Algebra 2

9.1-9.5 Worksheet: Sequences and Series Compilation

Name: KEY

Date: _____ Period: _____

1.) Determine the 14th term for the given sequence $6, -12, 24, \ldots$

$A_N = A_1 \cdot R^{N-1}$

$A_{14} = (6)(-2)^{14-1}$

$A_{14} = -49152$

$\boxed{-49,152}$

2.) Find the 20th term of the arithmetic sequence whose first term is 40 and has a common difference of 1.75.

$A_N = A_1 + (N-1)(D)$

$A_{20} = 40 + (20-1)(1.75)$

$A_{20} = 73.25$

$\boxed{73.25}$

3.) How many terms are there in the sequence $2, 6, 18, \ldots, 39366$?

$A_N = A_1 \cdot R^{N-1}$

$39366 = (2)(3)^{N-1}$

$19683 = 3^{N-1}$

$\log_3 19683 = N - 1$

$N = (\log_3 19683) + 1$

$N = 10$

$\boxed{10^{TH} \text{ TERMS}}$

4.) For the sequence $12, 6, \ldots$, you find the number 0.375. What term is 0.375?

$A_N = A_1 \cdot R^{N-1}$

$0.375 = (12)(1/2)^{N-1}$

$0.03125 = (1/2)^{N-1}$

$\log_{(1/2)} .03125 = N - 1$

$N = (\log_{(1/2)} .03125) + 1$

$N = 6$

$\boxed{6^{TH} \text{ TERM}}$

5.) Find the sum of the first 50 positive even integers.

$2, 4, 6, 8, \ldots$

$S_N = \frac{N}{2}(A_1 + A_N)$

$S_{50} = \frac{50}{2}(2 + 100)$

$S_{50} = 2550$

$A_{50} = 2 + (50-1)(2)$

$A_{50} = 2 + (49)(2)$

$A_{50} = 100$

$\boxed{2550}$

6.) Given the sequence $256, 192, 144, 108, \ldots$

a.) Arithmetic / (Geometric) / Neither

$R = .75$

b.) Write an explicit rule for the sequence.

$A_N = (256)(.75)^{N-1}$

c.) Find a_{14}

$A_{14} = (256)(.75)^{14-1}$

$A_{14} = 6.0819$

d.) Find S_{20}

$S_{20} = \frac{256(1 - .75^{20})}{(1 - .75)}$

$S_{20} = 1020.7527$

7.) Given the sequence 137, 102, 67, 32, ...

a.) Arithmetic / Geometric / Neither

$D = -35$

b.) Write an explicit rule for the sequence.

$A_N = 137 + (N-1)(-35)$

$A_N = 137 - 35N + 35$

$A_N = -35N + 172$

c.) Find a_{14}

$A_{14} = -35(14) + 172$

$A_{14} = -318$

d.) Find S_{20}

$S_{20} = \frac{20}{2}(137 + (-528))$

$S_{20} = 10(-391)$

$S_{20} = -3910$

$A_{20} = 137 + (20-1)(-35)$

$A_{20} = 137 + (19)(-35)$

$A_{20} = -528$

8.) What term is 511 (A_N) in the following arithmetic sequence? 3, 7, 11, 15, ...

$511 = 3 + (N-1)(4)$

$508 = (N-1)(4)$

$127 = N-1$

$N = 128$

128 TH TERM

9.) Consider the following Series $16 + 24 + 36 + 54 + \cdots$

a.) Arithmetic / Geometric / Neither

$R = 1.5$

b.) What is the common difference / common ratio?

$R = 1.5$

c.) What is the explicit rule for the sequence?

$A_N = (16)(1.5)^{N-1}$

d.) Find S_{18}

$S_{18} = \frac{16(1-1.5^{18})}{(1-1.5)}$

$S_{18} = 47260.5402$

e.) How many terms ($N = ?$) were added together for the series sum to be 1813.28125? (S_N)

$1813.28125 = \frac{16(1-1.5^N)}{(1-1.5)}$

$-906.640625 = 16(1-1.5^N)$

$-56.66503906 = 1-1.5^N$

$-57.66503906 = -1.5^N$

$N = \log_{1.5} 57.66503906 = 10$

10.) Evaluate each.

a.) $\sum_{k=1}^{40}(2k+3)$

$S_{40} = \frac{40}{2}(5 + 83)$

$S_{40} = 1760$

b.) $\sum_{k=1}^{13} 3^{n-1}$ (R)

$S_{13} = \frac{1(1-3^{13})}{(1-3)}$

$S_{13} = 797161$