Al Moattassem International School - Jubail

Revision 5 - Chapter 14 - Sets

Solve the following :

Q1) A is the set of even positive integers less than 10.

a) List all the elements of A in set notation.
b) State whether each of the following statements is True or False.

i) $8 \in A$ ii) $7 \notin A$

iii) $10 \in A$ iv) $0 \notin A$

Solution:

(a) $A = \{2, 4, 6, 8\}$

(b) **(i)** True

(ii) True

(iii) False

(iv) True

Q2) Given that B = { 3,6,9,12…….30} find the value of n(B).

Solution:

$n(B) = 10$

Q3) It is given that P = {x:x is a positive integer less than 1} and Q = {0}

i) List all the elements of P in set notation

ii) Are P and Q equal sets? Why?

Solution:

(i) $P = \{\ \}$

(ii) P and Q are not equal sets, as P is an empty set while Q consists of an element, 0.

Q4) It is given that Ξ = {x:x is an integer between 1 and 13 inclusive}

And B = { x:x is a prime number}

i) List all the elements of Ξ and of B in set notation.

ii) Draw a Venn Diagram to represent the sets Ξ and B.

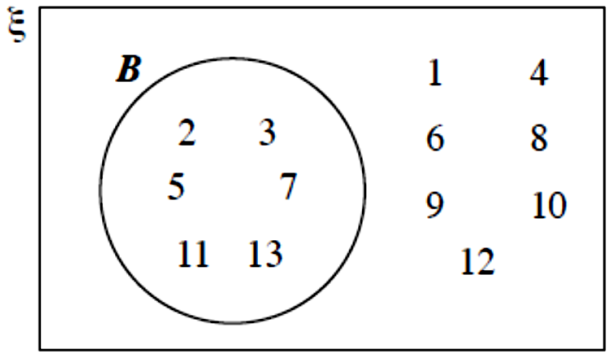
iii) From the Venn Diagram, list all the elements of B' in set notation.

iv) Describe the set B' in words.

Solution:

(i) $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$ and
$B = \{2, 3, 5, 7, 11, 13\}$

(ii)



(iii) $B' = \{1, 4, 6, 8, 9, 10, 12\}$

(iv) B' is the set of all integers between 1 and 13 inclusive which are not prime numbers.

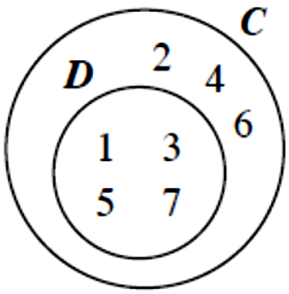
Q5) It is given that C = {1,2,3,4,5,6,7} and D = { 1,3,5,7}

i) Draw a venn diagram to represent the sets C and D.

ii) Is D a proper subset of C? Explain.

Solution:

(i)



(ii) Yes, D is a proper subset of C because every element of D is an element of C, and $D \neq C$.

Q6) List all the a) subsets and b) Proper subsets of

i) S = {7,8}

ii) T = { a,b,c }

Solution:

(i) **(a)** $\{7\}, \{8\}, \{7, 8\}$ **,{ }**

(b) $\{7\}, \{8\}$ **, { }**

(ii) **(a)** $\{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}$ **,{ }**

(b) $\{\ \}, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}$ **,{ }**

Q7) It is given that E = { x:x is a positive integer and a factor of 12}

and F = { x:x is a prime number between 5 and 13 inclusive}

i) List all the elements in E and in F in set notation.

ii) Find E∩F. Explain.

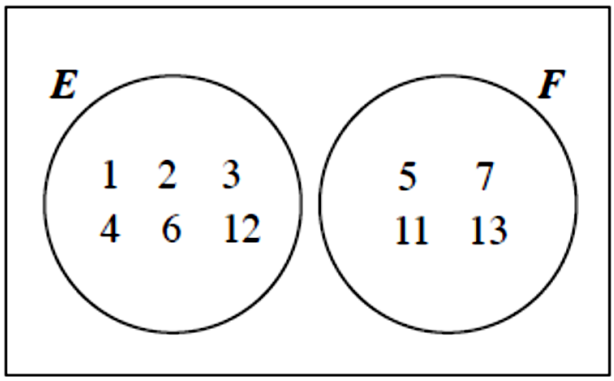
iii) Draw a venn diagram to represent the sets E and F.

Solution:

(i) $E = \{1, 2, 3, 4, 6, 12\}$ and $F = \{5, 7, 11, 13\}$

(ii) $E \cap F = \varnothing$ since E and F do not share any common elements.

(iii)



Q8) It is given that E= { x:x is a multiple of 7 such that 0 < x < 63 }

And F={ x:x is a multiple of 9 such that 0 < x < 63 }

i) List all the elements in E and F in set notation.

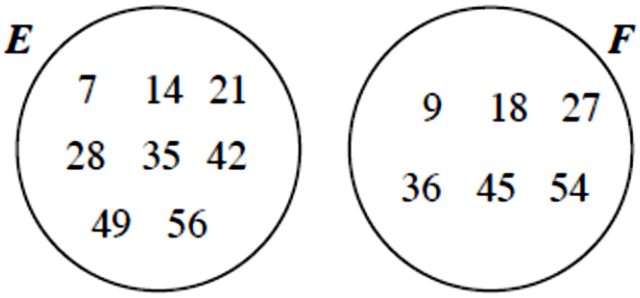
ii) Draw a venn diagram to represent the sets E and F

iii) From the Venn Diagram, find E∪F

Solution:

(i) $E = \{7, 14, 21, 28, 35, 42, 49, 56\}$ and
$F = \{9, 18, 27, 36, 45, 54\}$

(ii)



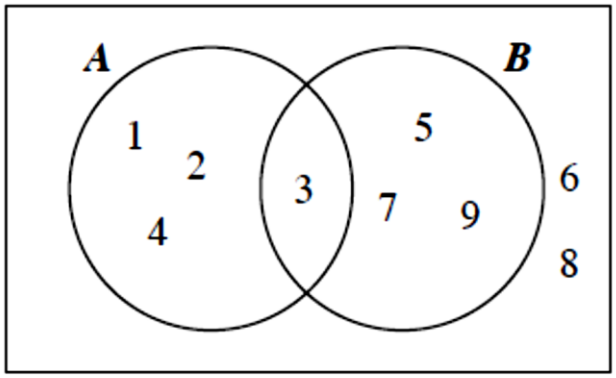
(iii) $E \cup F = \{7, 9, 14, 18, 21, 27, 28, 35, 36, 42, 45, 49, 54, 56\}$

Q9) It is given that ξ = {1,2,3,…9}, Draw Venn Diagrams to illustrate the following sets. In each case, find A∪B.

a) A= {1,2,3,4} B ={3,5,7,9}
b) A = {1,3,5,7,9} B= {2,4,6,8}
c) A = {4,8} B={2,4,6,8}
d) A ={multiples of 3} B={prime numbers}
e) A={multiples of 4} B= {multiples of 2}

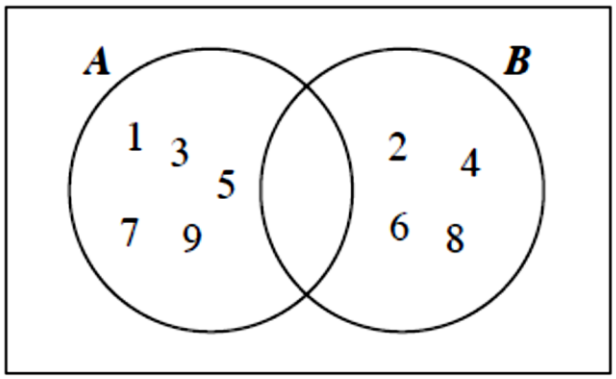
Solution:

(i)



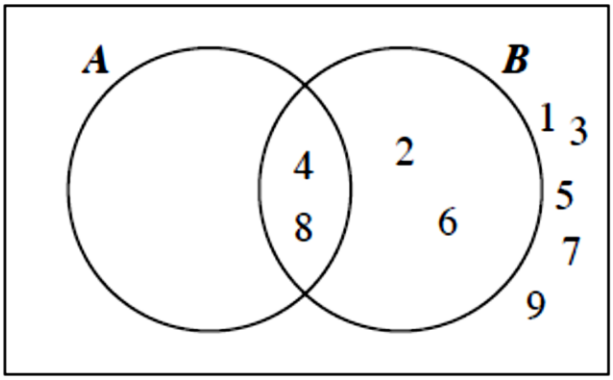
$A \cup B = \{1, 2, 3, 4, 5, 7, 9\}$

(ii)



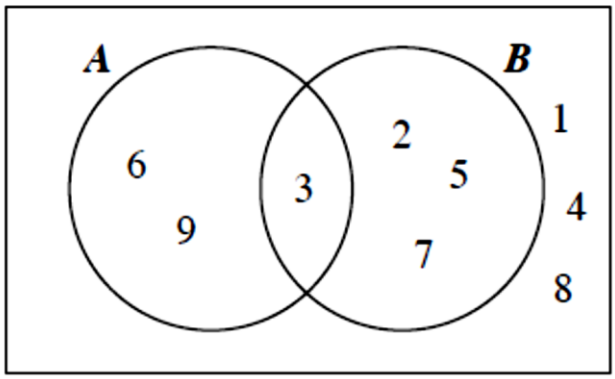
$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

(iii) ξ



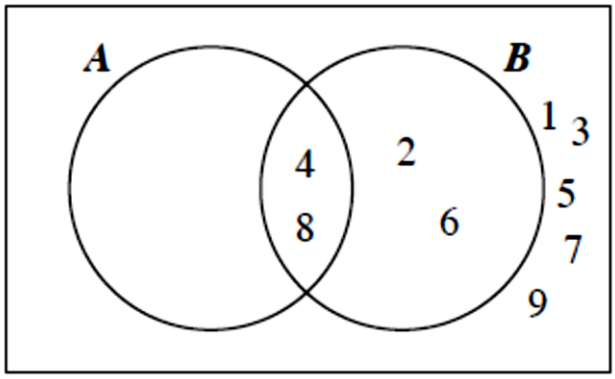
$A \cup B = \{2, 4, 6, 8\}$

(iv) ξ



$A \cup B = \{2, 3, 5, 6, 7, 9\}$

(v) ξ



$A \cup B = \{2, 4, 6, 8\}$