Name: Date:
ID:

CIS 185
Practice 6
Objective:

- Be able to determine set and subset
- Be able to determine the power set of a set
- Be able to use set operations (union, intersection, & Cartesian Product)

Exercise 1:
Determine whether each of these statements is true or false. Explain your reasoning.

a) $0 \in \emptyset$ False, the empty does not contain anything	c) $\{0\} \subset \emptyset$ False, the only subset of an empty set is an empty set
b) $\emptyset \in \{0\}$ False, set containing zero has no empty set	d) $\emptyset \subset \{0\}$ True, the empty set is a subset of every set
e) $\{0\} \in \{0\}$ False, set containing zero does not contain any sets	f) $\{0\} \subset \{0\}$ False, a set is always not a subset of itself

Exercise 2:
Define the sets A, B, C, and D as follows:

$A = \{-3, 0, 1, 4, 17\}$

$B = \{-12, -5, 1, 4, 6\}$

$C = \{x \in Z: x \text{ is odd}\}$

$D = \{x \in Z: x \text{ is positive}\}$

For each of the following set expressions, if the corresponding set is finite, express the set using roster notation. Otherwise, indicate that the set is infinite.

a) $A \cup (B \cap C)$ $\{-5, -3, 0, 1, 4, 17\}$

b) $A \cup C$ infinite

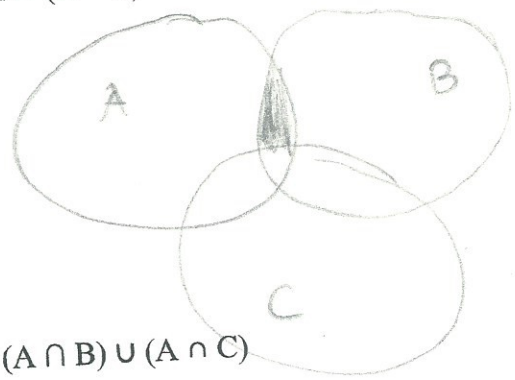
c) $A \cap B$ $\{1, 4\}$

d) $A \cup (C \cap D)$
infinite

Exercise 3:

Draw the Venn diagrams for each of these combinations of the sets A, B, and C.

a) $A \cap (B - C)$

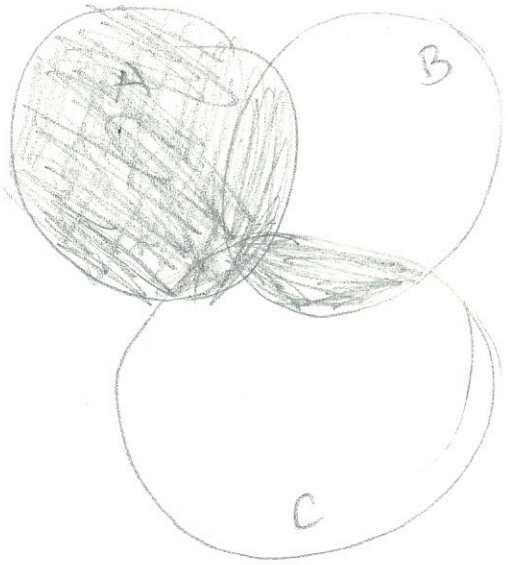


b) $(A \cap B) \cup (A \cap C)$

$(A \cap B) \cup (A \cap C) = A \cap (B \cup C)$

c) $(A \cup B) \cap (A \cup C)$

$A \cup (B \cap C)$



Exercise 4:

a. If S = {1,2,3}, then what is P(S)?

$P(S) = \{\emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}\}$

b. What is the power set of the set S = {1, 2, 3, 4}?

c. How many elements does the power set of S = {1, 2, 3, 4, 5, 6} have?

b) $\{\emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{1,4\}, \{2,3\}, \{2,4\}, \{3,4\}, \{1,2,3\}, \{1,3,4\}, \{2,3,4\}, \{4\}, \{1,2,4\}, \{1,2,3,4\}\}$

c) $2^6 = 64$