

# Practice 11-1

## Mathematical Patterns

Write a recursive formula for each sequence. Then find the next term.

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|--------------------------------|--|---|
| 1. $-14, -8, -2, 4, 10, \dots$ | 2. $6, 5.7, 5.4, 5.1, 4.8, \dots$                                  | 3. $1, -2, 4, -8, 16, \dots$                              |
| 4. $1, 3, 9, 27, \dots$        | 5. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots$ | 6. $\frac{2}{3}, 1, 1\frac{1}{3}, 1\frac{2}{3}, 2, \dots$ |
| 7. $36, 39, 42, 45, 48, \dots$ | 8. $36, 30, 24, 18, 12, \dots$                                     | 9. $9.6, 4.8, 2.4, 1.2, 0.6, \dots$                       |

Write an explicit formula for each sequence. Then find  $a_{20}$ .

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|--|---|--|
| 10. $7, 14, 21, 28, 35, \dots$                                     | 11. $2, 8, 14, 20, 26, \dots$   | 12. $5, 6, 7, 8, 9, \dots$   |
| 13. $-1, 0, 1, 2, 3, \dots$  | 14. $3, 5, 7, 9, 11, \dots$   | 15. $0.8, 1.6, 2.4, 3.2, 4, \dots$   |
| 16. $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}, \dots$ | 17. $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \dots$ | 18. $\frac{2}{3}, 1\frac{2}{3}, 2\frac{2}{3}, 3\frac{2}{3}, 4\frac{2}{3}, \dots$ |

Describe each pattern formed. Find the next three terms.

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|--------------------------------|--|--------------------------------------|
| 19. $1, 2, 4, 8, 16, \dots$    | 20. $44, 39, 34, 29, 24, \dots$                    | 21. $0.7, 0.8, 0.9, 1.0, 1.1, \dots$ |
| 22. $4, 11, 18, 25, 32, \dots$ | 23. $1\frac{1}{4}, 2\frac{1}{2}, 5, 10, 20, \dots$ | 24. $-6, -9, -12, -15, -18, \dots$   |

Decide whether each formula is *explicit* or *recursive*. Then find the first five terms of each sequence.

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|--------------------------------|----------------------------------|-----------------------------------|
| 25. $a_n = \frac{1}{3}n$       | 26. $a_n = n^2 - 6$              | 27. $a_1 = 5, a_n = 3a_{n-1} - 7$ |
| 28. $a_n = \frac{1}{2}(n - 1)$ | 29. $a_1 = 5, a_n = 3 - a_{n-1}$ | 30. $a_1 = -4, a_n = 2a_{n-1}$    |

31. The first figure of a fractal contains one segment. For each successive figure, six segments replace each segment.

- How many segments are in each of the first four figures of the sequence?
- Write a recursive formula for the sequence.

32. The sum of the measures of the exterior angles of any polygon is 360. All the angles have the same measure in a regular polygon.

- Find the measure of one exterior angle in a regular hexagon (six angles).
- Write an explicit formula for the measure of one exterior angle in a regular polygon with  $n$  angles.
- Why would this formula not be meaningful for  $n = 1$  or  $n = 2$ ?