

Calculus Group Work Handout:

Summation Notation

Summation Properties:

1)

2)

3)

Special Summation Formulas:

1)

2)

A **closed form** for a summation is an expression that doesn't have a \sum in it, and is not written as the sum of n terms. For example:

$$4/n^2(1 + 2 + \dots + n) = \sum_{k=1}^n (4/n^2)k = (4/n^2) \sum_{k=1}^n k = (4/n^2) * ((n(n+1))/2) = (2(n+1))/n$$

Then $(2(n+1))/n$ is the closed form for $\sum_{k=1}^n (4/n^2)k$

Find a closed form for these summations:

$$1) \sum_{k=1}^n (6k - 10)$$

$$2) \sum_{k=1}^n (4k^2 - 3k + 5)$$

Find a closed form for these summations, and evaluate the limit:

$$3) \lim_{n \rightarrow \infty} \sum_{k=1}^n ((5k/n^2) + (2/n))$$

$$4) \lim_{n \rightarrow \infty} \sum_{k=1}^n (k^2/n^3)$$