Sequences and Series Practice   Name ______________________

I. Find the next four terms of each sequence and write the equation for the *n*th term.

1) 1000, 500, 250, 125, … 62.5, 31.25, 15.625, 7.8125 $a_n = 1000\left(\frac{1}{2}\right)^{n-1}$

$\frac{125}{2}$ $\frac{125}{4}$ $\frac{125}{8}$ $\frac{125}{16}$

2) 6, 18, 54 …   162, 486, 1458, 4374 $a_n = 6(3)^{n-1}$

II. Given the explicit formula for the sequence, find the first five terms and the named term in the problem.

1) $a_n = 10\left(\frac{3}{4}\right)^{n-1}$ 10, $^{15}/_{2}$, $^{45}/_{8}$, $^{135}/_{32}$, $^{405}/_{128}$

a_{23} = .0178380672

2) $a_n = 3^{n-1}$ 1, 3, 9, 27, 81

a_{18} = 129140163

III. Given the first term and the common ratio of a *geometric* sequence find the first five terms and the explicit formula.

1) $a_1 = 1,\ r = 2$ 1, 2, 4, 8, 16

$a_n = 1(2)^{n-1}$

IV. Given a term and the common ratio of a *geometric* sequence find the first five terms and the explicit formula.

1) $a_5 = -\frac{16}{27},\ r = \frac{2}{3}$ -3, $\frac{-2}{1}$, $\frac{-4}{3}$, $\frac{-8}{9}$, $\frac{-16}{27}$

$a_n = -3\left(\frac{2}{3}\right)^{n-1}$

V. Find the first five terms using the given recursive formula then write the general rule.

1) $a_1 = -2$
$a_{k+1} = 5a_k$

-2, -10, -50, -250, -1250 $a_n = -2(5)^{n-1}$

VI. Evaluate each series.

1) $\sum_{n=1}^{8} 4(5)^{n-1} = \frac{4(1-5^8)}{1-5} = 390624$

2) $\sum_{n=1}^{\infty} 2(.5)^{n-1} = \frac{2}{1-.5} = 4$

VII. Rewrite each series using sigma notation.

1) $8 + 16 + 32 + 64 + 128 + 256 + 512 = \sum_{n=1}^{7} 8(2)^{n-1}$

2) $12 + 6 + 3 + 1.5 + .75 = \sum_{n=1}^{5} (12)\left(\frac{1}{2}\right)^{n-1}$

VIII. Evaluate each geometric series.

1) $\sum_{n=1}^{31} 2(1.2)^{n-1} = \frac{2(1-1.2^{31})}{1-1.2} = 2838.515766$

2) -3 + -6 + -12 + -24 … Diverges because $r = 2 > 1$

3) $a_1 = -4,\ a_n = -31104,\ r = 6$

$\frac{-4(1-6^6)}{1-6} = -37324$