EXERCISE 13D

1. If A = {4, 5, 6, 7, 8} and B = {6, 8, 10, 12}, find :
(i) A∪B
(ii) A∩B
(iii) A-B
(iv) B-A
Solution:

(i) A∪B
We know that
A∪B = {All the elements from set A and all the elements from set B} = {4, 5, 6, 7, 8, 10, 12}

(ii) A∩B
We know that
A∩B = {Elements which are common to both the sets A and B} = {6, 8}

(iii) A-B
We know that
A – B = {Elements of set A which are not in set B} = {4, 5, 7}

(iv) B-A
We know that
B - A = {Elements of set B which are not in set A} = {10, 12}

2. If A = {3, 5, 7, 9, 11} and B = {4, 7, 10}, find:
(i) n(A)
(ii) n(B)
(iii) A∪B and n(A∪B)
(iv) A∩B and n(A∩B)
Solution:

(i) n(A) = {3, 5, 7, 9, 11} = 5

(ii) n(B) = {4, 7, 10} = 3

(iii) A∪B = {3, 4, 5, 7, 9, 10, 11}
n(A∪B) = 7

(iv) A∩B = {7}
n(A∩B) = 1

3. If A = {2, 4, 6, 8} and B = {3, 6, 9, 12}, find:
(i) (A ∩ B) and n(A ∩ B)
(ii) (A – B) and n(A – B)
(iii) n(B)
Solution:

(i) (A ∩ B) = {6}
n(A ∩ B) = 1

(ii) (A – B) = {2, 4, 8}
n(A – B) = 3

(iii) n(B) = {3, 6, 9, 12} = 4

4. If P = {x : x is a factor of 12} and Q = {x: x is a factor of 16}, find :
(i) n(P)
(ii) n(Q)
(iii) Q – P and n(Q – P)
Solution:

(i) n(P) = Factors of 12 = 1, 2, 3, 4, 6, 12
n(P) = 6

(ii) n(Q) = Factors of 16 = 1, 2, 4, 8, 16
n(Q) = 5

(iii) Q – P and n(Q – P)
We know that
Elements of set P = {1, 2, 3, 4, 6, 12}
Elements of set Q = {1, 2, 4, 8, 16}
So we get
Q – P = 8, 16
n (Q – P) = 2

5. M = {x : x is a natural number between 0 and 8) and N = {x : x is a natural number from 5 to 10}. Find:
(i) M – N and n(M – N)
(ii) N – M and n(N – M)
Solution:

We know that
Natural numbers between 0 and 8 M = {0, 1, 2, 3, 4, 5, 6, 7}
Natural numbers between 5 and 10 N = {6, 7, 8, 9, 10}

(i) M – N = {1, 2, 3, 4}
n(M – N) = 4

(ii) N – M = {8, 9, 10}
n(N – M) = 3

6. If A = {x: x is natural number divisible by 2 and x< 16} and B = {x: x is a whole number divisible by 3 and x < 18}, find :
(i) n(A)
(ii) n(B)
(iii) A∩B and n(A∩B)
(iv) n(A – B)
Solution:

It is given that
A = {x: x is natural number divisible by 2 and x< 16} = {2, 4, 6, 8, 10, 12, 14}

B = {x: x is a whole number divisible by 3 and x < 18} = {3, 6, 9, 12, 15, 18}

(i) n(A) = 7

(ii) n(B) = 6

(iii) A∩B = {2, 4, 6, 8, 10, 12, 14} ∩ {3, 6, 9, 12, 15, 18} = {6, 12}
n(A∩B) = 2

(iv) We know that
A – B = {2, 4, 6, 8, 10, 12, 14} – {3, 6, 9, 12, 15, 18} = {2, 4, 8, 10, 14}
n(A – B) = 5

7. Let A and B be two sets such that n(A) = 75, M(B) = 65 and n(A ∩ B) = 45, find :
(i) n(A∪ B)
(ii) n(A – B)
(iii) n(B – A)
Solution:

It is given that
n(A) = 75, M(B) = 65 and n(A ∩ B) = 45

(i) n(A∪ B) = n(A) + n(B) – n(A ∩ B)
Substituting the values
n(A∪ B) = 75 + 65 – 45
So we get
n(A∪ B) = 95

(ii) n(A – B) = n(A) – n(A ∩ B)
Substituting the values
n(A – B) = 75 – 45
So we get
n(A – B) = 30

(iii) n(B – A) = n(B) - n(A ∩ B)
Substituting the values
n(B – A) = 65 – 45
So we get
n(B – A) = 20

8. Let A and B be two sets such that n(A) = 45, n(B) = 38 and n(A ∪B) = 70, find :
(i) n(A∩B)
(ii) n(A-B)
(iii) n(B – A)
Solution:

It is given that
n(A) = 45, n(B) = 38 and n(A ∪B) = 70

(i) n(A∩B) = n(A) + n(B) - n(A ∪B)

Substituting the values
$n(A \cap B) = 45 + 38 - 70$
So we get
$n(A \cap B) = 13$

(ii) $n(A-B) = n(A \cup B) - n(B)$
Substituting the values
$n(A-B) = 70 - 38$
So we get
$n(A - B) = 32$

(iii) $n(B - A) = n(A \cup B) - n(A)$
Substituting the values
$n(B - A) = 70 - 45$
So we get
$n(B - A) = 25$

9. Let n(A) 30, n(B) = 27 and n(A∪B) = 45, find :
(i) n(A∩B)
(ii) n(A-B)
Solution:

It is given that
n(A) 30, $n(B) = 27$ and $n(A \cup B) = 45$

(i) $n(A \cap B) = n(A) + n(B) - n(A \cup B)$
Substituting the values
$n(A \cap B) = 30 + 27 - 45$
So we get
$n(A \cap B) = 12$

(ii) $n(A-B) = n(A \cup B) - n(B)$
Substituting the values
$n(A-B) = 45 - 27$
So we get
$n(A-B) = 18$

10. Let n(A) = 31, n(B) = 20 and n(A ∩ B) = 6, find:
(i) n(A-B)
(ii) n(B – A)
(iii) n(A ∪B)
Solution:

It is given that
$n(A) = 31$, $n(B) = 20$ and $n(A \cap B) = 6$

(i) $n(A-B) = n(A) - n(A \cap B)$
Substituting the values
$n(A-B) = 31 - 6$
So we get

$n(A-B) = 25$

(ii) $n(B – A) = n(B) - n (A\cap B)$
Substituting the values
$n(B – A) = 20 – 6$
So we get
$n(B – A) = 14$

(iii) $n(A \cup B) = n(A) + n(B) - n (A\cap B)$
Substituting the values
$n(A \cup B) = 31 + 20 – 6$
So we get
$n(A \cup B) = 45$