Advanced Functions – 1.5 WS: Geometric (F and I) Series Name: Key (answers only)

I. Find sum for each finite geometric series described. Must show work!

1.) $a_1 = 2$, $r = 2$, $n = 6$ $S_6 = 126$	2.) $64 - 96 + 144 - \ldots$ to 8 terms $S_8 = -630.5$ or $\frac{-1261}{2}$	3.) $a_7 = -192$ and $r = -2$ $S_7 = -129$
4.) $a_1 = \frac{1}{3}$ and $a_{10} = 6{,}561$ $S_{10} = 9841.\overline{3}$ or $\frac{29524}{3}$	5.) $-7 - 14 - 28 - \ldots - 3{,}584$ $S_{10} = -7161$	6.) $a_3 = -36$, $a_6 = -972$, $n = 5$ $S_5 = -484$

II. Use the geometric series formulas to complete each problem. Must show work!

7.) If the sum of the first 8 terms of a finite series is 1,530 and the common ratio is 2, then what is the first term? $a_1 = 6$	8.) If the sum of a finite series is 1,062,880, the first term is 4, and the common ratio is 3, then how many terms were there? 12 terms	9.) If the sum of an infinite series is 40 and the common ratio is 0.6, then what is the first term of the series? $a_1 = 16$	10.) If the sum of an infinite series is -48 and the first term is -12, then what is the common ratio? $r = .75$ or $\frac{3}{4}$

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

11.) $6 + 4 + \frac{8}{3} + \ldots$ converges to 18	12.) $4 - 8 + 16 - \ldots$ diverges	13.) $-98 - 73.5 - 55.125 - \ldots$ converges to -392
14.) $\frac{1}{3} + \frac{5}{6} + \frac{25}{12} + \ldots$ diverges	15.) $\frac{1}{2} - \frac{3}{8} + \frac{9}{32} - \ldots$ converges to $\frac{2}{7}$	16.) $3 + 1 + \frac{1}{3} + \ldots$ converges to $\frac{9}{2}$

IV. Find the sum (if it exists) using the appropriate method.

17.) $\sum_{n=3}^{10} 4(-3)^{n-1}$ $S_8 = -59040$	18.) $\sum_{n=1}^{\infty} 4\left(\frac{1}{5}\right)^{n-1}$ $S = 5$	19.) $\sum_{n=2}^{7} \frac{1}{4}(2)^{n-1}$ $S_6 = 31.5$ or $\frac{63}{2}$	20.) $\sum_{n=1}^{\infty} \frac{1}{2}\left(\frac{5}{4}\right)^{n-1}$ $S = $ DNE