Lesson 3: Arithmetic and Geometric Sequences

Identify each of the following sequences as either arithmetic or geometric write the sequence in the columns below.

|  |  |
| --- | --- |
| Arithmetic | Geometric |
| 1.  2.  3. | 1.  2.  3. |

For each arithmetic sequence write the recursive formula and explicit formula

|  |  |
| --- | --- |
| **Recursive**  **an+1 = an + d** | **Explicit**  **an = a1 + (n - 1)d** |
| 1. |  |
| 2. |  |
| 3. |  |

For each geometric sequence write the recursive formula and explicit formula

|  |  |
| --- | --- |
| **Recursive**  **an+1 = an · r** | **Explicit**  **an = a1(r)n – 1** |
| 1. |  |
| 2. |  |
| 3. |  |

1. Find an explicit form in terms of ***a*** for each of the following arithmetic sequences (assume is some real number):
2. **, , ,...** is an arithmetic sequence for some real number .
   1. Find the value of .
   2. Find the 10th term of the sequence.
3. Find an explicit form of the arithmetic sequence where the 2nd term is and the sum of the 3rd term and 4th term is **.**
4. Consider the arithmetic sequence ....

a. Find an explicit form for the b. Find the 40th term c. If the th term is , find the value of .

sequence in terms of ***n***.

1. If forms an arithmetic sequence, find the values of , , and .

6. The first term in a geometric sequence is , and the 5th term is . Find an explicit form for the geometric sequence.

Lesson Summary

Two types of sequences were studied:

**ARITHMETIC SEQUENCE** (description). A sequence is called *arithmetic* if there is a real number  such that each term in the sequence is the sum of the previous term and .

**GEOMETRIC SEQUENCE** (description). A sequence is called *geometric* if there is a real number such that each term in the sequence is a product of the previous term and .

Problem Set

For problems 1–4, list the first five terms of each sequence, and identify them as arithmetic or geometric.

1. for and
2. for and
3. for and
4. for and

For problems 5–8, identify the sequence as arithmetic or geometric, and write a recursive formula for the sequence. Be sure to identify your starting value.

1. …
2. …
3. …
4. …
5. The local football team won the championship several years ago, and since then, ticket prices have been increasing $20 per year. The year they won the championship, tickets were $50. Is the sequence arithmetic or geometric? Write a recursive formula for a sequence that will model ticket prices.
6. A radioactive substance decreases in the amount of grams by one third each year. If the starting amount of the substance in a rock is g, is the sequence arithmetic or geometric? Write a recursive formula for a sequence that models the amount of the substance left after the end of each year.
7. Find an explicit form for each of the following arithmetic sequences (assume is some real number and is some real number):

a. ... b.

1. Consider the arithmetic sequence ....

a. Find an explicit form for the b. Find the 20th term c. If the th term is , find the value of .

sequence in terms of ***n***.

1. Find the common ratio and an explicit form in each of the following geometric sequences:
   1. ... b. ... c. ... d. ...

…

… …

…