Assignement#3 – CECS 228   
  
1. List the members of these sets.

a) {x | x is a real number such that x2 = 1}

b) {x | x is a positive integer less than 12}

c) {x | x is the square of an integer and x < 100}

d) {x | x is an integer such that x2 = 2}  
  
2. Determine whether each of these statements is true or false.

a) x ∈ {x} b) {x} ⊆ {x} c) {x} ∈ {x}

d) {x} ∈ {{x}} e) ∅ ⊆ {x} f ) ∅ ∈ {x}  
  
3. Find the power set of the set A = {a, b, c, 1, 2}  
  
4. Let A, B, and C be sets. Show that

a) (A ∪ B) ⊆ (A ∪ B ∪ C).

b) (A − C) ∩ (C − B) = ∅.

c) If A ⊆ C and B ⊆ D, then A × B ⊆ C × D  
  
5. Find the truth set of each of these predicates where the domain is the set of integers.

a) P(x): x3 ≥ 1   
b) Q(x): x2 = 2

c) R(x): x < x2  
  
6. Draw the Venn diagrams for each of these combinations

of the sets A, B, and C.

a) A ∩ (B ∪ C)   
b) ∩ ∩

c) (A − B) ∪ (A − C) ∪ (B − C)  
  
7. Prove or disprove: Suppose that f, g is a function from A to B. Show that if both f and g are one-to-one functions, then (f + g)(x) is also one-to-one, where (f+g)(x) = f(x) + g(x)  
  
8. Determine whether each of these functions is a bijection from **R** to **R**.

a) f (x) = −3x + 4

b) f (x) = −3x2 + 7

c) f (x) = (x + 1)/(x + 2)

d) f (x) = x5 + 1  
  
9. Determine whether the function f : **Z × Z → Z** is onto if

a) f (m, n) = m + n.

b) f (m, n) = m2 + n2.

c) f (m, n) = m.

d) f (m, n) = |n|.

e) f (m, n) = m − n.

10. Let f be a function from A to B. Let S be a subset of B. Show that ) = .  
  
11. Which of these collections of subsets are partitions of {−3,−2,−1, 0, 1, 2, 3}? Explain.

a) {−3,−1, 1, 3}, {−2, 0, 2}

b) {−3,−2,−1, 0}, {0, 1, 2, 3}

c) {−3, 3}, {−2, 2}, {−1, 1}, {0}

d) {−3,−2, 2, 3}, {−1, 1}