NOTES: Geometric Sequences and Series

Geometric Sequence – A list of terms that are found by using a pattern of repeated multiplication. All the terms in the list have a common ratio. (r).

- To find (r) divide the 2nd term by the 1st term. Divide the 3rd term by the 2nd term. If the answers match, then that is the common ratio.

Ex: Find the common ratio in the following sequence: 3, 9, 27, 81, 243, …

Ex: Find the common ratio in the following sequence: 10, 20, 40, 80, 160, …

Find the next five terms of a sequence:

Ex: $a_1 = 6$, r = 2

Ex: $a_1 = 2$, r = 4

Recall the formulas for geometric sequences

Explicit: $a_n = a_1 r^{n-1}$ Recursive: $a_n = a_{n-1} r$

How do we use it?

Ex: Find the 10th term of the geometric sequence: 6, - 2, $\frac{2}{3}$,…

Sum of a finite / Partial Sum geometric series:

$$S_n = \frac{a_{1(1-r^n)}}{1-r}$$

Ex: Find S_{10} of the following geometric sequence:

3, 12, 48, 192, …

Ex: Find S_{32} of the same sequence above.

Ex: Find the 9th partial sum of the following:

50, 25, 12.5, 6.25, …