✓ QUICK CHECK EXERCISES 9.3 (See page 539 for answers.)

1. In mathematics, the terms "sequence" and "series" have different meanings: a _____ is a succession, whereas a _____ is a sum.
2. Consider the series
$$\sum_{k=1}^{\infty} \frac{1}{2^k}$$
If $\{s_n\}$ is the sequence of partial sums for this series, then $s_1 =$ _____, $s_2 =$ _____, $s_3 =$ _____, $s_4 =$ _____, and $s_n =$ _____.
3. What does it mean to say that a series $\sum u_k$ *converges*?
4. A geometric series is a series of the form
$$\sum_{k=0}^{\infty} \_\_\_\_\_$$
This series converges to _____ if _____. This series diverges if _____.
5. The harmonic series has the form
$$\sum_{k=1}^{\infty} \_\_\_\_\_$$
Does the harmonic series converge or diverge?

EXERCISE SET 9.3 C CAS

1–2 In each part, find exact values for the first four partial sums, find a closed form for the nth partial sum, and determine whether the series converges by calculating the limit of the nth partial sum. If the series converges, then state its sum.

1. (a) $2 + \frac{2}{5} + \frac{2}{5^2} + \cdots + \frac{2}{5^{k-1}} + \cdots$

(b) $\frac{1}{4} + \frac{2}{4} + \frac{2^2}{4} + \cdots + \frac{2^{k-1}}{4} + \cdots$

(c) $\frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \frac{1}{4 \cdot 5} + \cdots + \frac{1}{(k+1)(k+2)} + \cdots$

2. (a) $\sum_{k=1}^{\infty} \left(\frac{1}{4}\right)^k$ (b) $\sum_{k=1}^{\infty} 4^{k-1}$ (c) $\sum_{k=1}^{\infty} \left(\frac{1}{k+3} - \frac{1}{k+4}\right)$

3–14 Determine whether the series converges, and if so find its sum.

3. $\sum_{k=1}^{\infty} \left(-\frac{3}{4}\right)^{k-1}$

4. $\sum_{k=1}^{\infty} \left(\frac{2}{3}\right)^{k+2}$

5. $\sum_{k=1}^{\infty} (-1)^{k-1} \frac{7}{6^{k-1}}$

6. $\sum_{k=1}^{\infty} \left(-\frac{3}{2}\right)^{k+1}$

7. $\sum_{k=1}^{\infty} \frac{1}{(k+2)(k+3)}$

8. $\sum_{k=1}^{\infty} \left(\frac{1}{2^k} - \frac{1}{2^{k+1}}\right)$

9. $\sum_{k=1}^{\infty} \frac{1}{9k^2 + 3k - 2}$

10. $\sum_{k=2}^{\infty} \frac{1}{k^2 - 1}$

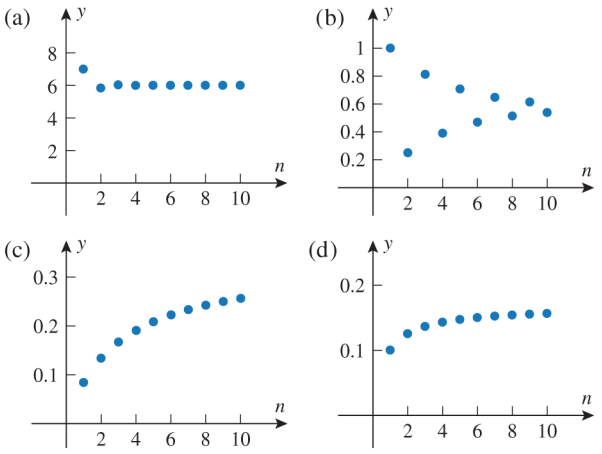
11. $\sum_{k=3}^{\infty} \frac{1}{k-2}$

12. $\sum_{k=5}^{\infty} \left(\frac{e}{\pi}\right)^{k-1}$

13. $\sum_{k=1}^{\infty} \frac{4^{k+2}}{7^{k-1}}$

14. $\sum_{k=1}^{\infty} 5^{3k} 7^{1-k}$

15. Match a series from one of Exercises 3, 5, 7, or 9 with the graph of its sequence of partial sums.



16. Match a series from one of Exercises 4, 6, 8, or 10 with the graph of its sequence of partial sums.