

## Unit 2: Lesson 3

## Infinite Geometric Series

**Skill A** Identifying convergent and divergent geometric series.

In a geometric series, the ratio,  $r$ , of any two consecutive terms is a constant.

A geometric series converges if  $|r| < 1$ . A geometric series diverges if  $|r| \geq 1$ .

For each series, determine if it is geometric. If so, determine whether it is convergent or divergent.

1.  $1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \dots$

2.  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \dots$

3.  $3 - 6 + 12 - 24 + \dots$

**Skill B** Finding the sum of an infinite geometric series.

The sum of a convergent infinite geometric series is equal to  $\frac{t_1}{1-r}$ .

Find the sum of each infinite geometric series, if it exists.

4.  $\frac{1}{3} + \frac{1}{6} + \frac{1}{12} + \dots$

5.  $1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \dots$

6.  $1 + \frac{5}{4} + \frac{25}{16} + \frac{25}{64} + \dots$

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

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

**Skill C** Changing a repeating decimal to a fraction.

Write each repeating decimal as a fraction in lowest terms.

9.  $0.\overline{63}$

10.  $0.\overline{7}$

11.  $0.\overline{027}$