CHAPTER REVIEW

Chapter 13: Sequences and Series

QUICK CHECK

Chapter 13

Complete these exercises before trying the Practice Test for Chapter 13. If you have difficulty with a particular problem, review the indicated section.

1. Find the first four terms of the sequence $t_n = (\sqrt{2})^n$. Then tell whether the sequence is arithmetic, geometric, or neither. *(Section 13-1)*
2. State whether the sequence 3, 5, 7, 9, ... is arithmetic, geometric, or neither. Find a formula for t_n, the nth term of the sequence. *(Section 13-1)*
3. Give the first four terms of the sequence $t_1 = 2, t_n = (t_{n-1})^2$. *(Section 13-2)*
4. Find S_{20} for the arithmetic series $4 + 8 + 12 + \ldots$. *(Section 13-3)*
5. Find S_6 for the geometric series $1000 + 100 + 10 + \ldots$. *(Section 13-3)*
6. Find **(a)** $\lim_{n \to \infty} \frac{n^2}{n+8}$ and **(b)** $\lim_{n \to \infty} \cos n\pi$. *(Section 13-4)*
7. Find the sum of the infinite geometric series $1 + \frac{1}{8} + \frac{1}{64} + \frac{1}{512} + \ldots$. *(Section 13-5)*
8. Express the series in Exercise 7 using sigma notation. *(Section 13-6)*
9. Explain how you could use mathematical induction to prove that $4 + 8 + 12 + \ldots + 4n = 2n(n + 1)$. *(Section 13-7)*

PRACTICE TEST

Chapter 13

State whether the given sequence is arithmetic, geometric, or neither. Find a formula for t_n, the nth term of each sequence.

1. 24, 12, 6, 3, ...
2. 5, 8, 13, 20, 29, ...
3. 84, 80, 76, 72, ...

Give a recursive definition for each sequence.

4. 3, 6, 12, 24, ...
5. 3, 4, 7, 11, 18, 29, ...

Find the indicated term of the indicated sequence.

6. Arithmetic: $t_5 = 40, t_8 = 61, t_{20} = ?$
7. Geometric: $t_3 = 10, t_7 = 160, t_{12} = ?$

Find the specified sum of the given series.

8. S_{200}: $5 + 8 + 11 + \ldots$
9. S_{12}: $24 + 12 + 6 + \ldots$

Find the given limit. If the limit does not exist, so state.

10. $\lim_{n \to \infty} \left(1 - \frac{1}{n}\right)$
11. $\lim_{n \to \infty} (-1)^n \left(\frac{2n+1}{2n-1}\right)$

Let $f(x) = 1 - (x - 2) + (x - 2)^2 - (x - 2)^3 + \ldots$.

12. Find the interval of convergence for $f(x)$.
13. Find the sum of the terms of $f(x)$.
14. Express $f(x)$ using sigma notation.
15. Find the difference between the sum of all terms of $f(2.1)$ and the sum of the first 5 terms.
16. Prove $1 + 4 + 7 + \ldots + (3n - 2) = \frac{n(3n-1)}{2}$ by mathematical induction.