hOME WORK

**#2.1,2.2**

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**#2.1**

6. Suppose that A = {2, 4, 6}, B = {2, 6}, C = {4, 6}, and D = {4, 6, 8}. Determine which of these sets are subsets of which other of these sets.

Answer: B is a subset of A ,C is a subset of both A and D.

10. Determine whether these statements are true or false.

a) ∅ ∈ {∅} True

b) ∅ ∈ {∅,{∅}} True

c) {∅} ∈ {∅} False

d) {∅} ∈ {{∅}} True

e) {∅} ⊂ {∅,{∅}} True

f) {{∅}} ⊂ {∅,{∅}} True

g) {{∅}} ⊂ {{∅},{∅}} False

16. Use a Venn diagram to illustrate the relationships A ⊂ B and A ⊂ C.

**Case 1: Neither set is a subset of the other set.**

**B**

**Case 2: C is a subset of B. C ⊂ B**

**C**

**Case 3: B is a subset of C. B ⊂ C**

22. Can you conclude that A = B if A and B are two sets with the same power set?

Answer: Yes

32. Let A = {a, b, c}, B = {x, y}, and C = {0, 1}. Find

a) A × B × C.

{(a, x,0), (a, x,1), (a, y,0), (a, y,1), (b, x,0), (b, x,1), (b, y,0), (b, y,1), (c, x,0), (c, x,1), (c, y,0), (c, y,1)}

b) C × B × A.

**{(0, x, a), (0, x, b), (0, x, c), (0, y, a), (0, y, b), (0, y, c), (1, x, a), (1, x, b), (1, x, c), (1, y, a), (1, y, b),**

**(1, y, c)}**

c) C × A × B.

**{(0, a, x), (0, b, x), (0, c, x), (0, a, y), (0, b, y), (0, c, y), (1, a, x), (1, b, x), (1, c, x), (1, a, y), (1, b, y),**

**(1, c, y)}**

d) B × B × B.

**{(x, x, x), (x, x, y), (x, y, x), (x, y, y), (y, x, x), (y, x, y), (y, y, x), (y, y, y)}**

44. Find the truth set of each of these predicates where the domain is the set of integers.

a) P (x): x3 ≥ 1

**{1,2,3…….}**

b) Q(x): x2 = 2

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c) R(x): x<x2

**{……., -3, -2, -1, 2, 3, 4, …...}**

**#2.2**

4. Let A = {a, b, c, d, e} and B = {a, b, c, d, e, f, g, h}. Find

a) A ∪ B

{a, b, c, d, e, f, g, h}

b) A ∩ B.

{a, b, c, d, e}

c) A − B.

{ }

d) B – A

{f, g, h}

19. Show that if A and B are sets, then

a) A − B = A ∩ B.

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**A − B = A ∩ B.**

b) (A ∩ B) ∪ (A ∩ B) = A.

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**(A ∩ B) ∪ (A ∩ B) = A.**

30. Can you conclude that A = B if A, B, and C are sets such that

a) A ∪ C = B ∪ C?

**NO**

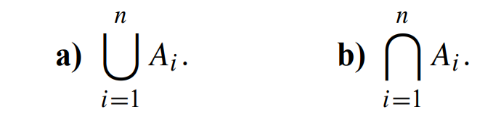
b) A ∩ C = B ∩ C?

**NO**

c) A ∪ C = B ∪ C and A ∩ C = B ∩ C?

**A=B**

48. Let Ai = {..., −2, −1, 0,1…….i}. Find



1. **An = {………, -2, -1, 0, 1, ……, n}**
2. **A1 = {………, -2, -1, 0, 1}**

52. Suppose that the universal set is U = {1, 2, 3, 4,5, 6, 7, 8, 9, 10}. Express each of these sets with bit strings where the *i* th bit in the string is 1 if *i* is in the set and 0 otherwise.

a) {3, 4, 5}  **0011100000**

b) {1, 3, 6, 10} **1010010001**

c) {2, 3, 4, 7, 8, 9}  **0111001110**

56. What is the bit string corresponding to the symmetric difference of two sets?

**Bit A=0 and Bit B=0: Symmetric difference.**

**Bit A=0 and Bit B=1: Symmetric difference.**

**Bit A=1 and Bit B=0: Symmetric difference.**

**Bit A=1 and Bit B=1: Symmetric difference.**