Pre-Calculus Name: _____

Notes 9.4 – Geometric Series

Sum of a Finite Geometric Series:

$$S_n = a_1 \frac{1-r^n}{1-r}$$

Sum of an Infinite Geometric Series:

$$\sum_{k=1}^{\infty} a_1 \cdot r^{n-1} = \frac{a_1}{1-r}, \text{ if \& only if } |r|<1$$

If an infinite series has a sum it is _____

If it does not it is called _____

Ex1) Find the sum of the given geometric series

a) $\sum_{n=1}^{11} 4\left(-\frac{1}{3}\right)^{n-1}$

b) $5 + 15 + 45 + \ldots + 98415$

c) $1+3+9+\ldots+2187$

d) $1-\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\ldots-\frac{1}{512}$

Ex2) Determine if the following series converge. If they do converge find the sum:

a) $\sum_{n=1}^{\infty} 3(0.75)^{n-1}$

b) $\sum_{n=0}^{\infty} \left(-\frac{4}{5}\right)^{n-1}$

c) $\sum_{n=1}^{\infty} \left(\frac{\pi}{2}\right)^{n}$

d) $\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{n-1}$