

## U5 Day 10 - Sigma Notation HW

Given the explicit formula for a geometric sequence find the first five terms and the 8th term.

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

$$a_8 = 3^{8-1} = 2187$$

2)  $a_n = -3 \cdot (-5)^{n-1}$     -3, 15, -75, 375, -1875

$$a_8 =$$

3)  $a_n = -243 \cdot \left(-\frac{1}{3}\right)^{n-1}$     -243, 81, -27, 9, -3

$$a_8 = -243 \cdot \left(-\frac{1}{3}\right)^{8-1} = 1117$$

4)  $a_n = (-6)^{n-1}$     1, -6, 36, -216, 1296

$$a_8 = -279,936$$

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

5)  $a_n = -\frac{2}{3} - \frac{1}{3}n$     -1,  $-\frac{4}{3}$ ,  $-\frac{5}{3}$ , -2,  $-\frac{7}{3}$

Find  $a_{26}$

$$-\frac{2}{3} - \frac{26}{3} = -\frac{28}{3}$$

6)  $a_n = \frac{35}{18} - \frac{3}{2}n$      $\frac{4}{9}$ ,  $-\frac{19}{18}$ ,  $-\frac{23}{9}$ ,  $-\frac{73}{18}$ ,  $-\frac{50}{9}$

Find  $a_{24}$

$$a_{24} = \frac{35}{18} - \frac{24}{2} = \frac{35}{18} - \frac{216}{18} = -\frac{181}{18}$$

7)  $a_n = -1 + 3n$     2, 5, 8, 11, 14

Find  $a_{21}$

$$a_{21} = -1 + 3(21) = 62$$

8)  $a_n = -8 - 6n$     -14, -20, -26, -32, -38, -44

Find  $a_{30}$

$$a_{30} = -8 - 6(30) =$$

Evaluate each arithmetic series described.

9)  $\sum_{n=1}^{13} (9n - 9) = 702$

10)  $\sum_{m=1}^9 (5m + 4) = 261$

11)  $\sum_{m=1}^8 (5m - 11) = 92$

12)  $\sum_{k=1}^5 (8k - 12) = 252$

Determine if each geometric series converges or diverges.

13)  $-1.1 + 2.75 - 6.875 + 17.1875 \dots$

Diverge

14)  $\frac{7}{4} + \frac{21}{8} + \frac{63}{16} + \frac{189}{32} \dots$      $\frac{21}{8} \left(\frac{4}{2}\right) = \frac{3}{2}$

Diverge

15)  $6 + 2 + \frac{2}{3} + \frac{2}{9} \dots$

Converge

16)  $\frac{625}{27} + \frac{125}{9} + \frac{25}{3} + 5 \dots$

$$\frac{125}{9} \left(\frac{27}{625}\right)^{\frac{3}{5}} = \frac{3}{5} \text{ Converge}$$

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Evaluate each geometric series described.

$$17) \sum_{n=1}^7 \left(\frac{2}{3}\right)^{n-1} \quad S_7 = \frac{1(1-(2/3)^7)}{1-2/3} = 2.8244701$$

$$19) \sum_{n=1}^7 -2 \cdot \left(-\frac{1}{4}\right)^{n-1}$$

$$a_1 = -2 \quad r = -1/4$$

$$21) 4 - 20 + 100 - 500 \dots, n=6$$

$$a_1 = 4 \quad r = -5$$

$$23) -2 - 6 - 18 - 54 \dots, n=8$$

$$a_1 = -2 \quad r = 3$$

$$18) \sum_{k=1}^9 4^{k-1} = \frac{1(1-4^9)}{(1-4)} = 87,381$$

$$20) \sum_{n=1}^7 0.2 \cdot (-5)^{n-1} = \frac{0.2(1-(-5)^7)}{(1-(-5))} = 2604.2$$

$$22) 2 + 12 + 72 + 432 \dots, n=6 \quad 23) \frac{2(1-6^6)}{(1-6)} = 18662$$

$$24) 1 + 4 + 16 + 64 \dots, n=7$$

$$21) S_6 = \frac{4(1-(-5)^6)}{1-5} = 15,624$$

$$24) \frac{(1-4^7)}{(1-4)} = 2730.5$$

$$22) S_8 = \frac{-2(1-3^8)}{(1-3)} = -6560$$

$$17) 1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \frac{16}{81} + \frac{32}{243} + \frac{64}{729} = 2.8244701$$

$$19) S_7 = \frac{-2(1-(-1/4)^7)}{(1-(-1/4))} = .1600097656$$