

# Algebra II

## Review Sequence & Series

Name \_\_\_\_\_

1. Identify the following as arithmetic, geometric or neither. If arithmetic, state the common difference. If geometric state the common ratio.

- a. 1, 4, 9, 16, 25, ..... Neither
- b. -3, 1, 5, 9, 13, ..... arithmetic d=4
- c.  $12, -3, \frac{3}{4}, -\frac{3}{16}, \frac{3}{64}, \dots$  geometric r=-1/4
- d. 9, .9, .09, .009, .0009, .... geometric r=.1
- e. 10, 5, 0, -5, -10, ... arithmetic d=-5

2. For this arithmetic sequence: -6, 2, 10, 18, .... find:

- a. the common difference  $d=8$
- b. the next term  $26$
- c. the simplified nth term formula  $a_n = 8n - 14$
- d. the 30<sup>th</sup> term  $226$
- e. the sum of the first 30 terms  $3300$
- f. the recursive formula  $a_1 = -6, a_n = a_{n-1} + 8$

3. For this geometric sequence: 243, 81, 27, 9, .... find:

- a. the common ratio  $r = \frac{1}{3}$
- b. the next term  $3$
- c. the simplified nth term formula  $a_n = 243 \left(\frac{1}{3}\right)^{n-1}$
- d. the 12<sup>th</sup> term,  $00137 = \frac{1}{729}$
- e. the sum of the first 12 terms.  $364.499$
- f. the recursive formula  
 $a_1 = 243 \quad a_n = a_{n-1} \cdot \left(\frac{1}{3}\right)$

4. For the arithmetic sequence with  $a_{20} = -25$  and  $a_{25} = -35$ , find the formula for the nth term.

$$a_n = -2n + 15$$

5. For the geometric sequence where  $a_4 = 1$  and  $a_8 = 16$ , find the formula for the nth term.

$$a_n = \frac{1}{8} (2)^{n-1}$$

6. Write the following series in summation notation,  $25 + 21 + 17 + \dots + -51$ . Then evaluate the sum.

$$\sum_{n=1}^{20} -4n + 29 = -260$$

7. Write out the terms of the series, then evaluate the sum.  $\sum_{n=4}^7 n^2 + 5 \quad 21 + 30 + 41 + 54 = 146$

8. Evaluate the following.

a.  $\sum_{n=1}^{50} 500 + 2n = 27550$

b.  $\sum_{k=1}^{10} 4(5^{k-1}) = 9.76562 \times 10^6$

$$9,765,620$$

9. Find  $S_{25}$  of  $-12 + -6 + 0 + 6 + \dots$  1560

10. Find  $S_{10}$  of the geometric series where  $a_1 = 5$  and  $r = -5$  + 8138020

11. Find the first 5 terms of the following sequences.

a.  $a_1 = 2$  and  $a_n = 3a_{n-1}$

2, 6, 18, 54, 162

b.  $a_1 = 6$ ,  $a_2 = 3$  and  $a_n = 2a_{n-1} + a_{n-2}$

6, 3, 12, 27, 66

12. A well drilling company charges \$10 for the first foot, \$11.50 for the second foot, \$13 for the third foot, and so on. How much would the company charge to drill an 80-foot well?

$$\sum_{n=1}^{80} 10 + (n-1)1.5 = \frac{80(10 + 128.5)}{2} = \$5540$$

13. Suppose you drop a tennis ball from a height of 15 feet. After the ball hits the floor, it rebounds to 85% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.

9.2188 ft

14. A snail is crawling straight up a wall. The first hour it climbs 16 inches, the second hour it climbs 12 inches, and each succeeding hour, it climbs only three-fourths the distance it climbed the previous hour. Assume the pattern continues. How far does the snail climb during the seventh hour? What is the total distance the snail has climbed in seven hours?

2.85 in. 55.457 in.

15. On October 1, a gardener plants 20 bulbs. On October 2, she plants 23 bulbs. On October 3, she plants 26 bulbs. She continues this pattern until October 15, when she plants the last bulbs. How many bulbs will the gardener plant on October 15<sup>th</sup>? What is the total number of bulbs she plants from October 1 to October 15, inclusive?

62 bulbs 615 bulbs