Geometric Sequences

Linear arithmetic 2 patterns

x	y	
1	10	+3
2	13	
* 3	16	
4	19	
5	22	

Geometric exponential

x	y	
1	4	x 2
2	8	
x 3	16	
4	32	
5	64	

Geometric Sequence

- Each term, after the 1st, is the product of the preceding term and the common ratio, r.
- The common ratio can be found: $r = \frac{a_n}{a_{n-1}}$

Are the following Arithmetic, Geometric, or neither. If arithmetic, state d. If Geometric, state r.

- 4, 12, 36, … geometric $r=3$
- 8, 4, 0, -4…. arithmetic $d=-4$
- 2, -4, 8, -16, 32,… geometric $r=-2$
- 1, 4, 9, 16, 25, … neither

$t_1\ t_2\ t_3$

n^2

Let's figure out the formula for a geometric sequence!

- 1st Term: a_1
- 2nd Term: $a_1 r$
- 3rd Term: $a_1 r r = a_1 r^2$
- 4th Term: $a_1 r^2 r = a_1 r^3$
- 10th Term: $a_1 r^9$
- nth Term:

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

Recursive: $a_n = a_{n-1} r$

Find the 10 term if $a_1 = 4$ and $r = -1/2$.

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

$$a_{10} = 4\left(-\frac{1}{2}\right)^{10-1}$$

$$a_{10} = 4\left(-\frac{1}{2}\right)^{9}$$

$$a_{10} = -\frac{1}{128}$$

Find a_{10} if ½, 1, 2, 4, … $r = \frac{2}{1} = 2$

$a_{10} = \frac{1}{2}(2)^{10-1}$

$a_{10} = \frac{1}{2}(2)^{9}$

$a_{10} = 256$

Find the 9th term if $a_1 = 3$ and $r = \frac{1}{2}$.

$a_9 = 3\left(\frac{1}{2}\right)^8$

$a_9 = \frac{3}{256}$