12 CHAPTER REVIEW

12.4 Find Sums of Infinite Geometric Series

pp. 820–825

EXAMPLE

Find the sum of the series $\sum_{i=1}^{\infty}\left(\frac{4}{5}\right)^{i-1}$, if it exists.

For this series, $a_1 = 1$ and $r = \frac{4}{5}$. Because $|r| < 1$, the sum of this series exists.

The sum is $S = \frac{a_1}{1 - r} = \frac{1}{1 - \frac{4}{5}} = 5$.

EXERCISES

EXAMPLES 2 and 5 on pp. 821–822 for Exs. 24–31

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

24. $\sum_{i=1}^{\infty} 3\left(\frac{5}{8}\right)^{i-1}$

25. $\sum_{i=1}^{\infty} 7\left(-\frac{3}{4}\right)^{i-1}$

26. $\sum_{i=1}^{\infty} 4(1.3)^{i-1}$

27. $\sum_{i=1}^{\infty} -0.2(0.5)^{i-1}$

Write the repeating decimal as a fraction in lowest terms.

28. 0.888. . .

29. 0.546546546. . .

30. 0.3787878. . .

31. 0.7838383. . .

12.5 Use Recursive Rules with Sequences and Functions

pp. 827–833

EXAMPLE

Write a recursive rule for the sequence 6, 10, 14, 18, 22, ...

The sequence is arithmetic with first term $a_1 = 6$ and common difference $d = 10 - 6 = 4$.

$a_n = a_{n-1} + d$ **General recursive rule for a_n**

$= a_{n-1} + 4$ **Substitute 4 for *d*.**

So, a recursive rule for the sequence is $a_1 = 6$, $a_n = a_{n-1} + 4$.

EXERCISES

EXAMPLES 1, 2, and 3 on pp. 827–828 for Exs. 32–38

Write the first five terms of the sequence.

32. $a_1 = 4, a_n = a_{n-1} + 9$

33. $a_1 = 8, a_n = 5a_{n-1}$

34. $a_1 = 2, a_n = n \cdot a_{n-1}$

Write a recursive rule for the sequence.

35. 6, 18, 54, 162, 486, . . .

36. 4, 6, 9, 13, 18, . . .

37. 7, 13, 19, 25, 31, . . .

38. POPULATION A town's population increases at a rate of about 1% per year. In 2000, the town had a population of 26,000. Write a recursive rule for the town's population P_n in year n. Let $n = 1$ represent 2000.