SEQUENCES AND SERIES PRACTICE

Name: _____ **DATE:** _____

1. Write the first 5 terms of the sequence: $a_n = 5n - 1$

4, 9, 14, 19, 24, ...

$a_1 = 5(1)-1 = 4$
$a_2 = 5(2)-1 = 9$
$a_3 = 5(3)-1 = 14$
$a_4 = 5(4)-1 = 19$
$a_5 = 5(5)-1 = 24$

	Sequence	Geometric or Arithmetic	Common Difference or Ratio
2	–8, –4, 0, 4, ...	Arithmetic	$d = 4$
3	5, 10, 20, 40, ...	Geometric	$r = 2$
4	2, 2.4, 2.88, 3.456, ...	Geometric	$r = 1.2$

For each of the sequences, write the recursive formula and explicit formulas.

		Recursive Formula	Explicit Formula
5	4, 14, 24, 34, 44, ...	$a_1 = 4$ $a_n = (a_{n-1}) + 10$	$a_n = 4 + 10(n-1)$
6	120, 60, 30, 15, $\frac{15}{2}$, ...	$a_1 = 120$ $a_n = (a_{n-1}) \cdot \frac{1}{2}$	$a_n = 120\left(\frac{1}{2}\right)^{n-1}$
7	– 100, –90, –80, –70 ...	$a_1 = -100$ $a_n = (a_{n-1}) + 10$	$a_n = -100 + 10(n-1)$
8	3, 4, 5.33, 7.11, ...	$a_1 = 3$ $a_n = (a_{n-1}) \cdot \frac{4}{3}$	$a_n = 3\left(\frac{4}{3}\right)^{n-1}$

9. For question #5, find a_{18}.

$a_{18} = 4 + 10(18-1)$
$a_{18} = 4 + 10(17)$
$a_{18} = 4 + 170$
$\boxed{a_{18} = 174}$

10. Write the explicit formula:

$a_{12} = 58$; $d = 5$

(12, 58)
n a_n

$a_n = a_1 + d(n-1)$
$58 = a_1 + 5(12-1)$
$58 = a_1 + 5(11)$
$3 = a_1$

$\boxed{a_n = 3 + 5(n-1)}$

11. Find the sum of the series from 1 – 20.

4, 14, 24, 34, 44, ...

$a_n = 4 + 10(n-1)$

$a_{20} = 4 + 10(19) = 194$

$n = 20$, $a_1 = 4$, $a_{20} = 194$

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

$S_{20} = \frac{20}{2}(4 + 194)$

$\boxed{S_{20} = 1980}$

12. Find the sum of the series from 1 – 15.

3, 4, 5.33, 7.11, ...

$a_n = 3\left(\frac{4}{3}\right)^{n-1}$

$a_{15} = 3\left(\frac{4}{3}\right)^{14} = 168.37$

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

$S_{15} = 3\left(\frac{1-(4/3)^{15}}{1-4/3}\right)$

$\boxed{S_{15} = 664.48}$

Find the sum of the series.

13. $\sum_{i=1}^{7} 3i + 4$ A

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

$a_1 = 3(1)+4 = 7$, $a_7 = 3(7)+4 = 25$

$n = 7$, $a_1 = 7$, $a_7 = 25$

$S_7 = \frac{7}{2}(7+25)$

$\boxed{S_7 = 112}$

14. $\sum_{i=1}^{7} 4\left(\frac{2}{3}\right)^{i-1}$ G

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

$a_1 = 4\left(\frac{2}{3}\right)^{1-1}$, $a_1 = 4(1) = 4$

$a_1 = 4$, $r = 2/3$, $n = 7$

$S_7 = 4\left(\frac{1-(2/3)^7}{1-2/3}\right)$

$S_7 = 4\left(\frac{0.941\ldots}{0.333\ldots}\right) = \boxed{11.30}$

15. $\sum_{i=1}^{\infty} 5\left(\frac{1}{3}\right)^{i-1}$ G

$S_\infty = \frac{a_1}{1-r}$

$a_1 = 5$, $r = 1/3$

$a_1 = 5\left(\frac{1}{3}\right)^{1-1}$, $a_1 = 5(1) = 5$

$S_\infty = \frac{5}{1-1/3}$

$S_\infty = 7.5$

16. $\sum_{i=1}^{5} 4i$ A

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

$a_1 = 4(1) = 4$, $a_5 = 4(5) = 20$

$n = 5$, $a_1 = 4$, $a_5 = 20$

$S_5 = \frac{5}{2}(4+20)$

$\boxed{S_5 = 60}$

17. $\sum_{i=1}^{5} 3\left(\frac{2}{5}\right)^{i-1}$ G

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

$a_1 = 3\left(\frac{2}{5}\right)^{1-1}$, $a_1 = 3\left(\frac{2}{5}\right)^0 = 3$

$a_1 = 3$, $r = 2/5$, $n = 5$

$S_5 = 3\left(\frac{1-(2/5)^5}{1-2/5}\right)$

$\boxed{S_5 = 4.95}$

18. $\sum_{i=1}^{\infty} 7\left(\frac{3}{2}\right)^{i}$ G

$r > 1$

No Sum!