

# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

## DEPARTMENT OF MATHEMATICS AND STATISTICS

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SECTION 1.1

Math 2000 Worksheet

WINTER 2020

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**For practice only. Not to be submitted.**

1. Simplify each of the following.

(a)  $\frac{(2i)!}{2 \cdot 4 \cdot 6 \cdots (2i)}$

(b)  $\frac{2 \cdot 4 \cdot 6 \cdots (2i)}{5 \cdot 10 \cdot 15 \cdots (5i)}$

2. Write the first five terms of the sequence defined by each of the following general terms  $a_i$ .

(a)  $a_i = \frac{\sin\left(\frac{i\pi}{2}\right)}{i^2}$

(b)  $a_i = (-1)^{i+1} \frac{1+i}{i!}$

(c)  $a_1 = 4, \quad a_{i+1} = \frac{a_i}{a_i + 2}$

3. Given the sequences

$$\{a_i\} = \{2i\} = \{2, 4, 6, 8, 10, \dots\} \quad \text{and} \quad \{b_i\} = \{2^i\} = \{2, 4, 8, 16, 32, \dots\}$$

find the formula for each of the following sequences and write the first five terms.

(a)  $\{a_i\} - \{b_i\}$

(b)  $4\{b_i\}$

(c)  $\{a_i\} \cdot \{b_i\}$

(d)  $\frac{\{b_i\}}{\{a_i\}}$

4. Find a formula, indexed from  $i = 1$ , for the general term  $a_i$  of each of the following sequences (assuming that the pattern of the first few terms continues).

(a)  $\left\{ \frac{1}{8}, \frac{2}{27}, \frac{3}{64}, \frac{4}{125}, \dots \right\}$

(b)  $\{-3, 8, -13, 18, \dots\}$

(c)  $\{10, 2, 10, 2, \dots\}$