GEOMETRIC SEQUENCES

In a **geometric sequence,** the ratio of any term, except the first one, to the previous term is constant for all pairs of consecutive terms.
This constant or **common ratio** is denoted by ***r.***
The **first term,** t_1, is denoted by the letter *a*.

Ex1. State the common ratio, r, for each geometric sequence.

a) 4, 8, 16, 32, …

b) 100, 10, 1, 0.1, …

Note that the **general arithmetic sequence** is $a, ar, ar^2, ar^3, \ldots$

where *a* is the first term and *r* is the common ratio.

General Term of a Geometric Sequence	**Recursive Formula of a Geometric Sequence**
$t_n = ar^{n-1}$, where *n* is a natural number	$t_1 = a$, $t_n = r\, t_{n-1}$ where *n* is a natural number and $n > 1$

The relationship between *n* and t_n of any geometric sequence is **nonlinear.**

Ex2. For the geometric sequence given below, find the general term and the recursive formula. Then, find t_{10}.

4, 12, 36, 108, …

Ex3. Find the number of terms in the geometric sequence given below.

2, -4, 8, …, -1024

Ex4. For a geometric sequence, $t_2 = 8$ and $t_5 = 64$. Find *a, r,* and t_n.

Ex5. In a laboratory, a bacterial population doubles every hour. At 1 pm, the population is 20000 cells. How many cells will be present at 10 pm?

Ex6. A store has a sale in which 10% is taken off of the cost of an item at the end of each day. Suppose the item originally costs \$250.

a) Determine its cost (at the end of the day) for each of the next five days.

b) About how many days will it take for the sale price to be less than \$90?