

Math Xb Spring 2004
Worksheet: Summation Notation
February 25, 2004

1. Express the following sums and series using summation notation.

(a) $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$

(b) $4 + \frac{12}{5} + \frac{36}{25} + \cdots + \frac{4 \cdot 3^8}{5^8}$

(c) $7 - 14 + 28 - 56 + \cdots$

2. For each of the following series, determine if the series converges or diverges. If it converges, determine its sum.

(a) $\sum_{n=0}^{\infty} \frac{3}{2} \left(\frac{5}{2}\right)^n$

(b) $\sum_{n=0}^{\infty} \frac{15}{100} \left(\frac{1}{10}\right)^n$

(c) $\sum_{n=1}^{\infty} \frac{3}{2} \left(-\frac{2}{3}\right)^n$

3. Determine whether each of the following statements is always true or not always true.

$$(a) \sum_{i=1}^n c = nc$$

$$(b) \sum_{i=1}^n (a_i + b_i) = \sum_{i=1}^n a_i + \sum_{i=1}^n b_i$$

$$(c) \sum_{i=1}^n a_i b_i = \left(\sum_{i=1}^n a_i \right) \left(\sum_{i=1}^n b_i \right)$$

4. Which of the following are equal to $\sum_{i=1}^{10} 5 \cdot 2^i$?

$$(a) \sum_{i=0}^9 5 \cdot 2^i$$

$$(b) \sum_{i=0}^9 5 \cdot 2^{i+1}$$

$$(c) \sum_{i=1}^{2^{10}} 5i$$

$$(d) \sum_{k=4}^{13} 5 \cdot 2^{k-3}$$

$$(e) 5 \cdot 2^{11} - 10$$