

Geometric Growth and Decay Worksheet

A number sequence has Geometric Growth if each succeeding term can be obtained by multiplying the prior term by a constant number. For example, starting with an initial term of 3, repeatedly multiplying by 5 leads to this geometric growth sequence: 3, 15, 75, 375, 1875, ... The common multiplier at each step is referred to as a *growth factor*. It can be any number (*e. g.* a whole number, a fraction, a decimal, and either positive or negative).

1. Which of the sequences demonstrate geometric growth? How do you know? If so, what is the growth factor? What is the difference equation?
 - a. 1, 5, 25, 125, 625, ...
 - b. 1, 3, 7, 15, 31, ...
 - c. 4, 2, 1, .5, .25, ...
 - d. 6, 6, 6, 6, 6, ...
 - e. $1/2$, -1, 2, -4, 8, ...

2. Suppose the following sequence is geometric: $s_0 = 3$, $s_1 = 6$, $s_2 = 12$, $s_3 = 24$, $s_4 = 48$. What is the growth factor? What is the difference equation?

3. Find a functional equation for the sequence s_n in problem 2. Why do you know it is correct?

4. For $a_{n+1} = 1.6 \cdot a_n$, if the initial term is $a_0 = 4$, what is the functional equation for a_n ?

5. Suppose in a geometric growth sequence $b_1 = 1.5$ and $b_3 = 13.5$. Find the growth factor for the sequence, b_0 , a difference equation and a functional equation for b_n .