Accelerated Geometry CC
Sequences & Series Practice

Name: KEY
Date: _____ Period: _____

1. Write the first five terms of the sequence defined by the given explicit formula $a_n = 3n - 6$

$-3, 0, 3, 6, 9$

$a_1 = 3(1) - 6$ $a_4 = 3(4) - 6$
$a_2 = 3(2) - 6$ $a_5 = 3(5) - 6$
$a_3 = 3(3) - 6$

2. Write the terms of the series, then **evaluate**

$\sum_{n=1}^{5} 3n - 2$ (5 terms; Start; Formula)

$1 + 4 + 7 + 10 + 13 = 35$

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

3. For the arithmetic sequence, find a_{23}: 45, 31, 17, 3,...

$d = -14$

$a_{23} = 45 - 14(23 - 1)$

$\boxed{a_{23} = -263}$

4 **Evaluate** $\sum_{n=1}^{5} 7n - 3$ ← arithmetic

$S_5 = 90$

(Use the formula) $n = 5$, $a_1 = 4$, $a_5 = 32$

$S_n = \frac{n}{2}(a_1 + a_n) = S_5 = \frac{5}{2}(4 + 32)$

Tell whether the sequence is arithmetic or geometric and give the common difference or the common ratio. If they are arithmetic or geometric give an nth term formula.

5. 3, 12, 48, 192, ... geometric: $r = 4$

$a_n = 3(4)^{n-1}$

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

6. 5, 12, 15, 38, 40, ...

Neither

7. 23, -12, -47, -82, ... arithmetic: $d = -35$

$a_n = 23 - 35(n-1)$

$a_n = 23 - 35n + 35$

$a_n = -35n + 58$

8. Find a_{107} in the arithmetic sequence where $a_4 = 7$ and $a_7 = 22$

$a_{107} = -8 + 5(107 - 1)$

$a_{107} = 522$

$d = \frac{22 - 7}{3} = 5$

$7 = a_1 + 5(4 - 1) \rightarrow -8 = a_1$

9. Find the sum of the arithmetic series: $-2 + -7 + -12 + -17 + -22$

(Use the formula for arithmetic series!) $S_n = \frac{n}{2}(a_1 + a_n)$

$S_5 = -60$

$S_5 = \frac{5}{2}(-2 + (-22))$

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$S_n = \frac{n}{2}(a_1 + a_n)$

10. Find S_{35} for the arithmetic series: $7 + 15 + 23 + 31 + \ldots$

$a_{35} = 7 + 8(35-1)$
$a_{35} = 279$

$S_{35} = \frac{35}{2}(7 + 279)$

$S_{35} = 5005$

Arithmetic $S_n = \frac{n}{2}(a_1 + a_n)$

11. Evaluate $\sum_{n=1}^{8}(5n-3)$

$n = 8$
$a_1 = 2$
$a_8 = 37$

$S_8 = \frac{8}{2}(2 + 37)$

$S_8 = 156$

12. Evaluate $\sum_{n=1}^{12}(-2n+7)$

$n = 12$
$a_1 = 5$
$a_{12} = -17$

$S_{12} = \frac{12}{2}(5 - 17)$

$S_{12} = -72$

13. List the first six terms of the sequence $a_n = \frac{1}{2}(4)^{n-1}$

$a_1 = 1/2(4)^{1-1}$
$a_2 = 1/2(4)^{2-1}$
$a_3 = 1/2(4)^{3-1}$
$a_4 = 1/2(4)^{4-1}$
$a_5 = 1/2(4)^{5-1}$
$a_6 = 1/2(4)^{6-1}$

→ 1/2, 2, 8, 32, 128, 512

14. Find a_{15} in the geometric sequence where $a_1 = 7$ and $r = -3$

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

$a_{15} = 7(-3)^{15-1}$

$a_{15} = 33,480,783$

15. Find S_{27} of the geometric series $2 + -6 + 18 + -54 + \ldots$

$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$

$S_{27} = 2\left(\frac{1-(-3)^{27}}{1-(-3)}\right)$

$S_{27} = 3.812798742 \text{ E } 12$

↓

3,812,798,743,000

16. Evaluate $\sum_{n=1}^{5} 4(3^{n-1})$ ← geometric $S_n = a_1\left(\frac{1-r^n}{1-r}\right)$

$S_5 = 4\left(\frac{1-3^5}{1-3}\right)$

$S_5 = 484$

Formulas:

Arithmetic Nth Term: $a_n = a_1 + d(n-1)$ **Geometric Nth Term:** $a_n = a_1 r^{n-1}$

Arithmetic Series: $S = \frac{n}{2}(a_1 + a_n)$ **Geometric Series:** $S = a_1\left(\frac{1-r^n}{1-r}\right)$