

# CSE 230 : Discrete Mathematics

## Homework 02

**Problem A.** Let  $A$  and  $B$  sets. If  $A \subset B$ , what does it tell you about  $A \cup B$  and  $A \cap B$ ?

**Problem B.** List all the subset of  $\{a, b, \{2\}\}$

**Problem C.** List all the elements of  $\{a, b, c\} \times \{2, 3\}$

**Problem D.** A survey of students at a film school revealed the following information.

- 51 like animated films,
- 49 like comedy films,
- 60 like dramatic films,
- 34 like animated and comedy,
- 32 like comedy and dramatic,
- 36 like animated and dramatic,
- 24 like all three types,
- 1 does not like any of the three types.

Answer the questions on the using a 3-Set Venn Diagram:

- a) How many like only one of the three types of film?
- b) How many like animated and comedy but not dramatic?
- c) How many like animated and dramatic but not comedy?
- d) How many like either animated, dramatic or comedy?
- e) How many like either dramatic or comedy?
- f) How many like dramatic and comedy?
- g) How many students were surveyed?
- h) How many do not like animated

**Problem E.** Determine whether the functions are one-to-one or onto or both:

- a)  $f(n) = n - 1$  where  $f : Z \rightarrow Z$
- b)  $f(n) = n^3$  where  $f : Z \rightarrow R$
- c)  $f(n) = n^2 + 1$  where  $f : R \rightarrow R$
- d)  $f(n) = \lceil \frac{n}{2} \rceil$  where  $f : Z \rightarrow Z$
- e)  $f(m, n) = m + n$  where  $f : Z \times Z \rightarrow Z$
- f)  $f(n) = |n|$  where  $f : Z \rightarrow R$

**Problem F.** Compute the sums:

- a)  $\sum_{i=1}^3 \sum_{j=2}^5 (i + j)$
- b)  $\sum_{i=0}^2 \sum_{j=1}^3 (i^2 + j^3)$
- c)  $\sum_{j=0}^8 (2^{j+1} + 3^j)$