)^{i-1}$ **19.** $\sum_{i=1}^{\infty} 8\left(\frac{3}{4}\right)^{i-1}$ **20.** $\sum_{i=1}^{\infty} 20\left(\frac{3}{10}\right)^{i-1}$

Write the repeating decimal as a fraction in lowest terms.

21. 0.111. . . **22.** 0.464646. . . **23.** 0.187187187. . . **24.** 0.3252525. . .

Write a recursive rule for the sequence.

25. 2, 12, 72, 432, . . . **26.** 3, 10, 17, 24, . . . **27.** 135, 45, 15, 5, . . . **28.** 1, −3, 9, −27, . . .

Find the first three iterates of the function for the given initial value.

29. $f(x) = 3x - 7$, $x_0 = 4$ **30.** $f(x) = 8 - 5x$, $x_0 = 1$ **31.** $f(x) = x^2 + 2$, $x_0 = -1$

32. QUILTS Use the pattern of checkerboard quilts shown.

$n = 1, a_n = 1$ $n = 2, a_n = 2$ $n = 3, a_n = 5$ $n = 4, a_n = 8$

a. What does n represent for each quilt? What does a_n represent?

b. Make a table that shows n and a_n for $n = 1, 2, 3, 4, 5, 6, 7,$ and 8.

c. Use the rule $a_n = \frac{n^2}{2} + \frac{1}{4}[1 - (-1)^n]$ to find a_n for $n = 1, 2, 3, 4, 5, 6, 7,$ and 8. *Compare* these values with the results in your table. What can you conclude about the sequence defined by this rule?

33. AUDITIONS Several rounds of auditions are being held to cast the three main parts in a play. There are 3072 actors at the first round of auditions. In each successive round of auditions, one fourth of the actors from the previous round remain. Find a rule for the number a_n of actors in the nth round of auditions. For what values of n does your rule make sense?