GEOMETRIC SEQUENCES

9.3.1

DEFINITION

- A <u>geometric sequence</u> has a pattern of multiplication or division
  - The ratio (i.e. the fraction) between two consecutive terms will always be the same
  - This ratio is called the constant ratio and is known as the letter "r", not to be confused with radius.

IS THIS SEQUENCE ARITHMETIC, GEOMETRIC, OR NEITHER?

- 7, 5, 3, 1, …
- 1, 1.5, 2, 2.5, 3, …
- 1, 2, 9, 16, 25, …
- 2, 4, 8, 16, …
- 100, 50, 25, 12.5, …
- 1, 1, 2, 3, 5, 8, …

COMPOUND INTEREST…

- **You deposit $600 into an account paying 3% interest, applied annually.**
    - **What is the sequence of the totals you will have in the account?**

    - **What is the constant ratio?**

RULES FOR GEOMETRIC SEQUENCE

- **Explicit**
  - $a_n = a_1(r)^{n-1}$
- **Cannot be simplified**

- $\begin{cases} a_n = the\ first\ term \\ a_n = a_n \cdot r \end{cases}$
  - **Where r = constant ratio**
  - **And a_{n-1} is the notation that means the phrase "the previous term"**

For the sequence 3, 12, 48, 192, find the 20th term.

GEOMETRIC MEAN

- You can use the geometric mean to find missing terms in a geometric sequence.
    - $\sqrt{xy}$ = geometric mean

    - Find the missing term: 5, _____, 911.25

    - Find the missing terms: 12.5, ____, _____, _____, 5.12