U9 Summation Notation  NOTES

Sigma (summation) Notation: \( \sum \) - Used to express the sum of a series:

\[ \sum \text{Explicit Rule} \]

3 + 4 + 5 + 6 means: \( \sum_{n=1}^{4} (n+2) \)

1) Find the sum of the series:
   a) \( \sum_{n=1}^{20} (-2n+1) \)
      Is this Arithmetic or Geometric?
      \( d = -2 \) or \( r = \)
      \[ S_{20} = \frac{20}{2} \left( -1 + 39 \right) \]
      \[ = \frac{-400}{2} \]

   b) \( \sum_{n=1}^{30} (5n) \)
   c) \( \sum_{n=1}^{10} (2)^n \)
   d) \( \sum_{n=1}^{4} \left( \frac{2}{3} \right)^n \)

   Is this Arithmetic or Geometric?
   Is this Arithmetic or Geometric?
   Is this Arithmetic or Geometric?
   d = \( \frac{5}{3} \) or \( r = \frac{2}{3} \)
   \[ S_{30} = \frac{30}{2} (5 + 150) \]
   \[ S_{10} = 6 \left( 1 - \frac{2^{10}}{1} \right) \]
   \[ S_{4} = \frac{3}{1 - \frac{2}{3}} \]

   a) \[ \sum_{n=1}^{5} 3(2)^{n-1} \]
   sum: 2325
   b) \[ \sum_{n=1}^{4} -5n+23 \]
   sum: 60, 138
   c) \[ \sum_{n=1}^{100} (n+1) \]
   sum: 9

2) Write the following series using summation notation.
   a) 3 + 6 + 12 + 24 + 48
   \[ \sum_{n=1}^{5} 3(2)^{n-1} \]
   \[ a_n = 18+ (n-1) (2) \]
   \[ 18 - 5n + 5 \]
   \[ -5n + 23 \]