8-1 Lesson Master

**Questions on SPUR Objectives**

**SKILLS** Objectives A and B

In 1–6, a sequence is described. a. Identify the formula as recursive or explicit. b. Find the first four terms. c. Find the nth term.

1. \( r_n = \frac{1}{2}(r_{n-1}) \), for all integers \( n \geq 1 \)
   - recursive: 1, 2, 4, 8
   - explicit: \( a_n = 2^{n-1} \)

2. \( s_n = 2s_{n-1} \), for all integers \( n \geq 1 \)
   - recursive: 2, 4, 8, 16
   - explicit: \( a_n = 2^n \)

3. \( t_n = 3t_{n-1} - 5t_{n-2} \), for all integers \( n \geq 2 \)
   - recursive: 2, 4, 9, 23
   - explicit: \( a_n = 2^n - 5^n \)

4. \( x_n = 12 - 3x_{n-1} \), for all integers \( n \geq 1 \)
   - recursive: 9, 3, -6, -24
   - explicit: \( a_n = -3^n + 12 \)

5. \( y_{n+1} = \frac{1}{2}y_n - 3 \), for all integers \( n \geq 0 \)
   - recursive: 18, 9, 3, -3
   - explicit: \( a_n = 3 - 3 \times \left(\frac{1}{2}\right)^n \)

6. \( z_n = 3 - 4z_{n-1} \), for all integers \( n \geq 1 \)
   - recursive: 1, 5, 19, 79
   - explicit: \( a_n = 3 - 4^n \)

7. Write an explicit formula for the sequence defined in Question 2. \( c_n = n - 5 \)
8. Write a recursive formula for the sequence defined in Question 6. \( j_n = j_{n-1} + 5 \), for all integers \( n \geq 2 \)
9. Write explicit and recursive formulas for the arithmetic sequence whose first eight terms are 21, 25, 29, 33, 37, 41, 45, 49.
   - explicit: \( a_n = 27 - 4n \)
   - recursive: \( a_n = a_{n-1} - 4 \), for all integers \( n \geq 2 \)

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8-2 Lesson Master

**Questions on SPUR Objectives**

**SKILLS** Objectives A and B

In 1–6, a sequence is described. a. Find the first four terms. b. Find the 10th term. c. Write a recursive formula for the sequence. d. Write an explicit formula for the sequence.

1. \( f_{n+1} = f_n + 1 \), for all integers \( n \geq 0 \)
   - recursive: 1, 2, 3, 4
   - explicit: \( a_n = n \)

2. \( g_n = 3 + 4g_{n-1} \), for all integers \( n \geq 1 \)
   - recursive: 7, 17, 45, 113
   - explicit: \( a_n = 4^n + 3 \)

3. \( h_n = 2h_{n-1} - 1 \), for all integers \( n \geq 1 \)
   - recursive: 1, 3, 7, 15
   - explicit: \( a_n = 2^n - 1 \)

4. \( i_n = n^2 \), for all integers \( n \geq 1 \)
   - recursive: 1, 4, 9, 16
   - explicit: \( a_n = n^2 \)

5. \( j_n = 2j_{n-1} + 3j_{n-2} \), for all integers \( n \geq 2 \)
   - recursive: 2, 9, 43, 202
   - explicit: \( a_n = \frac{1}{3}(-1)^n + \frac{2}{3} \times 2^n \)

6. \( k_n = 2k_{n-1} - 3k_{n-2} \), for all integers \( n \geq 2 \)
   - recursive: 2, 7, 22, 77
   - explicit: \( a_n = 2^n - 3 \times (-1)^n \)

7. Write an explicit formula for the sequence defined in Question 1. \( f_n = 1 \)
8. Write a recursive formula for the sequence defined in Question 6. \( j_n = j_{n-1} + 5 \), for all integers \( n \geq 2 \)
9. Write explicit and recursive formulas for the geometric sequence whose first five terms are 10, 20, 40, 80, 160.
   - explicit: \( a_n = 10 \times 2^{n-1} \)
   - recursive: \( a_n = 2a_{n-1} \), for all integers \( n \geq 2 \)

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