Algebra II – Mrs. Tilus
Unit 10 Review
"We like good quotes." ELKS

Name _____

1. Identify the following as arithmetic, geometric, or neither. Also find the next 2 terms.

a.) $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}$

0.5 0.6̄ 0.75 0.8

Circle one: Arithmetic Geometric (Neither)

Adding 1 to the numerator and denominator

b.) 3, -6, 9, -12, 15, -18

Circle one: Arithmetic Geometric (Neither)

Adding by 3 then alternating signs

c.) 729, 243, 81, 27, 9, 3

Circle one: Arithmetic (Geometric) Neither

Dividing by 3

2. Write the formula for the following sequence.

-2, 4, 10, 16, ….

+6

$t_1 = -2$

$d = 6$

$t_n = -2 + (n-1)6$ OR $t_n = -2 + 6n - 6$

$t_n = 6n - 8$

3. Find the specified term of the arithmetic sequence.

20, 17, 14, … ; t_{20}

-3

$t_1 = 20$

$d = -3$

$n = 20$

$t_{20} = 20 + (20-1)(-3)$

$t_{20} = 20 + 19(-3)$

$\boxed{t_{20} = -37}$

4. Find the position, n, of the underlined term.

-5, 5, 6, 11.5, …, 127

$t_1 = -5$

$d = 5.5$

$t_n = 127$

$127 = -5 + (n-1)5.5$

+5 +5

$\frac{132}{5.5} = \frac{5.5(n-1)}{5.5}$

$24 = n - 1$

+1 +1

$\boxed{n = 25}$

5. Insert three arithmetic means between 12 and 2.

12, ___, ___, ___, 2
t_1 t_5

$t_1 = 12$

$t_5 = 2$

$n = 5$

$2 = 12 + (5-1)d$

$-12 \quad -12$

$\frac{-10}{4} = \frac{4d}{4}$

$-2.5 = d$

5.) 12, 9.5, 7, 4.5, 2

6. Write the formula for the following sequence.

-6, -12, -24, …

×2

$t_n = -6 \cdot 2^{n-1}$

$t_1 = -6$

$r = 2$

7. Find the specified term of the geometric sequence.

$\frac{1}{9}, \frac{-1}{3}, 1, -3, \ldots;\ t_{15}$

×−3

$t_1 = \frac{1}{9} \quad n = 15$

$r = -3$

$t_{15} = \frac{1}{9} \cdot (-3)^{15-1}$

$t_{15} = \frac{1}{9} \cdot 4782969$

$t_{15} = 531441$

8. Find the position, n, of the underlined term.

4, 16, 64, 256, …, 16777216

×4

$t_1 = 4$

$r = 4$

$t_n = 16777216$

$\frac{16777216}{4} = \frac{4 \cdot 4^{n-1}}{4}$

$4194304 = 4^{n-1}$

$\log_4 4194304 = n-1$

$n-1 = \frac{\log 4194304}{\log 4}$

$n-1 = 11$

$+1 \quad +1$

$n = 12$

9. Insert three geometric means between 81 and 1.

81, ___, ___, ___, 1
t_1 t_5

$t_1 = 81$

$t_5 = 1$

$n = 5$

$\frac{1}{81} = \frac{81 \cdot r^{5-1}}{81}$

$\sqrt[4]{\frac{1}{81}} = \sqrt[4]{r^4}$

$\frac{1}{3} = r$

9.) 81, 27, 9, 3, 1

10. Write the series in expanded form, and find its sum.

a.) $\sum_{k=1}^{5} 4k-3$ $= 1 + 5 + 9 + 13 + 17$ Sum = 45

$t_1 = 4(1)-3$ $t_2 = 4(2)-3$ $t_3 = 4(3)-3$ $t_4 = 4(4)-3$ $t_5 = 4(5)-3$

$t_1 = 1$ $t_2 = 5$ $t_3 = 9$ $t_4 = 13$ $t_5 = 17$

b.) $\sum_{k=2}^{6} 4(2)^{(k-1)}$ $= 8 + 16 + 32 + 64 + 128$ Sum = 248

$t_2 = 4 \cdot 2^{2-1}$ $t_3 = 4 \cdot 2^{3-1}$ $t_4 = 4 \cdot 2^{4-1}$ $t_5 = 4 \cdot 2^{5-1}$ $t_6 = 4 \cdot 2^{6-1}$

$t_2 = 8$ $t_3 = 16$ $t_4 = 32$ $t_5 = 64$ $t_6 = 128$

11. Rewrite the series into sigma notation.

a.) $6 + 12 + 24 + \ldots + 98304$ (×2)

$t_1 = 6$

$r = 2$

$t_n = 98304$

* Geometric
$t_n = t_1 \cdot r^{n-1}$

$\frac{98304}{6} = \frac{6 \cdot 2^{n-1}}{6}$

$16384 = 2^{n-1}$

$\log_2 16384 = n-1$

$n-1 = \frac{\log 16384}{\log 2}$

$n-1 = 14$

$+1 \quad +1$

$n = 15$

$\sum_{n=1}^{15} 6 \cdot 2^{n-1}$

b.) $5 + 8 + 11 + 14 + \ldots \infty$ ← no limit (+3)

$t_1 = 5$

$d = 3$

* Arithmetic
$t_n = t_1 + (n-1)d$

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

$t_n = 5 + 3n - 3$

$t_n = 3n + 2$

$\sum_{n=1}^{\infty} 3n + 2$

12. A wealthy mother gives her daughter $5 on her first birthday, $10 on her second birthday, $20 on her third birthday, and $40 on her fourth birthday. If this pattern continues, what will be the gift on her 28th birthday?

5, 10, 20, 40 (×2)

$t_1 = 5$

$r = 2$

$n = 28$

* Geometric
$t_n = t_1 \cdot r^{n-1}$

$t_{28} = 5 \cdot 2^{28-1}$

$t_{28} = \$671,088,640$