Sequences & Series Review 1

<u>Arithmetic Sequences</u>:

Explicit:

$a_n = a_1 + d(n - 1)$

Recursive:

$a_1 = $ --

$a_n = a_{n-1} + d$

<u>Geometric Sequences:</u>

Explicit:

$a_n = a_1 r^{n-1}$

Recursive:

$a_1 = $ --

$a_n = (a_{n-1})r$

Sum of a finite arithmetic series: $s = \frac{n(a_1 + a_n)}{2}$

Sum of a finite geometric series: $s = \frac{a_1 - a_n r}{1 - r} = \frac{a_1(1 - r^n)}{1 - r}$

Sum of a infinite geometric series: $s = \frac{a_1}{1 - r}$

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What are the next <u>three</u> terms of the sequence?

1. 5, 11, 17, 23, …

2. 2, -6, 18, -54, …

3. 1, 4, 9, 16, …

For the following sequences, state whether they are Arithmetic, Geometric, or Neither. Then write an **<u>explicit</u>** formula for each.

4. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, ...$

5. 5, 9, 13, 17, …

6. $\frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}, ...$

For the following sequences, state whether they are arithmetic, geometric, or neither. Then write a **recursive** formula for each sequence.

7. $\frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}, \ldots$

8. 5, 3, 1, -1, …

9. 3, 9, 27, 81, …

Write the first five terms of the sequence.

10. $a_1 = 1$ $a_n = 2a_{n-1} + 3$

Find the sum of the following finite series:

11. 11 + 8 + 5 + 2 + -1 + -4

12. 1 + 10 + 100 + … + 10000000000000000000000000

Write the following sums in Sigma notation.

13. 3 + 6 + 9 + 12 + 15 + 18 + … + 144

14. $\frac{1}{3} - \frac{1}{6} + \frac{1}{12} - \frac{1}{24} + \ldots$

Find the following sums:

15. $\sum_{n=1}^{21} 13 + 4(n-1)$

16. $\sum_{n=1}^{\infty} 3 \cdot \left(\frac{8}{6}\right)^{n-1}$

If the following sequence is arithmetic, find the missing value:

17. 6, ____ , 17

If the following sequence is geometric, find the missing value:

18. 6, _____, 17