Assignment

LESSON 3: Did You Mean: *Recursion*

Write

Explain the difference between a recursive formula and an explicit formula in your own words.

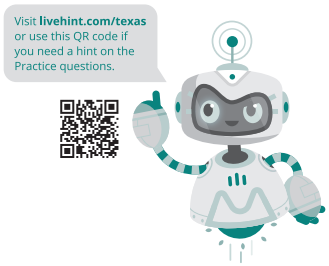
Remember

All sequences describe functions.

The explicit formula for an arithmetic sequence is $a_n = a_1 + d(n - 1)$, where n is the term number, a_1 is the first term in the sequence, a_n is the nth term in the sequence, and d is the common difference.

The explicit formula for a geometric sequence is $g_n = g_1 \cdot r^{(n-1)}$ where n is the term number, g_1 is the first term in the sequence, g_n is the nth term in the sequence, and r is the common ratio.

Practice



1. Greta must volunteer 225 hours for a community service project. She plans to volunteer for 6 hours each week. The sequence shown represents the number of volunteer hours she has left after three weeks have passed.

   225, 219, 213, 207, . . .

   a. Describe this sequence.
   b. Use a formula to determine how many volunteer hours Greta has left to fulfill her requirement after 33 weeks have passed. Show your work.
   c. Which formula should you use to determine how many volunteer hours Greta has left to fulfill her requirement after 40 weeks have passed? Explain your reasoning.
   d. Calculate the number of volunteer hours Greta has left to fulfill her requirement after 40 weeks have passed. Explain what your answer means in terms of the problem situation.

2. The half-life of a substance is defined as the period of time it takes for the amount of the substance to decay by half. The sequence below shows the amount of a substance that will be left after a certain number of half-lives have elapsed.

   $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$

   a. Describe this sequence.
   b. Calculate how much of the substance will be left after 21 half-lives have elapsed. Show your work. Does your answer make sense in this problem context? Why or why not?

Stretch

Consider the first two terms of this sequence $\frac{1}{16}, -\frac{3}{16}, \ldots$

- Determine the 63rd term if this is an arithmetic sequence. Write your answer as a reduced improper fraction.
- Determine the 63rd term if this is a geometric sequence. Write your answer in scientific notation.

Review

1. Determine whether each given sequence is arithmetic or geometric. Then write the next 3 terms of the sequence.
   a. 3, −12, 48, −192, . . .
   b. 2.45, 3.86, 5.27, 6.68, . . .

2. Determine the independent and dependent quantities in each scenario. Include units when possible.
   a. A lamp manufacturing company produces 750 lamps per shift.
   b. A grocery store sells pears by the pound. A customer purchases 3 pounds for $5.07.

3. Determine the function family for each equation.
   a. $g(x) = -15(x - 2)^2 + 430$
   b. $h(x) = 3 \cdot (-5)^x - 17$