

## EXERCISES

Find the first 5 terms of each sequence.

6.  $a_n = n - 9$   
 7.  $a_n = \frac{1}{2}n^2$   
 8.  $a_n = \left(-\frac{3}{2}\right)^{n-1}$   
 9.  $a_1 = 55$  and  $a_n = a_{n-1} - 2$   
 10.  $a_1 = 200$  and  $a_n = \frac{1}{5}a_{n-1}$   
 11.  $a_1 = -3$  and  $a_n = 3a_{n-1} + 1$

Write a possible explicit rule for the  $n$ th term of each sequence.

12.  $-4, -8, -12, -16, -20, \dots$   
 13.  $5, 20, 80, 320, 1280, \dots$   
 14.  $-24, -19, -14, -9, -4, \dots$   
 15.  $27, 18, 12, 8, \frac{16}{3}, \dots$

16. **Sports** Suppose that a basketball is dropped from a height of 3 ft. If the ball rebounds to 70% of its height after each bounce, how high will the ball reach after the 4th bounce? the 9th bounce?

Expand each series and evaluate.

17.  $\sum_{k=1}^5 k^2(-1)^k$     18.  $\sum_{k=1}^4 (0.5k + 4)$   
 19.  $\sum_{k=1}^4 (-1)^{k+1}(2k-1)$     20.  $\sum_{k=1}^4 \frac{5k}{k^2}$   
 Evaluate each series.    21.  $\sum_{k=1}^4 -5$     22.  $\sum_{k=1}^4 k^2$     23.  $\sum_{k=1}^4 k$

24. **Finance** A household has a monthly mortgage payment of \$1159. How much is paid by the household after 2 years? 15 years?

Find the 11th term of each arithmetic sequence.

25.  $23, 19, 15, 11, \dots$     26.  $\frac{1}{3}, \frac{1}{5}, \frac{7}{9}, \dots$   
 27.  $-3, 2, -8, 4, -7, 6, -6, 8, \dots$   
 28.  $a_3 = 1.5$  and  $a_4 = 5$   
 29.  $a_6 = 47$  and  $a_8 = 21$   
 30.  $a_5 = -7$  and  $a_9 = 13$

Find the indicated sum for each arithmetic series.

31.  $S_{18}$  for  $-1 - 5 - 9 - 13 + \dots$   
 32.  $S_{12}$  for  $\frac{1}{3} + \frac{1}{6} + 0 + \frac{1}{6} + \dots$   
 33.  $\sum_{k=1}^{15} (-11 + 3k)$   
 34.  $\sum_{k=1}^{15} \left(\frac{2}{3}k + 10\right)$

35. **Savings** Kelly has \$50 and receives \$8 a week for allowance. He wants to save all of his money to buy a new mountain bicycle that costs \$199. Write an arithmetic sequence to represent the situation. Then find whether Kelly will be able to buy the new bicycle after one year (52 weeks).

Find the 8th term of each geometric sequence.

36.  $40, 4, 0.4, 0.04, 0.004, \dots$   
 37.  $\frac{1}{18}, \frac{1}{6}, \frac{1}{2}, 2, \dots$   
 38.  $-16, -8, -4, -2, \dots$   
 39.  $-6, 12, -24, 48, \dots$

Find the 9th term of the geometric sequence with the given terms.

40.  $a_2 = 24$  and  $a_4 = 96$   
 41.  $a_1 = \frac{2}{3}$  and  $a_2 = -\frac{1}{3}$   
 42.  $a_2 = -1$  and  $a_5 = -4$   
 43.  $a_1 = 4$  and  $a_5 = 500$

Find the indicated sum for each geometric series.

48.  $S_5$  for  $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$   
 49.  $S_5$  for  $-\frac{4}{5} + 8 - 80 + 800 + \dots$   
 50.  $\sum_{k=1}^8 (4)^{k-1}$   
 51.  $\sum_{k=1}^8 -2(5)^{k-1}$   
 52.  $\sum_{k=1}^8 6k \left(\frac{1}{2}\right)^{k-1}$   
 53.  $\sum_{k=1}^8 16 \left(\frac{1}{12}\right)^{k-1}$   
 54. **Depreciation** A new photocopier costs \$8000 and depreciates each year such that it retains only 65% of its preceding year's value. What is the value of the photocopier after 5 years?  
 55. **Rent** A one-bedroom apartment rents for \$650 a month. The rent is expected to increase by 6% per year.  
 a. What will be the annual rent expense on the apartment after 5 years?  
 b. What will be the total amount spent on rent if a person rents the apartment for the entire 5-year period?

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

56.  $-2700 + 900 - 300 + 100 + \dots$   
 57.  $-1.2 - 0.12 - 0.012 - 0.0012 + \dots$   
 58.  $-49 - 42 - 36 - \frac{216}{7} + \dots$   
 59.  $4 + \frac{4}{5} + \frac{4}{25} + \frac{4}{125} + \dots$   
 60.  $\sum_{k=1}^9 \frac{9}{13^k}$   
 61.  $\sum_{k=1}^9 -\frac{7(3)^k}{(5)^k}$   
 62.  $\sum_{k=1}^9 (1)^{k+1} \left(\frac{1}{8}\right)^k$   
 63.  $\sum_{k=1}^9 \left(\frac{4}{13}\right)^k$