9-1 Geometric Sequences

Objective: Recognize and extend geometric sequences. Find the nth term of a geometric sequence.

A geometric sequence is a sequence in which the ratio of successive terms is a constant r, called the common ratio, where r ≠ 0 and r ≠ 1.

A common ratio is the constant ratio of any term and the previous term, in a geometric sequence.

Example 1:

Find the next three terms in each geometric sequence.

1, 4, 16, 64,…

**256, 1024, 4096**

-9, 3, -1, , - ,….

**, - ,**

an = a1rn-1, where n is the nth term, a1 is the first term, and r is the common ratio.

Example 2:

The first term of a geometric sequence is 500 and the common ratio is 0.2. What is the 7th term of the sequence? **0.032**

For a geometric sequence, a1 = 5 and r = 2. Find the 6th term of this sequence. **160**

What is the 9th term of the sequence 2, -6, 18, -54,…? **13, 122**

Example 3:

A ball is dropped from a tower. The table shows the heights of the ball’s bounces, which form a geometric sequence. What is the height of the 6th bounce?

|  |  |
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| **Bounce** | **Height (cm)** |
| 1 | 300 |
| 2 | 150 |
| 3 | 75 |

**9.375 cm**