CECS 228 Name:

Lab 3.1 ID: Date:  
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 ∈ ∅ | c) {0} ⊂ ∅ |
| b) ∅ ∈ {0} | d) ∅ ⊂ {0} |
| e) {0} ∈ {0} | f ) {0} ⊂ {0} |

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 ∈ Z: x is odd}

D = {x ∈ Z: x 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 ∪ (B ∩ C)   
  
b) A ∪ C   
  
c) A ∩ B   
  
d) A ∪ (C ∩ D)

Exercise 3:  
Draw the Venn diagrams for each of these combinations of the sets A, B, and C.  
a) A ∩ (B − C)

b) (A ∩ B) ∪ (A ∩ C)

c) (A ∪ B) ∩ (A ∪ C)

Exercise 4:   
a. If S = {1,2,3}, then what is P(S)?

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?