

MATH 125 Worksheet 12 Summation and Arrays

1. Find the sum

a. $\sum_{K=2}^5 3 * k$

b. $\sum_{K=1}^4 5 * k^2$

c. $\left[\sum_{K=1}^4 5 * k \right]^2$

d. $\left[\sum_{K=0}^4 2(k-2) \right]^2$

e. $\left[\sum_{K=0}^3 (2k-1)^2 \right]^2$

f. $\sum_{K=1}^{12} (k+1)$

2. Write in sigma notation

a. $3+8+13+18+23+28+\dots\dots+48$

b. $(7+14+21+28+\dots\dots+77)^5$

c. $2^3 + 6^3 + 10^3 + \dots\dots + 50^3$

d. $(1+5+9+13+\dots\dots+437)^2$

e. $1^2 + 4^2 + 7^2 + \dots\dots + 163^2$

13.1 Summation Properties Worksheet

Directions. Use the *properties and formulas* discussed in class to evaluate each of the following summations, and answer the related questions.

$$1. \sum_{i=1}^{14} (3i + 2)$$

$$2. \sum_{i=1}^{12} (-2i^2 + 6)$$

$$3. \sum_{k=1}^{22} (-2k + 5)$$

$$4. \sum_{i=1}^{10} (i^3 - 2)$$

$$5. \sum_{n=8}^{24} (7n - 8)$$

$$6. \sum_{i=11}^{38} 18$$

$$7. \sum_{i=1}^{18} (i - 3)^2$$

$$8. \sum_{i=1}^{12} [(i - 7)(i + 7)]$$

$$9. \sum_{a=1}^7 (a-2)^3$$

$$10. \sum_{i=89}^{147} 0.7i - 32$$

11. Consider the series $-6 - 2 + 2 + 6 + \dots$. Find the number of terms, n , if $S_n = 640$.

12. Consider the series $-6 - 3 + 2 + 9 + \dots$. Find the number of terms, n , if $S_n = 1384$.

13. Consider the series $212 + 199 + 186 + 173 + \dots$. Find the number of terms, n , if $S_n = -4488$.

Math 229 Summation Worksheet

Summation Formulas

$$\sum_{i=1}^n c = \underbrace{c + c + \cdots + c}_{n \text{ times}} = n \cdot c$$

$$\sum_{i=1}^n i = 1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$$

$$\sum_{i=1}^n i^2 = 1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{i=1}^n i^3 = 1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4}$$

Evaluate

$$(1) \sum_{i=0}^3 (5 + \sqrt{4^i})$$

$$(2) \sum_{i=1}^{100} (4 + 3i)$$

$$(3) \sum_{i=1}^{200} (i - 3)^2$$

$$(4) \sum_{i=15}^{150} (4i + 1)$$

$$(5) \sum_{i=10}^{80} (i^3 + i^2)$$

$$(6) \sum_{i=1}^{20} \sin\left(\frac{i \cdot \pi}{2}\right)$$

$$(7) \sum_{i=7}^{32} \cos(i \cdot \pi)$$

$$(8) \sum_{i=25}^{150} \left(\frac{1}{i+4} - \frac{1}{i+5} \right)$$

(9) Compute the sum of the first 120 numbers in $3 + 7 + 11 + 15 + \cdots$

$$(10) \lim_{n \rightarrow \infty} \sum_{i=1}^n (1 + i + i^2)$$