Name Key Date Hour

Sequences – Arithmetic & Geometric

Alg 2 Trig G

Complete the blanks and/or complete the tables in each problem.

1)

Term 1 Term 2 Term 3

Figure

Term #	How many black triangles?
1	1
2	3
3	9
4	27
5	81

Geom ×3

2)

1 2 3

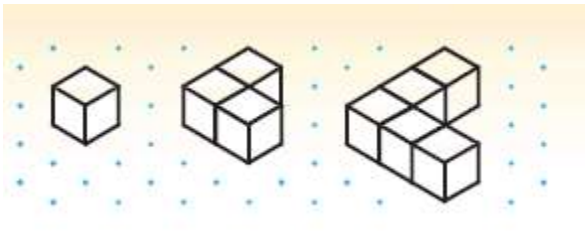

Figure #	Volume
1	1
2	3
3	5
4	7
5	9

Arith +2

3) -4, -2, 0, 2, 4, 6, 8 (+2, Arith)

4) 4, -2, 1, -½, ¼, -⅛, 1/16 (×-½, Geom)

5) 8, 15, 22, 29, 36, 43, 50 (+7, Arith)

6) 4, 9, 16, 25, 36, 49, 64 (perfect squares) NEITHER!

Are all these arithmetic and geometric sequences?? Which ones are arithmetic? Which ones are geometric??

arithmetic: add/sub; geometric: multiplication

Formula for an arithmetic sequence:

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

a_n = nth term (ending term)

a_1 = 1st term

d = repeated addition or subtraction

n = number of term a_n

Practice:

7) In August, you open a savings account with $1,000. Each month after that, you deposit $200. If you never withdraw money, express the money in your savings account. How much money would you have after 11 months?

$a_1 = 1000$ $d = 200$ $n = 11$

Find a_{11}

$a_{11} = 1000 + 200(11-1)$

$a_{11} = \$3{,}000$

8) A rumor that Justin Bieber is performing a concert at HC is started by a group of 6 friends at lunch. The rumor spreads and the total number of people who have heard the rumor increases by 35 people every day. Several days later, you find out that 321 people heard the rumor. Exactly how many days later was it?

$a_1 = 6$ $\quad a_n = 321$ $\quad d = 35$

$321 = 6 + 35(n-1)$

$-6 \quad -6$

$\frac{315}{35} = \frac{35(n-1)}{35}$

$9 = n-1$

$10 = n$

10 days

9) Consider the sequence: 38, 46, 54, 62, … What is a_{12}? What is the 12th term?

$a_{12} = 38 + 8(12-1)$

$a_{12} = 126$

10) Find the indicated term if $a_1 = -7$, $d = -3$, and $n = 15$. Find the 15th term

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

$a_{15} = -49$

Ok, good. Now…..

Use the following sequence to answer the questions below: **30, 120, 480, …** (x4 x4)

Is there a common difference, common ratio, neither, or both? _____

Find the value if possible: $r = 4$

* choose one of the terms and divide by the previous term

$\frac{120}{30} = 4$ / $\frac{480}{120} = 4$

Formula for a geometric sequence:

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

a_n = nth term (ending term)

a_1 = 1st term

r = common ratio (repeated multiplication)

n = number of term a_n

11. a) What is the formula for this sequence: (a_1) **30, 120, 480, …**

$a_n = 30 \cdot 4^{n-1}$

b) Find a_6: $= 30 \cdot 4^{6-1} = 30{,}720$

Find the 6th term

Let's Practice:

12) Find the formula and the indicated term of each sequence:

Arith $d = -11$

a) 4, −7, −18, ... find a_{10} $= 4 - 11(10-1)$ ★

$= \boxed{-95}$

Geom $r = \frac{1}{4}$

b) $a_1 = 4096$, $r = \frac{1}{4}$, $n = 8$ $a_8 = 4096\left(\frac{1}{4}\right)^{8-1}$

$= \boxed{.25}$

Arith $d = 8$

c) 38, 46, 54, 62, … find a_{25} $= 38 + 8(25-1)$

$= \boxed{230}$

Geom $r = -3$

d) $a_1 = 5$ $r = -3$ $n = 6$ $a_6 = 5(-3)^{6-1}$

$= \boxed{-1215}$