

EXERCISES

Find the indicated sum of the geometric sequence (Evaluate each series).

1. $1 + 2 + 4 + 8 + \dots + 512$

2. $1 + 3 + 9 + 27 + \dots + 2187$

3. $2 - 4 + 8 - 16 + \dots + a_{15}$

4. $1 - 3 + 9 - 27 + \dots + a_{12}$

5. $0.3 + (0.3)^2 + (0.3)^3 + \dots + (0.3)^{12}$

6. $2(0.3) + 2(0.3)^2 + 2(0.3)^3 + \dots + 2(0.3)^{12}$

7. $6 + 6(\frac{1}{2}) + 6(\frac{1}{2})^2 + \dots + a_6$

8. $6 + 6(\frac{1}{2}) + 6(\frac{1}{2})^2 + \dots + a_{100}$

9. $\frac{7}{100} + \frac{7}{1000} + \frac{7}{10000} + \dots + a_8$

10. $\sqrt{2} + 1 + \frac{1}{\sqrt{2}} + \dots + a_{10}$

11. $1 - \frac{1}{2} + \frac{1}{4} + \dots + a_n$

12. $\frac{3}{2} + \frac{9}{2} + \frac{27}{2} + \dots + a_n$

13. $\sum_{k=1}^{12} 2^{k-1}$

14. $\sum_{k=1}^{12} (-2)^{k-1}$

15. $\sum_{k=0}^{12} (-2)^{k-1}$

16. $\sum_{k=1}^{12} (-2)^{k-2}$

17. $\sum_{k=1}^5 (\frac{2}{3})^{k-2}$

18. $\sum_{k=1}^n (\frac{1}{2})^k$

19. $\sum_{k=1}^n 6 \cdot 3^{k-1}$

20. $\sum_{k=1}^8 3(\frac{1}{10})^{k+1}$

Find the sum of each infinite geometric series.

21. $16 + 8 + 4 + 2 + \dots$

22. $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots$

23. $1 + 0.1 + 0.01 + 0.001 + \dots$

24. $2 - \frac{1}{2} + \frac{1}{8} - \frac{1}{32} + \dots$

25. $27 + 3 + \frac{1}{3} + \frac{1}{27} + \dots$

26. $3 - 1 + \frac{1}{3} - \frac{1}{9} + \dots$

27. $\sum_{k=1}^{\infty} (\frac{1}{2})^k$

28. $\sum_{k=0}^{\infty} (\frac{1}{2})^k$

29. $\sum_{k=1}^{\infty} (\frac{5}{4})^{k-1}$

30. $\sum_{k=1}^{\infty} 5(10)^{-k-1}$

31. Find the sum of the geometric series from $a_1 = 12$ to $a_5 = 48$.

32. Find the sum of the geometric series $a^{n-1} + a^{n-1}b + a^{n-2}b^2 + \dots$ with n terms and $a \neq b$.

33. If a, b, c is a geometric sequence, the sum is 19, and the product is 216, find a, b, c .

34. If a, b, c is an arithmetic sequence and also a geometric sequence, find $a : b : c$.

35. If a, b, c is an arithmetic sequence and c, a, b is a geometric sequence, find $a : b : c$.

36. Write the repeating decimal $0.121212\dots$ in fractional form.

37. Write the repeating decimal $0.12222\dots$ in fractional form.

38. A ball is dropped from a tower of 40 feet height and bounces straight up and down. Each time it strikes the ground and bounces up exactly one-half of the previous height.

a) How far will the ball have traveled after it reaches the top of sixth bounce ?

b) What total distance does the ball travel before it stops bouncing ?

39. John decides to deposit \$3,000 annually in his IRA account that pays 10% interest compounded annually for the next 20 years. Find the sum (A) of all deposits made plus all interest paid (it is called the amount A of the **annuity**) at the end of 20 years.

40. If P represents the deposit in dollars annually at i percent interest compounded annually,

prove that the amount A of the annuity at the end of n years is $A = P(1+i) \frac{(1+i)^n - 1}{i}$.