1.5 – Geometric Series (Finite and Infinite)

Specific Series # 2 – Finite Geometric Series

– **geometric series** → the indicated _____

where it's represented by the following formula: $S_n = \dfrac{a_1\left(1 - r^n\right)}{\left(1 - r\right)}$

_____ _____ _____ _____

* Reminder – Don't forget to put _____ around any "r" that is a _____ or a _____

Example 1: Find the sum of each finite geometric series.

a.) $a_1 = 8,\ r = -3,\ n = 7$	b.) $a_1 = 1{,}280\ ,\ a_9 = 5$	c.) $4 + 24 + \ldots + 31{,}104$	d.) $\sum_{n=4}^{18} 2(3)^{n-1}$

Example 2: Use the finite geometric series formula to complete each problem.

a.) The sum of first 8 terms is 39,360 and the common ratio is 3. What is the first term?	b.) The first term is – 3 and the common ratio is 4. How many terms were added together to get a sum of –16,383?

Specific Series # 3 – Infinite Geometric Series

– **infinite geometric series** → the indicated _____

where it's represented by the following formula: $S = \dfrac{a_1}{(1 - r)}$

▪ An infinite geometric series can do TWO THINGS:

1.) _____ → _____ where _____

2.) _____ → _____ where _____

Example 3: Determine if each series converges or diverges. If it's convergent, state the sum.

a.) $2+\frac{1}{2}+\frac{1}{8}+\frac{1}{32}+...$	b.) $\frac{1}{2}+\frac{3}{2}+\frac{9}{2}+\frac{27}{2}+...$	c.) $\sum_{n=1}^{\infty} 5\left(\frac{1}{2}\right)^{n-1}$	d.) $\sum_{n=1}^{\infty} -2\left(\frac{4}{3}\right)^{n-1}$

Example 4: Use the infinite geometric series formula to complete each problem.

a.) The sum of an infinite geometric series is 81, and its common ratio is ⅔. What is the first term?	b.) The first term in an infinite geometric series is – 34, and its sum is – 42.5. What is common ratio?	c.) Rewrite $1.\overline{42}$ as a series and then determine its fraction.