

Solutions

SUMMATION NOTATION

Instructions. Put the first and last name of everyone in your workgroup at the top of your paper. Everyone is to do their own worksheet but only one from each group is graded with the score shared. Be sure to show your work and explain your reasoning.

(1) Evaluate the sum.

(a) \[ \sum_{i=1}^{4} \frac{1}{i} = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{25}{12} \]

(b) \[ \sum_{j=2}^{n} (-1)^j = (-n^3 + (-n)^3 + \ldots + (-n) = \begin{cases} 0 & \text{if } n \text{ odd} \\ 1 & \text{if } n \text{ even} \end{cases} \]

(c) \[ \sum_{i=0}^{3} 2^i = 2^0 + 2^1 + 2^2 + 2^3 = 15 \]

(2) Write the sum in sigma notation.

(a) \[ \frac{3}{7} + \frac{4}{8} + \frac{5}{9} + \frac{6}{10} + \ldots + \frac{23}{37} = \sum_{i=3}^{n} \frac{i}{n+i} \]

(b) \[ 1 + 2 + 4 + 8 + 16 + 32 = \sum_{i=0}^{5} 2^i \]

(c) \[ \sqrt{3} + \sqrt{4} + \sqrt{5} + \sqrt{6} + \sqrt{7} = \sum_{i=3}^{7} \sqrt{i} \]

(d) \[ 1 - x + x^2 - x^3 + \ldots + (-1)^n x^n = \sum_{i=0}^{n} (-1)^i x^i \]
