**Unit 1- Sequences and Series\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lesson 1.3: Geometric Sequences**

Specific Outcome: 1. Analyze geometric sequences and series to solve problems.

Coin Toss Outcomes

Work with a partner for the following activity

1. a) Toss a single coin. How many possible outcomes are there?

b) Toss two coins. How many possible outcomes are there?

c) Create a tree diagram to show the possible outcome for three coins.

2. Copy the table. Continue the pattern to complete the table.

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Coins,*n* | Number of Outcomes,tn | Expanded Form | Using Exponents |
| 1 | 2 | (2) | 21 |
| 2 | 4 | (2)(2) | 22 |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| *n* |  |  |  |

3. a) Describe how the terms of the sequence are related. Is this relationship different from an arithmetic sequence? Explain.

b) Predict the next two terms of the sequence. Describe the method you used to make your prediction.

c) Describe a method you could use to generate one term from the previous term.

d) For several pairs of consecutive terms in the sequence, divide the second term by the preceding term.

A geometric sequence is :

You can determine *r*, the common ratio, for any geometric sequence by dividing any term by the previous term:

Example 1: Which of the following sequences are geometric? State t1 and r values for those which are.

1. 3,6,9,12,….
2. 2,4,8,16,….
3. 12,3,¾, ….
4. *x, 2x, 3x…*

The *general term* of a geometric sequence where *n*  is a positive integer is:

Where *t1* is

*n* is

*r* is

*tn* is

Example 2: For the geometric sequence 4, 8, 16, 32, . . .,

1. find the general term.
2. find the value of *t*9.

Example 3: In a geometric sequence, the sixth term is 972 and the eighth term is 8748. Determine *t1*, *r,* and *tn***.**

Example 4: At the end of the fourth year, Archbishop O’Leary High School had a population of 1327 students. At the end of its tenth year, the school had 2036 students.

Assuming that the growth rate was consistent, find

1. the growth rate.
2. the number of students in the first year.

Example 5:

9, 15, 3x + 7 **. . .**  form a geometric sequence. Find the value of x.

**Assignment:** Pg. 39 questions 1,3c,d, 4, 5a,c, 7, 9, 11, 12, 14, 18, 20