12 CHAPTER TEST

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

1. 5, 9, 13, 17, . . .
2. 3, 6, 12, 24, . . .
3. $40, 10, \frac{5}{2}, \frac{5}{8}, \ldots$
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. $\frac{6}{5}, \frac{7}{10}, \frac{8}{15}, \frac{9}{20}, \ldots$
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. . .

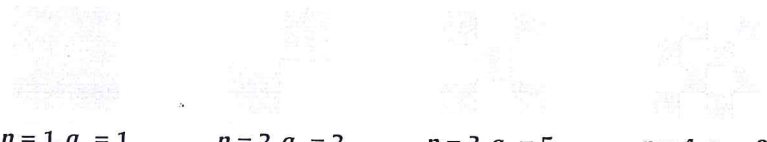
Write a recursive rule for the sequence.

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?