1. **MULTIPLE CHOICE** What is the next term in the sequence 1, 4, 9, 16, 25, . . .?
   - A 34
   - B 35
   - C 36
   - D 38
   - E 39

2. **MULTIPLE CHOICE** Which series is represented by \( \sum_{i=1}^{4} (4i - 2) \)?
   - A 2 + 6 + 10 + 14
   - B -2 + 2 + 6 + 10
   - C 4 + 8 + 12 + 16
   - D 6 + 10 + 14 + 18
   - E 2 + 6 + 10 + 14 + \ldots

3. **MULTIPLE CHOICE** What type of series is 32 + 16 + 8 + 4 + 2 + 1?
   - A Finite arithmetic series
   - B Finite geometric series
   - C Infinite arithmetic series
   - D Infinite geometric series
   - E None of these

4. **MULTIPLE CHOICE** What is the sum of the series \( \sum_{n=0}^{5} (n^3 + 3) \)?
   - A 128
   - B 131
   - C 240
   - D 242
   - E 243

5. **MULTIPLE CHOICE** What is a rule for the nth term of the arithmetic sequence with \( a_4 = 9 \) and common difference \( d = 2 \)?
   - A \( a_n = 2n + 7 \)
   - B \( a_n = 2n + 11 \)
   - C \( a_n = 2n - 9 \)
   - D \( a_n = 2n - 15 \)
   - E \( a_n = 2n - 19 \)

6. **MULTIPLE CHOICE** What is the sum of the first 50 terms of the series 2 + 17 + 32 + 47 + \ldots?
   - A 1600
   - B 18,235
   - C 18,475
   - D 18,800
   - E 19,125

7. **MULTIPLE CHOICE** What is a rule for the nth term of the geometric sequence with \( a_3 = -12 \) and common ratio \( r = 3 \)?
   - A \( a_n = -\frac{4}{3}(3)^n - 1 \)
   - B \( a_n = -4(3)^n - 1 \)
   - C \( a_n = -\frac{3}{4}(3)^n - 1 \)
   - D \( a_n = -\frac{1}{3}(3)^n - 1 \)
   - E \( a_n = 4(3)^n - 1 \)

8. **MULTIPLE CHOICE** What is the sum of the series \( \sum_{i=0}^{9} 20 \left(\frac{1}{2}\right)^i \)?
   - A \( \approx 11.74 \)
   - B \( \approx 13.30 \)
   - C \( \approx 13.32 \)
   - D \( \approx 39.96 \)
   - E \( \approx 29.97 \)

9. **MULTIPLE CHOICE** What is the sum of the series \( \sum_{i=1}^{\infty} 5(1.2)^{i-1} \)?
   - A -30
   - B -25
   - C 25
   - D 30
   - E The series has no sum.

10. **MULTIPLE CHOICE** Which fraction is equivalent to the repeating decimal 0.3838 . . .?
    - A \( \frac{3}{10} \)
    - B \( \frac{3}{8} \)
    - C \( \frac{38}{100} \)
    - D \( \frac{383}{1000} \)
    - E \( \frac{38}{99} \)

11. **MULTIPLE CHOICE** What is a recursive rule for the sequence 2, 6, 18, 54, . . .?
    - A \( a_n = 2(3)^n - 1 \)
    - B \( a_n = 3(2)^n - 1 \)
    - C \( a_1 = 2, a_n = a_{n-1} + 4 \)
    - D \( a_1 = 2, a_n = 3a_{n-1} \)
    - E \( a_1 = 3, a_n = 2a_{n-1} \)

12. **MULTIPLE CHOICE** What is the fourth term of the sequence defined by the recursive rule \( a_1 = 3, a_n = n + a_{n-1} - 7 \)?
    - A -1
    - B -6
    - C -9
    - D -10
    - E -11
**Quantitative Comparison** In Exercises 13 and 14, choose the statement that is true about the given quantities.

- **A** The quantity in column A is greater.
- **B** The quantity in column B is greater.
- **C** The two quantities are equal.
- **D** The relationship cannot be determined from the given information.

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>The tenth term of the sequence defined by ( a_n = 7 - 2n )</td>
</tr>
<tr>
<td>14.</td>
<td>( n! ) when ( n ) is an integer greater than 1</td>
</tr>
</tbody>
</table>

**15. Multi-Step Problem** Use the pattern of checkerboard quilts at the right.

- **a.** What does \( n \) represent in each quilt?
- **b.** What does \( a_n \) represent in each quilt?
- **c.** Draw the next four quilts in the pattern.
- **d.** Complete a table that gives \( n \) and \( a_n \) for \( n = 1, 2, 3, 4, 5, 6, 7, 8 \).
- **e.** Use the rule \( a_n = \frac{n^2}{2} + \frac{1}{4}[1 - (-1)^n] \) to find \( a_n \) for \( n = 1, 2, 3, 4, 5, 6, 7, 8 \).

**16. Multi-Step Problem** Use the series \( 4 + 7 + 10 + 13 + 16 + 19 + 22 + 25 \).

- **a.** Use a formula to find the sum of the series. Show your work.
- **b.** Find the sum of the series without using a formula. Explain your method.
- **c.** Write the series with summation notation. Use 1 as the lower limit of summation.
- **d.** Write the series with summation notation. Use 0 as the lower limit of summation.
- **e.** Write the series with summation notation. Use 4 as the lower limit of summation.
- **f.** Compare your answers to parts (c), (d), and (e). Describe any similarities and differences. Which of these ways do you prefer to write the series? Explain your answer.

**17. Multi-Step Problem** Use the sequence 100, 50, 25, 12.5, . . .

- **a.** Is this sequence arithmetic, geometric, or neither? Is it finite or infinite?
- **b.** Write the next three terms of the sequence.
- **c.** Graph the sequence. Describe the curve on which the points lie.
- **d.** Write an explicit rule for the \( n \)th term of the sequence.
- **e.** Write a recursive rule for the sequence.
- **f.** Find the twelfth term of the sequence. Which rule from parts (d) and (e) did you use? Explain your choice.