**U5 Day 9 Geometric Sequence Notes**

A geometric sequence is a sequence of numbers with a common ratio between terms. For example, 3, 6, 12, 24… is a geometric sequence with the first term 3 and a common ratio of 2. We will typically denote the first term of a geometric sequence as a1 and its common ratio as r.

, where denotes the nth term of the sequence. Fill in the information below.

Ex. 3, 6, 12, 24, \_\_\_\_, \_\_\_\_, \_\_\_\_ \_\_\_\_,

 Recursive formula

Individual Practice: Give the next 3 terms in the sequence, then list the a­­1 and d values for each example below. Then write an equation describing the pattern.

1. 10, 30, 90, \_\_\_\_, \_\_\_\_, \_\_\_\_ \_\_\_\_,

 Recursive formula

1. 16, 8, 4, \_\_\_\_, \_\_\_\_, \_\_\_\_ \_\_\_\_,

 Recursive formula

1. – 2, – 10, – 50, \_\_\_\_, \_\_\_\_ \_\_\_\_,

 Recursive formula

1. – 1, 7, – 49, \_\_\_\_, \_\_\_\_ \_\_\_\_,

 Recursive formula

**Sequences with “n”**

Sequences with “n” where the formula is given

n = number of term in the sequence

ex. 2, 4, 6, 8, … 2 is n=1, 4 is n=2, 6 is n=3, 8 is n=4…

Find the first 4 terms of the following:

1. =7n
2. =n2 + 5
3. =

**U5 Day 9 Geometric Series Notes**

A geometric series is the sum of a geometric sequence. There are finite (partial) and infinite geometric series.

**Finite Geometric Series**

Sequence: Series:

, where is the number of terms, and is the 1st term.

Ex. Find the sum of the first 10 terms. Series:

Use the formula to find .

Individual Practice: Find the sum indicated.

1. 10, 30, 90, \_\_\_\_\_\_, \_\_\_\_\_\_, \_\_\_\_\_\_ \_\_\_\_, \_\_\_\_,
2. 16, 8, 4, \_\_\_\_\_\_, \_\_\_\_\_\_, \_\_\_\_\_\_ \_\_\_\_,
3. – 2, – 10, – 50, \_\_\_\_\_\_, \_\_\_\_\_\_ \_\_\_\_,
4. – 1, 7, – 49, \_\_\_\_\_\_, \_\_\_\_\_\_ \_\_\_\_,

**Infinite Geometric Series**

You can only find the sum of an infinite geometric series if the series converges (approaches a distinct number).

If , the series is “convergent” If , the series is “divergent”

, where is the 1st term, and is the common ratio, ONLY if the series converges.

Ex. Find the sum, if possible. Series:

1. First determine if it converges. Is ?
2. If it does converge, use the formula.

Individual Practice: Find the sum, if possible. (If it is not convergent, then just put “can’t find” next to )

1. convergent?
2. convergent?
3. convergent?
4. convergent?