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India's Number 1 Education App

## MATHS

## BOOKS - JBD PUBLICATION

## SETS

Exercise

1. Which of the following statement is not
correct? Given $X$ is universal set, $A$ and $B$ are
two sets:
A. $A-B \subseteq A$

$$
\text { B. } A \cap B \subseteq A \cup B
$$

C. $(A \cup B)^{\prime}=A^{\prime} \cap B^{\prime}$
D. $(A \cup B)^{\prime}=A^{\prime} \cup B^{\prime}$

Answer:

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2. A set contain $n$ elements, then power set contains:
A. n elements
B. $2^{\wedge} n$
C. $\mathrm{n}^{\wedge} 2$
D. none of these

Answer:

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3. Let $A=\{1,2,3\}, \quad B=\{3,4\}, \quad C=\{4,5,6\}$, then
$A \cap(B \cap C)$ is:
A. $\{3\}$
B. $\{1,2,3,4\}$
C. $\{1,2,5,6\}$
D. $\{\phi\}$

Answer:

## D Watch Video Solution

4. If sets $A=\{1,2,3,4\}$ and $B=\{2,4,6,8\}$, then $A-B$ is:
A. $\{-1,-2,-3,-4\}$
B. $\{1,3\}$
C. $\{1,0,3\}$
D. none of these

## Answer:

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5. Which of the set builder form of the set
$\{1,2,3\}$ ?

$$
\text { A. }\{x: 2 \leq x<3, x \in Z\}
$$

B. $\{x: 0<x \leq 3, x \in Z\}$
C. $\{x: 0 \leq x<3, x \in Z\}$
D. none of these

## Answer:

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6. In roster form, the solution set of equaitons
$x^{2}+x-30=0$ is:
A. $\{-6,5\}$
B. $\{-6,-5\}$
C. $\{-5,6\}$
D. $\{5,6\}$

## Answer:

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7. If $A$ and $B$ are two disjoint sets, then $n(A \cup B)$ is equal to:
A. $n(A)-n(B)$
B. $n(B)-n(A)$
C. $n(A)+n(B)$
D. none of these

## Answer:

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8. The set $\{x: x$ is a prime number and divisor of
$6\}$ is equal to:
A. $\{1,2,3\}$
B. $\{1,2,3,6\}$
C. $\{2,3,6\}$
D. $\{2,3\}$

## Answer:

## D Watch Video Solution

## 9. The set $\{x: x$ is an integer and $-3<x \leq 2\}$

is equal to:
A. $\{-2,-1,0,1,2\}$
B. $\{-3,-2,-1,0,1,2\}$
C. $\phi$
D. $\{-2,-1,0,1\}$

## Answer:

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10. Set of even prime number is a
A. infinite set
B. null set

## C. singleton set

D. none of these

## Answer:

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11. The number of subsets of the set $\{1,2,4\}$ is:
A. 4
B. 6
C. 8

## D. 10

## Answer:

## D Watch Video Solution

12. The number of proper subsets of the set
$\{\mathrm{a}, \mathrm{c}, \mathrm{l}, \mathrm{o}, \mathrm{u}\}$ are:
A. 30
B. 32
C. 23
D. 31

## Answer:

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13. Which of the false statements?
A. $B-(A \cup C)=(B-C)-A$
B. $A-(B \cup C)=(A-C)-B$
C. $C-(B \cup A)=(C-B)-A$
D. $A-(B \cup C)=(B-C)-A$

## Answer:

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14. Which is the false statement?
A. $(A \cap B)^{\prime}=A^{\prime} \cup B^{\prime}$
B. $(A \cup B)^{\prime}=A^{\prime} \cap B^{\prime}$
C. $A \cap(B \cup C)=(A \cap B) \cup(A \cap C)$
D. $A \cup(B \cap C)=(A \cup B) \cap(A \cap C)$

## 15. Which is the false statement?

A. $\{1,2,3\}=\{2,1,3\}$
B. $A \subset B \Rightarrow B \subset A$
C. $A \cap B \subset A$

## D. $A \subset A \cup B$

## Answer:

## 16. Which is the false statement?

A. $\{x: 9<x<11, x \in N\}$ is a singleton
B. $\{x: 9.1<x<9.2, x \in Q\} \quad$ is
singleton
C. $\left\{x: x^{2}=9, x \in N\right\}$ is a singleton
D. $\{x: 9<x<10, x \in R\} \quad$ is not $\quad$ a
singleton.

Answer:
17. Which is the false statement?
A. Every subset of a finite set is finite
B. A subset of an infinite set may be finite
C. If A contains five elements then power set of A contains 25 elements.
D. $\{a\} \neq a$.

Answer:

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18. Let $A=\{x: x$ is a positive multiple of 3 less
than 100$\}$ and $\mathrm{B}=\{\mathrm{x}: \mathrm{x}$ is a prime number less
than 20$\}$, then $n(A)+n(B)$ is equal to:
A. 23
B. 29
C. 33
D. 41

Answer:

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# 19. $A \cap(A \cup B)^{\prime}$ is equal to: 

A. A
B. B
C. $\phi$
D. $A \cap B$

Answer:

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20. If $A$ and $B$ are any two sets, then
$A \cup(A \cap B)$ is equal to
A. A
B. $A \cap B$
C. B
D. $\phi$

Answer:

- Watch Video Solution

21. If $\quad \mathrm{A} \quad=\{x: x \in Z$ and $x \geq 2\}, \quad \mathrm{B}=$
$\{x: x \in Z$ and $x \leq 4\}$, then $A \cap B$ is equal to:

> A. $\{x: 2 \leq x \leq 4, x \in Z\}$
> B. $\{x: 2<x \leq 4, x \in Z\}$
> C. $\{x: 2<x<4, x \in Z\}$
D. none of these

Answer:

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22. Let $n(U)=500$. If $A$ and $B$ are such that $\mathrm{n}(\mathrm{A})=200, \mathrm{n}(\mathrm{B})=300$ and $n(A \cap B)=100$ then $n\left(A^{\prime} \cap B^{\prime}\right)$ is equal to:
A. 200
B. 300
C. 100
D. 150

Answer:

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23. The set $\left(A \cap B^{\prime}\right)^{\prime} \cup(B \cap C)$ is equal to:
A. $A^{\prime} \cap B$
B. $A^{\prime} \cap C^{\prime}$
C. $A^{\prime} \cup B$
D. none of these

Answer:
24. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of the second set. The values of $m$ and are, respectively :
A. 7,4
B. 4,7
C. 4,4
D. none of these

Answer:
25. Which of the following is an empty set?
A. $\left\{x: x^{2}-1=0, x \in R\right\}$
B. $\left\{x: x^{2}+1=0, x \in R\right\}$
C. $\left\{x: x^{2}-4=0, x \in R\right\}$
D. $\left\{x: x^{2}-x-2, x \in R\right\}$

## Answer:

## 26. If A and B are two sets then $A \cap(B \cup A)$

is equal to:
A. A
B. B
C. $\phi$
D. $\mathrm{A}^{\prime}$

Answer:
( Watch Video Solution
27. Let $A=\{x: x$ is a multiple of 5$\}$ and $B=\{x: x$ is a multiple of 3$\}$, then $A \cap B$ is:
A. $\{5,10,15,20, . . . . . . . . . .$.
B. $\{15,30,45, . . . . . . . . . . . .\}^{\prime}$
C. $\{3,6,9, \ldots \ldots \ldots \ldots . .$.
D. $\phi$

## Answer:

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28. If $A$ and $B$ are two non-empty sets, then $(A-B) \cup(B-A)$ is equal to:
A. $(A \cup B)-B$
B. $A-(A \cap B)$
C. $(A \cup B)-(A \cap B)$
D. $(A \cap B) \cup(A \cup B)$

Answer:

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29. In a college of 300 students every student
reads of 5 newspaper and every newspaper is
read by 60 students. The number of newspapers is:
A. at least 30
B. at most 20
C. exactly 25
D. none of these

Answer:
30. A survery shows that $63 \%$ of the Indians
like cheese whereas $76 \%$ like oranges. If $x \%$ of the Indians like both cheese and oranges then:
A. $x=39$
B. $x=63$
C. $39 \leq x \leq 63$
D. 39ltxlt63

Answer:

## Example

1. Write the following as intervals :
$\{x: x \in R,-4<x \leq 6\}$

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2. Write the following as intervals
$\{x: x \in R,-12<x<-10\}$

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3. Write the following as intervals:
$\{x: x \in R, 0 \leq x \leq 7\}$

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4. Write the following as intervals:
$\{x: x \in R, 1 \leq x \leq 4\}$
5. Mark the following subsets of set $R$ of real numbers on the number line and write them intervals:
$\{x: x \in R, x \geq 3\}$

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6. Mark the following subsets of set R of real
numbers on the number line and write them
intervals:
$\{x: x \in R, x \geq 3\}$
7. Mark the following subsets of set $R$ of real numbers on the number line and write them intervals:
$\{x: x \in R, x \geq 3\}$

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8. Mark the following subsets of set R of real numbers on the number line and write them
intervals:
$\{x: x \in R, x \geq 3\}$

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9. Write the following interval in set-builder form : $(-3,0)$

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10. Write the following interval in set-builder
form : $[6,12]$
11. Write the following interval in set-builder form : [6,12]

## - Watch Video Solution

12. Write the following intervals in the set builder form and mark them on the number line.
$[-3,5)$

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13. Which of the following pairs of sets are disjoint?
$A=[a, e, l, o, u], B=[c, d, e, g, f]$

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14. Which of the following pairs of sets are disjoint:- $\{1,2.3,4\}$ and $\{x: x$ is a natural number and $4 \leq x \leq 6\}$
15. Prove that the following pairs of sets are disjoint
$A=\{x: x$ is an even integer], $B=[x: x$ is an odd number]

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16. Let $A=\{a, b\}, B=\{a, b, c\}$. Is $A \subset B$ ? What is $\mathrm{A} \cup \mathrm{B}$ ?

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17. A and B are two sets such that $A \subset B$, then what is $A \cup B$.

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18. Is it true that for any sets $A$ and $B$,
$P(A) \cup P(B)=P(A \cup B)$ ? Justify your answer.

## D Watch Video Solution

19. Using properties of sets, show that $A \cup(A \cap B)=A$

## D Watch Video Solution

20. Using properties of sets, show that

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

## - Watch Video Solution

21. Let $U=\{1,2,3,4,5,6,7,8,9\}, A=\{1,2,3,4\}$,

$$
B=\{2,4,6,8\} \text { and } C=\{3,4,5,6\} . \text { Find:- }
$$

$(A \cup C)^{\prime}$

## D Watch Video Solution

22. Let $U=\{1,2,3,4,5,6,7,8,9\}, A=\{1,2,3,4\}, B=[2,4,6,8]$,
$C=[3,4,5,6]$.

Find:
$\left(\left(A^{\prime}\right)^{\prime}\right)^{\prime}$

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23. Let $U=\{1,2,3,4,5,6,7,8,9\}, A=\{1,2,3,4\}$,
$B=\{2,4,6,8\}$ and $C=\{3,4,5,6\}$. Find:- $(B-C)^{\prime}$

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24. Prove the following:
$A \cap\left(A^{\prime} \cup B\right)-A \cap B$

- Watch Video Solution

25. Prove the following:
$A \cup\left(A^{\prime} \cap B\right)=A \cup B$

D Watch Video Solution
26. Using properties of sets, prove that
$A \cup(B-A)=A \cup B$

D Watch Video Solution
27. Using properties of sets, prove that
$A-(A \cap B)=A-B$

D Watch Video Solution
28. $A, B, C$ are three sets. Determine whether the
following are True or False. Justify your answers:
$A \subset C, B \subset C \Rightarrow(A \cup B) \subset C$

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29. Show that $A \cap B=A \cap C$ need not imply
$B=C$.

## D Watch Video Solution

30. Let $A, B$, and $C$ be the sets such that
$A \cup B=A \cup C$ and $A \cap B=A \cap C$. Show that $B=C$.

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31. Given $L=\{1,2,3,4\}, M=\{3,4,5,6\}$ and $N=\{1,3,5\}$

Verify
that
$L-(M \cup N)=(L-M) \cap(L-N)$.

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32. Prove the De-Morgan's laws:
$(A \cup B)^{\prime}=A^{\prime} \cap B^{\prime}$

D Watch Video Solution
33. Prove the De-Morgan's laws:
$(A \cup B)^{\prime}=A^{\prime} \cap B^{\prime}$

- Watch Video Solution

34. If $U=\{1,2,3,4,5,6,7,8,9\}, A=\{2,4,6,8\}$ and
$B=\{2,3,5,7\}$. Verify that
$(A \cup B)^{\prime}=A^{\prime} \cap B^{\prime}$

D Watch Video Solution
35. If $U=\{1,2,3,4,5,6,7,8,9\}, A=\{2,4,6,8\}$ and
$B=\{2,3,5,7\}$. Verify that $(A \cap B)^{\prime}=A^{\prime} \cup B^{\prime}$

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36. Let $U$ be the set of all triangles in a plane. If

A is the set of all triangles with at least one angle different from $60^{\circ}$, what is $\mathrm{A}^{\prime}$ ?
37. Prove that: $A \subseteq B \Rightarrow B^{\prime} \subseteq A^{\prime}$

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38. Prove that: $A \subseteq B \Leftrightarrow B^{\prime} \subseteq A^{\prime}$

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39. Draw the Venn Diagram for the following:
$A^{\prime} \cap(B \cup C)$
40. Draw the Venn Diagram for the following:
$A^{\prime} \cap(C-B)$.

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41. In a group of 400 people, 250 can speak

Hindi and 200 can speak English. How many people can speak both Hindi and English?
42. In a group of people, 50 speak both English and Hindi and 30 speak English but not Hindi.

If all the people speak at least one of the two languages, how many speak English?

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43. In a group of 950 residents of a locality
every resident is fond of reading at least one
of the morning news-papers published in
English and Hindi. 750 of them of like to read
Hindi newspaper and 460 reads the English
newspapers. Find how many of them read
both the English newspaper and the Hindi newspaper?

## - Watch Video Solution

44. In a group of 950 residents of a locality
every resident is fond of reading at least one
of the morning news-papers published in
English and Hindi. 750 of them of like to read

Hindi newspaper and 460 reads the English
newspapers. Find how many of them read
both the English newspaper and the Hindi newspaper?

## - Watch Video Solution

45. In a group of 950 residents of a locality every resident is fond of reading at least one of the morning news-papers published in English and Hindi. 750 of them of like to read Hindi newspaper and 460 reads the English newspapers. Find how many of them read Hindi newspaper only?

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46. Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 pwned both A and B cars. Is the data correct ?

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47. There are 200 individuals with in skin
disorder. 120 had been exposed to the chemical $C_{1}, 50$ to chemical $C_{2}$ and 30 to both
the chemicals $C_{1}$ and $C_{2}$. Find the number of
individuals exposed to :

Chemical $C_{1}$ but not chemical $C_{2}$

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48. There are 200 individuals with in skin
disorder. 120 had been exposed to the chemical $C_{1}, 50$ to chemical $C_{2}$ and 30 to both the chemicals $C_{1}$ and $C_{2}$. Find the number of individuals exposed to :

Chemical $C_{2}$ but not chemical $C_{1}$
49. There are 200 individuals with in skin disorder. 120 had been exposed to the chemical $C_{1}, 50$ to chemical $C_{2}$ and 30 to both the chemicals $C_{1}$ and $C_{2}$. Find the number of individuals exposed to :

Chemical $C_{2}$ but not chemical $C_{1}$

## D Watch Video Solution

50. There are 200 individuals with a skin disorder, 120 had been exposed to the
chemical $C_{1}, 50$ to chemical $C_{2}$ and 30 to both
the chemicals $C_{1}$ and $C_{2}$. Find the number of individuals exposed to:
not exposed to any of the chemicals $C_{1}$ and $C_{2}$.

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51. In a survey it was found that 21 people liked product A, 26 liked product $B$ and 29 liked product C. If 14 people liked products Aand $B$,

12 people liked products $C$ and $A, 14$ people
liked products B and C and 8 liked all the three products. Find how many liked product C only.

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52. In a class of 60 students, 25 students play
cricket, 20 students play tennis and 10 students play both games. Find the number of students who play neither.
53. In a survey of 200 students of higher secondary school, it was found that 120 studied Mathematics, 90 studies Physics and 70 studied Chemistry, 40 studied Mathematics
and Physics, 3 studied Physics and Chemistry,
50 studied Chemistry and Mathematics and 20 studied none of these subjects. Find the number of students who studied all the three subjects.
54. In a town of 10000 families, it was found that 40\% families buy newspaper A, 20\% families buy newspaper B and 10\% families buy newpaper C, 5\% families buy newspaper A and B, 3\% buy newspapers B and C and 4\% buy newspaper A and C. If $2 \%$ families buy all the three newspapers, then number of families which buy $A$ only is

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55. In a town of 10,000 families, it was found
that $\mathbf{4 0 \%}$ families buy newspaper A, 20\% by
newspaper B and 10\% buy newspaper C.
Further 5\% buy A and B, 3\% buy B and C, 4\%
buy $A$ and C. If $2 \%$ of the families buy all the three newspaper find:

Number of families that buy none of the three newspapers.

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56. In a survey of 60 people, it was found that

25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both

H and $\mathrm{I}, 11$ read both H and $\mathrm{T}, 8$ read both T and $\mathrm{I}, 3$ read all three newspapers. Find: the number of people who read at least one of the newspapers.

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57. In a survey of 60 people, it was found that

25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both

H and $\mathrm{I}, 11$ read both H and $\mathrm{T}, 8$ read both T and $\mathrm{I}, 3$ read all three newspapers. Find: the number of people who read exactly one newspaper.
58. In a survey of 60 people, it was found that

25 people read newspaper $H, 26$ read newspaper T, 26 read newspaper I, 9 read both

H and $\mathrm{I}, 11$ read both H and $\mathrm{T}, 8$ read both T and $\mathrm{I}, 3$ read all three newspapers. Find: the number of people who read at least one of the newspapers.

