

Chapter Standardized Test

TEST-TAKING STRATEGY If the answers to a question are formulas, substitute the given numbers into the formulas to test the possible answers.

- 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
- 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) $2 + 6 + 10 + 14 + \dots$
- 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
- 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
- MULTIPLE CHOICE** What is a rule for the n th term of the arithmetic sequence with $a_{14} = 9$ 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) $a_n = 2n - 19$
- MULTIPLE CHOICE** What is the sum of the first 50 terms of the series $2 + 17 + 32 + 47 + \dots$?

(A) 1600 (B) 18,235 (C) 18,475
(D) 18,800 (E) 19,125
- MULTIPLE CHOICE** What is a rule for the n th 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) $a_n = 4(3)^{n-1}$
- MULTIPLE CHOICE** What is the sum of the series $\sum_{i=0}^9 20\left(\frac{1}{2}\right)^i$?

(A) ≈ 11.74 (B) ≈ 13.30 (C) ≈ 13.32
(D) ≈ 39.96 (E) ≈ 29.97
- 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.
- MULTIPLE CHOICE** Which fraction is equivalent to the repeating decimal $0.3838\dots$?

(A) $\frac{3}{10}$ (B) $\frac{3}{8}$ (C) $\frac{38}{100}$
(D) $\frac{383}{1000}$ (E) $\frac{38}{99}$
- 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) $a_1 = 3, a_n = 2a_{n-1}$
- 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

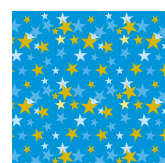
QUANTITATIVE COMPARISON In Exercises 13 and 14, choose the statement that is true about the given quantities.

- (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.

	Column A	Column B
13.	The tenth term of the sequence defined by $a_n = 7 - 2n$	$\sum_{n=1}^{10} (7 - 2n)$
14.	$n!$ when n is an integer greater than 1	n^n when n is an integer greater than 1

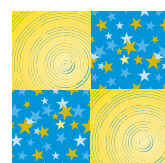
15. **MULTI-STEP PROBLEM** Use the pattern of checkerboard quilts at the right.

- 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 $n = 1, 2, 3, 4, 5, 6, 7, 8$. Compare with the results in your table. What can you conclude about the sequence defined by this rule?



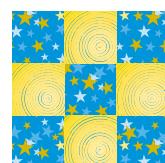
$$n = 1$$

$$a_1 = 1$$



$$n = 2$$

$$a_2 = 2$$



$$n = 3$$

$$a_3 = 5$$



$$n = 4$$

$$a_4 = 8$$

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. **Writing** 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 $100, 50, 25, 12.5, \dots$

- 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.