**6.2**

**10.** Draw Venn Diagrams to help solve the problem

**Proof:**

Suppose A, B, C are any sets. To show that (A − B) ∩ (C − B) = (A ∩ C) – B, we must show that

(A − B) ∩ (C − B) ⊆ (A ∩ C) – B and that (A ∩ C) – B ⊆ (A − B) ∩ (C − B).

**(A − B) ∩ (C − B) ⊆ (A ∩ C) – B:** Suppose that x is any element in (A − B) ∩ (C − B). *[We must show that x ∈ (A ∩ C) – B.]* By definition of intersection, x ∈ (A − B) and x ∈ (C − B).

Then, by definition of set difference, x ∈ A, x ∈ C and x ∉ B. By definition of intersection x ∈ A ∩ C and x ∉ B and so, by definition of set difference, x ∈ (A ∩ C) – B. So, (A − B) ∩ (C − B) ⊆ (A ∩ C) – B.

**(A ∩ C) – B ⊆ (A − B) ∩ (C − B):** Suppose that x is any element in (A ∩ C) – B. *[We must show that x ∈ (A − B) ∩ (C − B).]* By definition of set difference x ∈ (A ∩ C) and x ∉ B. By definition of intersection x ∈ A and x ∈ C. And so by definition of set difference x ∈ (A − B) and x ∈ (C − B). By definition of intersection x ∈ (A − B) ∩ (C − B). So, (A ∩ C) – B ⊆ (A − B) ∩ (C − B).

**7.1**

**2a.** domain of , co-domain of

**b.**

**c.** range of

**d.** No, Yes

**e.** inverse image of , inverse image of

**f.**

**7.2**

**9a.** X f Y **9b.** X g Z

1

2

1

2

3

1

2

3

4

1

2

3

**9c.** X h X X k X

1

2

3

1

2

3

1

2

3

1

2

3

**21a.** No, multiple strings can have the same length. {0}, {1} have the same length.

**21b.** Yes, because each element maps to at least element in the co-domain.

**8.2**

**15.** Reflexive: For all pos ints m, m D m, m=m\*1.

Symmetric: No, for example m=3, n=9 m|n but n|m is not a positive integer

Transitive: m,n,s are positive integers, if m|n and n|s then m|s

**9.5**

**6a.** 15 choose 6

**b.** 13 choose 5 + 13 choose 5 + 13 choose 6

**c.** 13 choose 4 + 13 choose 6

**di.** 8 choose 3 \* 7 choose 3

**dii.**

**e.**