1. Let T = {m ∈ **Ζ** ⎮m = 1 + (-1)i, for some integer i}. Describe T.
2. Let A = {m ∈ **Ζ** ⎮m = 2i - 1, for some integer i},

B = {n ∈ **Ζ** ⎮n = 3j + 2, for some integer j},

C = {p ∈ **Ζ** ⎮p = 2r + 1, for some integer r}, and

D = {q ∈ **Ζ** ⎮q = 3s – 1, for some integer s}.

1. Describe the 4 sets (by enumerating their elements).
2. Is A = D? Explain.
3. Is B = D? Explain.
4. Let R, S, and T be defined as follows:

R = {x ∈ **Ζ** ⎮ x is divisible by 2},

S = {y ∈ **Ζ** ⎮ y is divisible by 3},

T = {z ∈ **Ζ** ⎮ z is divisible by 6}.

1. Describe the 3 sets (by enumerating their elements).
2. Is T ⊆ S? Explain.
3. Find R ∩ S. Explain.
4. Let A = {a, b, c}, B = {b, c, d}, and C = {b, c, e}.
5. Find A ∩ ( B ∪ C), (A ∩ B) ∪ C, and (A ∩ B) ∪ (A ∩ C). Which of these sets are equal?
6. Find (A − B) − C and A − (B − C). Are these sets equal?
7. For all sets A, B, and C,

(A − B) ∩ (C − B) = A − (B ∪ C).

Either prove it is true (from the definitions of the set operations) or find a counterexample to show that is false.

1. For all sets A, B, and C,

if A ∩ C ⊆ B ∩ C and A ∪ C ⊆ B ∪ C, then A = B.

Either prove it is true (from the definitions of the set operations) or find a counterexample to show that is false.

1. For all sets A, B, and C,

(A ∪ B) ∩ C = A ∪ (B ∩ C).

Either prove it is true (from the definitions of the set operations) or find a counterexample to show that is false.

1. Derive the following property:

For all sets A, B, and C,

(A − B) − C = (A − C) − B.

1. Derive the following property:

For all sets A and B,

A − (A − B) = A ∩ B.

1. Suppose A, B, and C are sets.
2. Are A − B and B − C necessarily disjoint? Explain.
3. Are A − B and C − B necessarily disjoint? Explain
4. Are A − (B ∪ C) and B − (A ∪ C) necessarily disjoint? Explain.
5. Let S = {a, b, c} and for each integer i = 0, 1, 2, 3, let Si be the set of all subsets of S that have i elements. List the elements in S0, S1, S2, and S3. Is {S0, S1, S2, S3} a partition of ℘(S) (the power set of S)?