

9-5

Practice

Form G

Geometric Series

Evaluate each finite series for the specified number of terms.

1. $40 + 20 + 10 + \dots; n = 10$

2. $4 + 12 + 36 + \dots; n = 15$

3. $15 + 12 + 9.6 + \dots; n = 40$

4. $27 + 9 + 3 + \dots; n = 100$

5. $0.2 + 0.02 + 0.002 + \dots; n = 8$

6. $100 + 200 + 400 + \dots; n = 6$

7. This month, your friend deposits \$400 to save for a vacation. She plans to deposit 10% more each successive month for the next 11 months. How much will she have saved after the 12 deposits?

Determine whether each infinite geometric series *diverges* or *converges*. State whether each series has a sum.

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

9. $4 + 2 + 1 + \dots$

10. $17 + 15.3 + 13.77 + \dots$

11. $6 + 11.4 + 21.66 + \dots$

12. $-20 - 8 - 3.2 - \dots$

13. $50 + 70 + 98 + \dots$

Evaluate each infinite geometric series.

14. $8 + 4 + 2 + 1 + \dots$

15. $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$

16. $120 + 96 + 76.8 + 61.44 + \dots$

17. $1000 + 750 + 562.5 + 421.875 + \dots$

18. Suppose your business made a profit of \$5500 the first year. If the profit increased 20% per year, find the total profit over the first 5 yr.
19. The end of a pendulum travels 50 cm on its first swing. Each swing after the first, it travels 99% as far as the preceding swing. How far will the pendulum travel before it stops?
20. A seashell has chambers that are each 0.82 times the length of the enclosing chamber. The outer chamber is 32 mm around. Find the total length of the shell's spiraled chambers.
21. The first year a toy manufacturer introduces a new toy, its sales total \$495,000. The company expects its sales to drop 10% each succeeding year. Find the total expected sales in the first 6 years. Find the total expected sales if the company offers the toy for sale for as long as anyone buys it.

9-5

Practice (continued)

Form G

Geometric Series

Determine whether each series is *arithmetic* or *geometric*. Then evaluate the series for the specified number of terms.

22. $2 + 5 + 8 + 11 + \dots; n = 9$

23. $\frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} + \dots; n = 8$

24. $-3 + 6 - 12 + 24 - \dots; n = 10$

25. $-2 + 2 + 6 + 10 + \dots; n = 12$

26. $4 + 8 + 16 + 32 + \dots; n = 15$

27. $5 + 10 + 15 + 20 + \dots; n = 20$

Evaluate each infinite series that has a sum.

28. $\sum_{n=1}^{\infty} 5\left(\frac{2}{3}\right)^{n-1}$

29. $\sum_{n=1}^{\infty} (-2.1)^{n-1}$

30. $\sum_{n=1}^{\infty} \left(-\frac{1}{2}\right)^{n-1}$

31. $\sum_{n=1}^{\infty} 2\left(\frac{5}{3}\right)^{n-1}$

32. **Open Ended** Write an infinite geometric series that converges to 2. Show your work.

Find the specified value for each infinite geometric series.

33. $a_1 = 5, S = \frac{25}{3}$, find r

34. $S = 108, r = \frac{1}{3}$, find a_1

35. $a_1 = 3, S = 12$, find r

36. $S = 840, r = 0.5$, find a_1

37. **Error Analysis** Your friend says that an infinite geometric series cannot have a sum because it's infinite. You say that it is possible for an infinite geometric series to have a sum. Who is correct? Explain.

38. **Writing** Describe in general terms how you would find the sum of a finite geometric series.