

Algebra II  
Sequence 5

Name \_\_\_\_\_  
Date \_\_\_\_\_

Describe the pattern, write the next term and write a rule for the nth term of the sequence.

1. 1, 7, 13, 19,.....                      2. -5, 10, -20, 40,.....                      3.  $\frac{1}{20}, \frac{2}{30}, \frac{3}{40}, \frac{4}{50}, \dots$

Write the series using summation notation. Then find the sum of the series. (Hint: Find a formula for the nth term of the series)

4.  $1 + 2 + 3 + 4 + \dots + 15$                       5.  $1 + 3 + 9 + \dots + 6561$                       6.  $9 + 16 + 25 + \dots + 100$

Tell whether the sequence is arithmetic, geometric or neither. Write a rule for the nth term of the sequence. Then find  $a_9$ .

7. 13, 6, -1, -8, .....                      8. 1, -4, 16, -64, .....                      9.  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots$

10. One term of an arithmetic sequence is  $a_{12} = 19$  and the common difference is  $d = 7$ . Write a rule for the nth term.

11. Two terms of geometric sequence are  $a_6 = -50$  and  $a_9 = -6250$ . Write a rule for the nth term.

Find the sum for each of the following.

12.  $\sum_{n=1}^9 3n + 5$

13.  $\sum_{k=1}^5 11(-3)^{k-2}$

14.  $4 + 9 + 14 + 19 + \dots$  (sum first 20 terms)

15.  $1 + 3 + 9 + 27 + \dots + 59,049$

16. Pieces of chalk are stacked in a pile. The bottom row has 15 pieces of chalk, and the top row has 6 pieces of chalk. Each row has one less piece of chalk than the row below it. How many pieces of chalk are in the pile?

17. You accept a job as an environmental engineer that pays a salary of \$45,000 in the first year. After the first year, your salary increases by 3.5% per year.

a. Write a rule giving your salary  $a_n$  for your  $n$ th year of employment.

b. What will your salary be during your fifth year of employment?

c. You work 10 years for the company. What are your total earnings? Show work.

Write the first five terms of the sequence.

18.  $a_1 = 7, a_n = a_{n-1} + 11$

19.  $t_1 = 6, t_n = 4t_{n-1}$

20.  $a_1 = 4, a_2 = 5, a_n = 2a_{n-1} + a_{n-2}$

Write a recursive rule for the sequence.

21.  $9, 6, 4, \frac{8}{3}, \frac{16}{9}, \dots$

22.  $2, 5, 8, 11, 14, \dots$

23.  $t_n = 105 \left( \frac{3}{5} \right)^{n-1}$

Write an explicit rule for the sequence.

24.  $a_1 = -4, a_n = a_{n-1} + 26$

25.  $t_1 = 8, t_n = -5t_{n-1}$

26. A town's population increases at a rate of about 4% per year. In 2010, the town had a population of 11,120. Write a recursive rule for the population  $P_n$  of the town in year  $n$ . Let  $n = 1$  represent 2010.