



MATHS

BOOKS - ICSE

SETS

Example

1. Let $A = \{ 2,3,4,5,6 \}$ and $B = \{ 4,6,8,10 \}$ Find $A \cup B$



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2. Let $A = \{ 2, 4, 6, 8, 10 \}$ and $B = \{ 3, 6, 9 \}$ Find $A \cup B$.





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3. Let $A = \{a, b, c, d\}$, $B = \{b, c, e\}$ and $C = \{d, e, f\}$

Verify that :

$$A \cup B = B \cup A$$



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4. Let $A = \{a, b, c, d\}$, $B = \{b, c, e\}$ and $C = \{d, e, f\}$

Verify that :

$$(A \cup B) \cup C = A \cup (B \cup C)$$



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5. Let $A = \{2, 4, 6, 8, 10, 12\}$ and $B = \{3, 6, 9, 12, 15, 18\}$ Find $A \cap B$



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6. Let $M = \{x : x \text{ is a factor of } 12\}$ and $N = \{x : x \text{ is a factor of } 16\}$ Find $M \cap N$



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7. Let $P = \{x : x \text{ is a positive integer, } x < 6\}$



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8. Let $A = \{2, 3, 5, 7, 9\}$ and $B = \{2, 3, 4, 5, 6\}$ Find $A - B$ and $B - A$



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9. Let $M = \{ 3,6,9, 12, 15\}$ and $N = \{ 6, 12, 18, 24 \}$. Find $M - N$ and

$N - M$

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10. In a class of 45 students each one plays either Cricket or Hockey. If 30 play Cricket and 27 play Hockey then :

how many play both Cricket and Hockey ?

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11. In a class of 45 students each one plays either Cricket or Hockey. If 30 play Cricket and 27 play Hockey then :

how many play Cricket only ?

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12. In a class of 45 students each one plays either Cricket or Hockey. If 30 play Cricket and 27 play Hockey then :
how many play Hockey only ?

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13. In a group of 50 people . 31 like tea , 20 like coffee and 6 like both tea and coffee.
how many like tea only ?

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14. In a group of 50 people . 31 like tea , 20 like coffee and 6 like both tea and coffee.

How many like coffee only ?

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15. In a group of 50 people . 31 like tea , 20 like coffee and 6 like both tea and coffee.

How many like none of tea and coffee ?

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16. It is found that out of 100 students .25 can drive neither a scooter nor a , while 15 can drive both these and 52 of them can drive a scooter . How many can drive a car?



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17. In a class of 50 pupils ,20 have offered French but not Hindi and 32 have offered French .

How many have offered both ?



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18. In a class of 50 pupils ,20 have offered French but not Hindi and 32 have offered French .

How many have offered Hindi but not French ?



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1. Which of the following collections are sets?

All books in your school library ?

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2. Which of the following collections are sets?

All red flowers in a park.

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3. Which of the following collections are sets?

All good players in your school.

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4. Which of the following collections are sets?

All fictions movies

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5. Which of the following collections are sets?

All easy problems in your book on mathematics.

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6. Which of the following collections are sets?

All poor people in Mumbai.

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7. Which of the following collections are sets?

All boys in your class weighing less than 50 kg.

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8. Which of the following collections are sets?

All persons are repute in your colony .

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9. Which of the following collections are sets?

All even number greater than 100.

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10. Which of the following collections are sets?

All integers less than -5.

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11. Write each of the following sets in Roster form:

A = set of all prime numbers between 70 and 100.

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12. Write each of the following sets in Roster form:

B = set of all whole number less than 8.

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13. Write each of the following sets in Roster form:

C = set of all integers lying between -7 and 2.

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14. Write each of the following sets in Roster form:

D = set of all composite numbers between 23 and 33.

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15. Write each of the following sets in Roster form:

E = set of letters in the word , ' MATHMEATICS''

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16. Write each of the following sets in Roster form:

F = set of consonants in the word , "SECONDARY"

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17. Write each of the following sets in Roster form:

G= st of vowels in the word , " INTERMEDIATE"

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18. Write each of the following sets in Roster form and write the cardinal number of each .

A= { x: x is an integer , $- 3 < x \leq 4$ }

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19. Write each of the following sets in Roster form and write the cardinal number of each .

$$B = \{x : x \in N, 3x - 6 < 9\}$$

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20. Write each of the following sets in Roster form and write the cardinal number of each .

$$C = \{x : x = n^2, n \in N, 10 < n < 16\}$$

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21. Write each of the following sets in Roster form and write the cardinal number of each .

$$D = \{x : x \in W, x - 3 < 2\}.$$



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22. Write each of the following sets in Roster form and write the cardinal number of each .

$$E = \{x : x = 2n - 1, n \in N \text{ and } n < 6. \}$$



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23. Write each of the following sets in Roster form and write the cardinal number of each .

$$F = \{x : x \text{ is a letter in the word ' COMMON'}\}$$



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24. Write each of the following sets in Roster form and write the cardinal number of each .

$$G = \{x: x \text{ is a primary colour} \}$$

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25. Write each of the following sets in Roster form and write the cardinal number of each .

$$H = \{x: x \text{ is a digit in the numeral } 2362\}.$$

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26. Write each of the following sets in Roster form and write the cardinal number of each .

$$J = \left\{ x : x = \frac{1}{n}, n \in N, 4 < n < 10 \right\}$$



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27. Write each of the following sets in set-builder form :

$$A = \{4, 6, 8, 9, 10, 12, 14, 15, 16, 18\}$$



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28. Write each of the following sets in set-builder form :

$$B = \{1, 2, 3, 5, 6, 10, 15, 30\}$$



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29. Write each of the following sets in set-builder form :

$$C = \{-9, -6, -3, 0, 3, 6, 9, 12, 15\}.$$



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30. Write each of the following sets in set-builder form :

$$D = \left\{ \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \dots, \frac{8}{9} \right\}.$$

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31. Write each of the following sets in set-builder form :

$$E = \left\{ \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{11}, \frac{1}{13}, \frac{1}{17}, \frac{1}{19} \right\}$$

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32. Write each of the following sets in set-builder form :

$$F = \{\text{April}, \text{June}, \text{september}, \text{November}\}.$$

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33. Write each of the following sets in set-builder form :

$$G = \{0\}.$$



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34. Write each of the following sets in set-builder form :

$$H = \{.\}$$



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35. State whether the given set is finite or infinite.

Set of all even natural numbers.



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36. State whether the given set is finite or infinite.

Set of all odd intergers.

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37. State whether the given set is finite or infinite.

Set of all rivers in India.

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38. State whether the given set is finite or infinite.

Set of all points on a line segment 1 cm long .

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39. State whether the given set is finite or infinite.

Set of all factors of 1200 .

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40. State whether the given set is finite or infinite.

Set of all multiples of 6.

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41. State whether the given set is finite or infinite.

Set of all drops of water in a bucket.

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42. Identify the null sets among the following

$$A = \{x: x \text{ is a whole number, } x < 1\}$$

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43. Identify the null sets among the following

$$B = \{x: x \text{ is a number, } x > x, \}$$

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44. Identify the null sets among the following

$$C = \{x: x \text{ is an even prime number} \}.$$

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45. Identify the null sets among the following

$$D = \{x : x \in I, x^2 = -4\}$$



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46. Identify the null sets among the following

$$E = \{x : x \text{ is a perfect square number, } 40 < x < 50\}$$



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47. Identify the null sets among the following

$$F = \{x : x \in N, 5 < x < 6.\}$$



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48. Identify whether the given pair consists of equal or equivalent but not equal sets or none:

A = set of letters of the word 'FLOWER'

B = set of letters of the word ' FOLLOWER'

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49. Identify whether the given pair consists of equal or equivalent but not equal sets or none:

$C = \{x: x \in N, x + 5 = 6\}$ and $D = \{x: x \in W, x < 1\}$.

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50. Identify whether the given pair consists of equal or equivalent but not equal sets or none:

E = set of first five whole numbers.

F = set of first five natural numbers.

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51. Identify whether the given pair consists of equal or equivalent but not equal sets or none:

$G = \{a, b, c\}$ and $H = \{x, y, z\}$

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52. Identify whether the given pair consists of equal or equivalent but not equal sets or none:

$J = \{x, x \in N, x \neq x\}$ and $K = \{x : x \in N, 6 < x < 7\}$.

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53. For each of the following pairs of sets , identify the disjoint and overlapping sets:

$$A = \{x: x \text{ is a prime number , } x < 8\}$$

$$B = \{x: x \text{ is an even natural number , } x < 8\}.$$



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54. For each of the following pairs of sets , identify the disjoint and overlapping sets:

$$C = \{x: x \in N, x < 10\} \text{ and } D = \{x: x \in N, x \text{ is a multiple of } 5\}$$



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55. For each of the following pairs of sets , identify the disjoint and overlapping sets:

$$E = \{x: x = 4n, n \in \mathbb{N}\} \text{ and } F = \{x: x = 9n, n \in \mathbb{N}\}$$

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56. For each of the following pairs of sets , identify the disjoint and overlapping sets:

$$G = \{x: x = 8n, n \in \mathbb{N} \text{ and } n < 7\} \text{ and } H = \{x: x = 9n, n \in \mathbb{N} \text{ and } n < 7\}$$

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57. State whether the given statement is true or false :

If A is the set of all non- negative integers, then $0 \in A$.



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58. State in each case, whether the given statement is true or false :

If B is the set of all consonants , then $c \in B$.



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59. State whether the given statement is true or false :

If C is the set of all prime numbers , less than 80, then

$57 \in C$.



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60. State in each case, whether the given statement is true or false :

$\{x : x \in W, x + 5 = 5\}$ is a singleton set.

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61. State in each case, whether the given statement is true or false :

If $D = \{x : x \in W, x < 4\}$, then $n(D) = 4$.

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62. State in each case, whether the given statement is true or false :

$[a,b,c,1,2,3]$ is not a set.



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63. State in each case, whether the given statement is true or false :

[1,2,3,1,2,3,1,2,3,.....] is an infinite set.



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64. State in each case, whether the given statement is true or false :

$0 \in \phi$



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65. State in each case, whether the given statement is true or false :

$$[3, 5] \in [1, 3, 5, 7, 9]$$

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Exercise 6 B

1. Indicate whether the given statement is true or false :

$$[\text{Triangles}] \subseteq (\text{Quadrilaterals})$$

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2. Indicate whether the given statement is true or false :

(squares) \subseteq (Rectangles)

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3. Indicate whether the given statement is true or false :

[Rhombuses) \subseteq {Parallelograms }

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4. Indicate whether the given statement is true or false :

[Natural numbers] \subseteq {Whole numbers }

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5. Indicate whether the given statement is true or false :

$$\{\text{Integers}\} \subseteq \{\text{Whole numbers}\}$$

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6. Indicate whether the given statement is true or false :

$$\{\text{Composite number}\} \subseteq \{\text{Odd numbers}\}$$

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7. Write down all possible subsets of each of the sets given

below :

$$\{1\}$$

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8. Write down all possible subsets of each of the sets given

below :

$\{3,4\}$



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9. Write down all possible subsets of each of the sets given

below :

$\{2,3,5\}$



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10. Write down all possible subsets of each of the sets given

below :

ϕ



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11. Write down all possible subsets of each of the sets given

below :

$\{c,d,e\}$



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12. Write down all possible subsets of each of the sets given

below :

$\{a,b,c,d\}$



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13. Write down all possible proper subsets of each of the sets given below :

$\{x\}$



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14. Write down all possible proper subsets of each of the sets given below :

$\{p,q\}$



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15. Write down all possible proper subsets of each of the sets given below :

$\{m,n,p\}$



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16. Write down all possible proper subsets of each of the sets given below :

$\{1,2,3,4\}$



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17. Write down :

The sets C of letters of the word ' PAPAYA '



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18. Write down :

All subsets of C , $C=\{P,A,Y\}$

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19. The set C is letters of the word, *PAPAYA*

Write down :

All proper subsets of C .

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20. How many subsets in all are there of a set containing 4 elements ?

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21. How many subsets in all are there of a set with cardinal number 6?

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22. How many proper subsets in all are there of a set containing 3 elements ?

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23. How many proper subsets in all are there of a set with cardinal number 5?

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24. Which of the following statements are true ?

$$\{a\} \subset \{a, b, c, \}$$

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25. Which of the following statements are true ?

$$\{a\} \subset \{b, c, d, e\}$$

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26. Which of the following statements are true ?

$$\phi \subset \{a, b, c\}$$

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27. Which of the following statements are true ?

$$\phi \in \{a, b, c\}$$



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28. Which of the following statements are true ?

$$0 \notin \phi$$



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29. Which of the following statements are true ?

$$\{1\} \subset \{0, 1\}$$



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30. Which of the following statements are true ?

Every subset of a finite set is finite.

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31. Which of the following statements are true ?

Every subset of an infinite set is infinite.

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32. Let $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, \}$

Write the subset of A containing:

all odd numbers

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33. Let $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, \}$

Write the subset of A containing:

all prime numbers

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34. Let $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, \}$

Write the subset of A containing:

all multiples of 4.

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35. Let $U = \{5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16\}$ be the universal set and let $A = \{5, 7, 11, 13\}$, $B = \{6, 8, 10, 12, 14, 16\}$

and $C = \{ 5, 6, 8, 10, 11, 12 \}$

be its subsets .

Find

(i) A' (ii) B' (iii) C'



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36. Let the set I of all integers be the universal set and let

$A = \{x: x \text{ is a negative integers be its subset} \}$. Find A' .



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37. Suggest a universal set for the sets given below :

$(5, 7, 9)$, $(3, 5, 7)$, $(1, 3, 9)$ and $(2, 4, 8)$



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38. Suggest a universal set for the sets given below :

[odd number less than 8], [Prime numbers less than 8] and
(even numbers between 3 and 8].

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39. Suggest a universal set for the sets given below :

[vowels in English alphabet), (consonants in English
alphabet).

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1. Let $A = \{2,4,6,8\}$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$A \cup B$$

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2. Let $A = [2,4,6,8]$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$A \cup C$$

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3. Let $A = [2,4,6,8]$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$B \cup C$$

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4. Let $A = [2,4,6,8]$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$A \cap B$$

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5. Let $A = [2,4,6,8]$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$A \cap C$$

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6. Let $A = [2,4,6,8]$, $B = \{6,8,10,12\}$ and $C = \{7,8,9,10\}$ Find .

$$B \cap C$$

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7. Let $P = \{ x : x \text{ is a factor of } 18 \}$ and $Q = \{ x : x \text{ is a factor of } 24 \}$.

Write each one of P and Q in Roster form.

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8. Let $P = \{ x : x \text{ is a factor of } 18 \}$ and $Q = \{ x : x \text{ is a factor of } 24 \}$.

Find : (a) $P \cup Q$

(b) $P \cap Q$

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9. Let $A = (a, b, c)$, $B = (b, d, e)$ and $C = (e, f, g)$, verify that :

$$A \cup B = B \cup A$$



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10. Let $A = (a, b, c)$, $B = (b, d, e)$ and $C = (e, f, g)$,
verify that :

$$(A \cup B) \cup C = A \cup (B \cup C)$$



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11. Let $A = (a, b, c)$, $B = (b, d, e)$ and $C = (e, f, g)$,
verify that :

$$A \cap B = B \cap A$$



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12. Let $A = (a, b, c)$, $B = (b, d, e)$ and $C = (e, f, g)$,

verify that :

$$(A \cap B) \cap C = A \cap (B \cap C)$$

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13. Let $A = \{ x: x \text{ is a multiple of } 2, x < 15 \}$,

$B = \{ x: x \text{ is a multiple of } 3, x < 20 \}$,

$C = \{ x: x \text{ is a prime } x < 20 \}$,

Write each one of the sets A, B, C in Roster form.

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14. Let $A = \{ x: x \text{ is a multiple of } 2, x < 15 \}$,

$B = \{ x: x \text{ is a multiple of } 3, x < 20 \}$,

$C = \{ x : x \text{ is a prime } x < 20 \}$,

Find

(a) $A \cup B$ (b) $A \cup C$ (c) $B \cup C$ (d) $A \cap B$ (e) $A \cap C$ (f) $B \cap C$



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15. Let $A = \{ b, d, e, f \}$, $B = \{ c, d, g, h \}$ and $C = \{ e, f, g, h \}$. Find :

$A - B$



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16. Let $A = \{ b, d, e, f \}$, $B = \{ c, d, g, h \}$ and $C = \{ e, f, g, h \}$. Find :

$B - C$



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17. Let $A = \{ b,d,e,f \}$, $B = \{ c,d,g,h \}$ and $C = \{ e,f,g,h \}$.Find :

$C - A$

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18. Let $A = \{ b,d,e,f \}$, $B = \{ c,d,g,h \}$ and $C = \{ e,f,g,h \}$.Find :

$(A - B) \cup (B - A)$

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19. Let $A = \{ b,d,e,f \}$, $B = \{ c,d,g,h \}$ and $C = \{ e,f,g,h \}$.Find :

$(B - C) \cup (C - B)$

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20. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Find A'

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21. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Find B'

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22. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Find $A' \cap B'$

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23. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Find $A' \cup B'$

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24. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Verify that : $(A \cup B)' = (A' \cap B')$

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25. Let $U = \{ 1,2,3,4,5,6,7,8,9,10 \}$ be the universal set and let $A = \{2,3,4,5,6\}$ and $B = \{ 3,5,7,8\}$ be its subsets .

Verify that : $(A \cup B)' = (A' \cap B')$

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26. Let $U = \{a,b,c,d,e,f,g\}$ be the universal set and let its subsets be $A = \{a,b,d,e\}$ and $B = \{b,e,g\}$

Verify that : $(A \cup B)' = (A' \cap B')$

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27. Let $U = \{a,b,c,d,e,f,g\}$ be the universal set and let its subsets be $A = \{a,b,d,e\}$ and $B = \{b,e,g\}$

Verify that : $(A \cap B)' = (A' \cup B')$



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28. Let $U = \{3,6,9,12,15,18,21,24\}$ be the universal set and let

$A = \{6,12,18,24\}$ be its subset.

Verify that $A \cup A = A$



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29. Let $U = \{3,6,9,12,15,18,21,24\}$ be the universal set and let

$A = \{6,12,18,24\}$ be its subset.

Verify that $A \cap A = A$



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30. Let $U = \{3,6,9,12,15,18,21,24\}$ be the universal set and let

$A = \{6,12,18,24\}$ be its subset.

Verify that $A \cap A' = \phi$

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31. Let $U = \{3,6,9,12,15,18,21,24\}$ be the universal set and let

$A = \{6,12,18,24\}$ be its subset.

Verify that $A \cup A' = U$

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32. Let $U = \{3,6,9,12,15,18,21,24\}$ be the universal set and let

$A = \{6,12,18,24\}$ be its subset.

Verify that $(A')' = A$



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Exercise 6 D

1. Let A and B be two sets such that $n(A) = 52$, $n(B) = 60$ and $n(A \cap B) = 16$. Draw a Venn diagram and find

$$n(A \cup B)$$



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2. Let A and B be two sets such that $n(A) = 52$, $n(B) = 60$ and $n(A \cap B) = 16$. Draw a Venn diagram and find

$$n(A - B)$$



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3. Let A and B be two sets such that $n(A) = 52$, $n(B) = 60$ and $n(A \cap B) = 16$. Draw a Venn diagram and find

$$n(B - A)$$



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4. Let P and Q be two sets such that $n(P \cup Q) = 70$, $n(P) = 45$ and $n(Q) = 38$, Draw a Venn diagram and find :

$$n(P \cap Q)$$



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5. Let P and Q be two sets such that $n(P \cup Q) = 70$, $n(P) = 45$ and $n(Q) = 38$, Draw a Venn diagram and find :

$$n(P - Q)$$

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6. Let P and Q be two sets such that $n(P \cup Q) = 70$, $n(P) = 45$ and $n(Q) = 38$, Draw a Venn diagram and find :

$$n(Q - P)$$

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7. In a city , here are 25 Hindi medium schools , 18 English medium schools and 7 schools have both the medium . Find how many schools are there in all in the city

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8. In a city , here are 25 Hindi medium schools , 18 English medium schools and 7 schools have both the medium . Find how many schools have Hindi medium only :

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9. In a city , here are 25 Hindi medium schools , 18 English medium schools and 7 schools have both the medium . Find how many schools have English medium only :



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10. There is a group of 50 persons who can speak English or Tamil or both. Out of these persons , 37 can speak English and 30 can speak Tamil.

How many can speak both English and Tamil



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11. There is a group of 50 persons who can speak English or Tamil or both. Out of these persons , 37 can speak English and 30 can speak Tamil.

How many can speak English only ?



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12. There is a group of 50 persons who can speak English or Tamil or both. Out of these persons , 37 can speak English and 30 can speak Tamil.

How many can speak both English and Tamil

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13. In a class of 40 students , each one plays either Tennis or Badminton or both. If 28 play Tennis and 26 play Badminton ,find

How many play both the games.

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14. In a class of 40 students , each one plays either Tennis or Badminton or both. If 28 plays Tennis and 26 play Badminton ,find

How many play Tennis only:

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15. In a class of 40 students , each one plays either Tennis or Badminton or both. If 28 plays Tennis and 26 play Badminton ,find

How many play Badminton only.

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16. In a class of 45 pupils ,21 play chess , 23 play cards and 5 play both the games . Find how many do not play any of the games,

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17. In a class of 45 pupils ,21 play chess , 23 play cards and 5 play both the games . Find how many play chess play ,

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18. In a class of 45 pupils ,21 play chess , 23 play cards and 5 play both the games . Find how many play cards only ,



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19. In a group of 36 girls , each one can either stitch or weaves or can do both . If 25 girls can stitch and 17 can stitch only , how many can weaves only ?



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20. In a group of 24 children , each one play cricket or hockey or both. If 16 play cricket and 12 play cricket only , find how many play hockey only.



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21. In a group of 40 persons ,10 drinks tea but not coffee and 26 drinks tea. How many drink coffee but not tea ?

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22. All the people in a locality read the daily newspaper Indian Express or Hindustan Times or both If 120 read Indian Express and 150 read Hindustan Times and 36 read both , find ,
how many people are there in the locality.

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23. All the people in a locality read the daily newspaper Indian Express or Hindustan Times or both If 120 read Indian

Express and 150 read Hindustan Times and 36 read both ,
find ,

how many people read only Indian Express.



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