

Secondary Math III  
 Unit 6 Test Retake  
 Sequences & Series

Name: Key  
 Period: \_\_\_\_\_

**Multiple Choice. Choose the best answer. There is only one correct answer for each problem.**

1. What is the sum of the first 68 even natural numbers?

2, 4, 6, ...  
 $a_n = 2 + 2(n-1)$   
 $a_n = 2n$

$$S_{68} = \frac{68(2+136)}{2}$$

$S_{68} = 4692$

2. Vince receives \$70 for his birthday. He deposits the money in a savings account and then saves an additional \$20 each month. He decides to calculate how much total money he will have saved after 5 months. This situation is best modeled by a series or a sequence? Arithmetic or Geometric?

Arithmetic Series

3. Becky buys a car for \$10500. She expects the value of the car to decrease by 25% each year. She wants to figure out the car's value after 7 years. This situation is best modeled by a series or a sequence? Arithmetic or Geometric?

Geometric Sequence

4. Write a recursive formula to represent the 3<sup>rd</sup> term in the sequence.



$a_3 = a_2 + 6$

5. Compute the series  $1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \dots$

$$S_{\infty} = \frac{1}{1 - 2/3} = \boxed{3}$$

6. A cold virus infects 8 students at school in the same day. In the following days, the number of students infected with the virus increases at a rate of 9% each day. How many new students are infected on the 12<sup>th</sup> day?

$$8 \cdot (1.09)^{n-1}$$

About 20 students

7. Is the sum of the following infinite geometric series finite or infinite?

$$\sum_{i=1}^{\infty} \left(\frac{7}{2}\right)^i$$

infinite

8. Given the sequence -10, -3, 4, 11, 18, 25, ..... what is the 50<sup>th</sup> term?

$$-10 + 7(n-1)$$

$$-10 + 7n - 7$$

$$7n - 17$$

$$a_{50} = 333$$

$$7(50) - 17$$

9. Sandra starts a savings plan in which she deposits an increasing amount in the bank each month. The first month she deposits \$50, the second month she deposits \$53, the third month she deposits \$56, and so on. If she continues saving at this rate, how much will she deposit during the 20<sup>th</sup> month?

$$50 + 3(n-1)$$

$$50 + 3n - 3$$

$$3n + 47$$

$$3(20) + 47$$

$$\boxed{\$607}$$

10. Compute a geometric series with 8 terms, a common ratio of 3, and a first term of 4.

$$\sum_8 \frac{4(1-3^8)}{1-3} = \boxed{13120}$$

11. What is the 30<sup>th</sup> term in the arithmetic sequence for which  $a_1 = 4$  and  $d = 3$ ?

$$4 + 3(n-1)$$

$$4 + 3n - 3$$

$$3n + 1$$

$$3(30) + 1$$

$$\boxed{91}$$

12. The number 73 is what term in the arithmetic sequence -5, -2, 1, ... ?

$$-5 + 3(n-1)$$

$$-5 + 3n - 3$$

$$73 = 3n - 8$$

$$3n = 81 \quad n = 27$$

$$\boxed{27^{\text{th}}}$$

13. What is the common ratio for the geometric sequence 3, 15, 75, 375, . . . ?

$$\boxed{5}$$

14. What is the 6<sup>th</sup> term in the geometric sequence in which  $a_1 = 2$  and  $r = 7$

$$2(7)^{n-1}$$
$$2(7)^5 \quad \boxed{33614}$$

15. What is the sum of the infinite geometric sequence series in which  $a_1 = -7$  and  $r = \frac{3}{5}$

$$S_{\infty} = \frac{-7}{1 - \frac{3}{5}} = \boxed{-17.5 \text{ or } \frac{-35}{2}}$$

16. What is the sum of the infinite geometric series  $3 + 1 + \frac{1}{3} + \dots$  ?

$$S_{\infty} = \frac{3}{1 - \frac{1}{3}} = \boxed{4.5 \text{ or } \frac{9}{2}}$$

17. What is the 1<sup>st</sup> term of the infinite geometric series for which  $S_{\infty} = 120$  and  $r = \frac{3}{4}$

$$(1 - \frac{3}{4})120 = \frac{a_1}{1 - \frac{3}{4}} \cdot (1 - \frac{3}{4})$$
$$\boxed{a_1 = 30}$$

18. Evaluate

$$\sum_{i=1}^{25} 4i + 2$$

$$S_{25} = \frac{25(6 + 102)}{2} = \boxed{1350}$$

19. Use sigma notation to express the series  $7 - 14 + 28 - 56 + 112$

$$\sum_{i=1}^5 7(-2)^{i-1}$$

20. Write an expression for the  $n$ th term of the sequence.

$-3, 1, 5, 9, 13, \dots$

$$\boxed{a_n = -3 + 4(n-1) \text{ or } a_n = 4n - 7}$$