**PreAP Precalculus** Name Key

**Geometric HW** Date ___________ Period _________

Write the first five terms of each sequence defined by the given explicit formula. Start with n = 1.

**1.** $a_n = -4(2)^n$ -8, -16, -32, -64, -128

**2.** Write the explicit formula for the geometric sequence given $a_2 = 15$ and $a_5 = 1875$. Then use this formula to find the 7th term.

$a_n = 3(5)^{n-1}$

7th term 46,875

| n | $a_n$ |
|---|---|
| 2 | 15 |
| 5 | 1875 |

$r^3 = 125$

$r = 5$

$a_1 = 3$

**3.** Evaluate: $\sum_{k=1}^{10} 5(-1)^{k-3}$ 10

**4.** Evaluate: $\sum_{k=0}^{\infty} 6(0.6)^k$ $r < 1$ 15

$a_1 = 6$

$r = 0.6$

$\frac{6}{1-0.6} = 15$

Tell whether the sequence is arithmetic, geometric, or neither and give explicit formula for the sequence.

**5.** 3, 12, 48, 192… geometric – $a_n = 3(4)^{n-1}$

$\cdot 4$ $\cdot 4$

**6.** ln 1, ln 2, ln 4, ln 8, ln 16,… neither

**7.** $\frac{2}{3}, \frac{5}{9}, \frac{8}{27}, \frac{11}{81}...$ neither

**8.** List the first four terms of the geometric sequence

given $a_1 = 3$ and $a_n = 4a_{n-1}$

recursive

$a_2 = 4(3) = 12$

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

$a_1 = 3$

$r = 4$

3, 12, 48, 192

9. Find $a_{15}$ in the geometric sequence where $a_3 = 7$ and $r = -3$

$a_1 = \frac{7}{9}$ , $r = -3$

$a_n = (\frac{7}{9})(-3)^{n-1}$

$a_{15} = \frac{7}{9}(-3)^{15-1}$

| n | $a_n$ |
|---|---|
| 1 | 7/9 |
| 2 | -7/3 |
| 3 | 7 |

↑ ÷ −3

**$a_{15} = 3{,}720{,}087$**

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

Sum of 15 terms ·−3 ·−3

$a_1 = 2$

$r = -3$

$\sum_{n=1}^{15} (2(-3)^{n-1}) = 7{,}174{,}454$

11. Find the sum of the infinite geometric series, if it exits. $14 + 7 + 3.5 + 1.75 + \ldots$

$\cdot\frac{1}{2}$ $\cdot\frac{1}{2}$

$a_1 = 14$

$r = \frac{1}{2}$

$\frac{14}{1 - \frac{1}{2}} = 28$

12. Find the sum of the infinite geometric series, if it exits. $8 + 10 + 12.5 + 15.625 + \ldots$

·1.25 ·1.25

$r > 1 \rightarrow$ sum = $\infty$

13. Find the sum of the infinite geometric series, if it exits. $\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^{n-1}$

$a_1 = 1$

$r = \frac{2}{3}$

$\frac{1}{1 - \frac{2}{3}} = 3$

14. Find the sum of the infinite geometric series, if it exits. $\sum_{k=0}^{\infty} \left(\frac{5}{3}\right)^{k+1}$

$r > 1 \rightarrow$ sum = $\infty$

15. If $a_2=4$ and $a_5=108$ in a geometric sequence. Find $a_1$.

| n | $a_n$ |
|---|---|
| 1 | 4/3 |
| 2 | 4 |
| 5 | 108 |

↑ ÷3 ↓ ·3

3 < > 27

$\sqrt[3]{r^3} = \sqrt[3]{27}$

$r = 3$

**$a_1 = \frac{4}{3}$**