MATHS

BOOKS - NCERT MATHS (HINGLISH)

SETS

Short Answers Type Questions

1. Write the following sets in the roaster from.

(i) $A = \{x : x \in R, 2x + 11 = 15\}$

(ii) $B = \{x \mid x^2 = x, x \in R\}$

C = $\{x \mid x$ is a positive factor of a prime number p$\}$

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2. If $Y = \{x \mid x$ is a positive factor of the number $2^{p-1}(2^p - 1)$ where $2^p - 1$ is a prime number} Write Y in roaster form.

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3. If $L = \{1, 2, 3, 4\}$, $M = \{3, 4, 5, 6\}$ and $N = \{1, 3, 5\}$, then verify that $L - (M \cup N) = (L - M) \cap (L - N)$.

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4. If A and B are subsets of the universal set U, then slow that

(i) $A \subset A \cup B$, (ii) $A \subset B \Leftrightarrow A \cup B = B$

(iii) $(A \cap B) \subset A$

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5. Give that $N = \{1, 2, 3, \ldots\ldots\ldots, 100\}$. The, write

(i) the subset of N whose elements are even numbers.

(ii) the subset of N whose elements are perfect square numbers.

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6. If $X = \{1, 2, 3\}$, if n represents any member of X, write the following sets containing all numbers represented by

(i) $4n$, (ii) $n + 6$, (iii) $\frac{n}{2}$, (iv) $n - 1$

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7. If $y = \{1, 2, 3, \ldots\ldots, 10\}$ and a represents any element of Y, write the following sets, containing all the elements satisfying the given conditions,

(i) $a \in Y$ but $a^2 \notin Y$

(ii) $a + 1 = 6, a \in Y$

(iii) a is less than 6 and $a \in Y$

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8. A, B and C are subsets of universal set U. If $A = \{2, 4, 6, 8, 12, 20\}$, $B = (3, 6, 9, 12, 15\}, C = \{5, 10, 15, 20\}$ and U is the set of all whole numbers, draw a Venn diagram showing the relation of U, A, B and C.

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9. Let U be the set of all boyes and girls in a school, G be the set of all girls in the school, B be the set of all boys in the school and S be the set of all students in the school who take swimming. Some but not all, students in the school take swimming. Draw a Venn diagram

showing one of the possible interrelationship among sets U, G, B and S.

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10. For all sets a,B and C show that $(A - B) \cap (A - C) = A - (B \cup C)$

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11. For all sets A and B, $(A - B) \cup (A \cap B) = A$.

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12. For all sets A, B and C, $A - (B - C) = (A - B) - C$.

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13. For all sets A, B and C, if $A \subset B$, then $A \cap C \subset B \cap C$.

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14. For all sets A, B and C, if $A \subset B$, then $A \cup C \subset B \cup C$.

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15. For all sets A, B and C, if $A \subset C$ and $B \subset C$, then $A \cup B \subset C$.

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16. For all sets A and B, A and B, $A \cup (B - A) = A \cup B$.

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17. For any two sets A and B prove the following: $A-(A-B)=A\cap B$

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18. For all sets A and B, $A-(A\cap B)$ is equal to .....

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19. For all set A and B, $(A\cup B)-B=A-B$.

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20. Let $T=\left\{x\mid \frac{x+5}{x-7}-5=\frac{4x-40}{13-x}\right\}$. Is T an empty set ? Justify your answer.

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Long Answers Type Questions

1. If A, B and C be sets. Then, show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

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2. Out of 100 students, 15 passed in English, 12 passed in Mathmatics, 8 in Science, 6 in English and Mathematics, 7 in Mathematics and Science , 4 in English and Science, 4 in all the three. Find how many passed

(i) in English and Mathematics but not in Science.

(ii) in Mathematics and Science but not in English.

(iii) in Mathematics only.

(iv) in more than one subject only.

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3. In a class of 60 students , 25 students play cricket and 20 students play tennis and 10 students play both the games. Find the number of students who play neither.

A. 25

B. 35

C. 40

D. 15

Answer: A

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4. In a survey of 200 students of a school, it was found that 120 study Mathematics, 90 study Physics and 70 study Chemistry , 40 study

Mathematics and Physics, 30 study Physics and Chemistry, 50 study Chemistry and Mathematics and 20 none of these subjects. Find the number of students who study all the three subjects.

A. 30

B. 20

C. 10

D. None of These

Answer: B

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5. In a town of 10000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B, 10 % families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4 % buy a and C. If 2% families buy all the three newspaper. Find

(i) the number of familiar which buy newspaper A only.

(ii) the number of familiar which buy none of A , B and C.

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6. In a group of 50 students, the number of students studying French, English, Sanskrit were found to be as follows French = 17, English = 13, Sanskrit = 15 French and English = 09, English and Sanskrit = 4, French and Sanskrit = 5, English , French and Sanskrit = 3. Find the number of students who study

(i) only French, (ii) only English.

(iii) only Sanskrit. , (iv) English and Sanskrit but not French.

(v) French and Sanskrit but not English.

(vi) French and English but not Sanskrit.

(vii) atleast one of the three languages.

(viii) none of the three languages.

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Objective Type Questions

1. Suppose, $A_1, A_2, \ldots\ldots\ldots, A_{30}$ are thirty sets each having 5 elements and B_1, B_2, B_n sets each with 3 elements, let $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^{n} B_j = S$ and each element of S belongs to exactly 10 of the $A_i's$ and exactly 9 of the $B_j's$. Then, n is equal to

A. 15

B. 3

C. 45

D. 35

Answer: C

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2. 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 n are, respectively.

A. $4, 7$

B. $7, 4$

C. $4, 4$

D. $7, 7$

Answer: B

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3. The set $\left(A \cup B'\right)' \cup (B \cap C)$ is equal to $A' \cup B \cup C$ b. $A' \cup B$ c. $A' \cup C'$ d. $A' \cap B$

A. $A' \cup B \cup C$

B. $A' \cup B$

C. $A' \cup C'$

D. $A' \cap B$

Answer: B

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4. Let F_1 be the set of parallelograms, F_2 the set of rectangle , F_3 the set of rhombuses, F_4 the set of squares and F_5 the set of trapeziums in a plane. Then, F_1 may be equal to

A. $F_2 \cap F_3$

B. $F_3 \cap F_4$

C. $F_2 \cup F_5$

D. $F_2 \cup F_3 \cup F_4 \cup F_1$

Answer: D

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5. Let $S =$ set of point inside the square, $T =$ set of points inside the triangles and $C =$ the set of point inside the circle, if the triangle and circle intersect each other are contained in the square, then

A. $S \cap T \cap C = \phi$

B. $S \cup T \cup C = C$

C. $S \cup T \cup C = S$

D. $S \cup T = S \cap C$

Answer: C

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6. Let R be set of points inside a rectangle of sides a and b $(a, b > 1)$ with two sides along the positive direction of x-axis and y-axis

A. $R = \{(x, y) : 0 \leq x \leq a, 0 \leq y \leq b\}$

B. $R = \{(x, y) : 0 \leq x < a, 0 \leq y \leq b\}$

C. $R = \{(x, y) : 0 \leq x \leq a, 0 < y < b\}$

D. $R = \{(x, y) : 0 < x < a, 0 < y < b\}$

Answer: D

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7. In a town of 840 persons , 450 persons read Hindi, 300 read English and 200 read both. Then, the number of persons who read neither, is

A. 210

B. 290

C. 180

D. 260

Answer: B

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8. If $X = \{8^n - 7n - 1 \mid n \in N\}$ and $Y = \{49n - 49 \mid n \in N\}$. Then

A. $X \subset Y$

B. $Y \subset X$

C. $X = Y$

D. $X \cap Y = \phi$

Answer: A

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9. A survey shows that $63\,\%$ of the people watch a news channel whereas $76\,\%$ watch another channel. If $x\,\%$ of the people watch both channel then,

A. $x = 35$

B. $x = 63$

C. $39 \leq x \leq 63$

D. $x = 39$

Answer: C

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10. If set A and B are defined as

$$A = \left\{(x, y) \mid y = \frac{1}{x}, 0 \neq x \in R\right\}, B = \{(x, y) \mid y = -x, x \in R, \}$$

. Then

A. $A \cap B = A$

B. $A \cap B = B$

C. $A \cap B = \phi$

D. $A \cup B = A$

Answer: C

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11. If A and B are two sets $A \cap (A \cup B) =$

A. A

B. B

C. ϕ

D. $A \cap B$

Answer: A

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12. If $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$, $B = \{2, 4, \ldots\ldots, 18\}$ and N the set of natural numbers is the universal set, then $A' \cup \{(A \cup B) \cap B'\}$ is

A. ϕ

B. N

C. A

D. B

Answer: B

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13. If $S = \{x : x$ is a positive multiple of 3 less than $100\}$ and $P = \{x : x$ is a prime number less than $20\}$. Then, $n(S) + n(P)$ is equal to

A. 34

B. 31

C. 33

D. 41

Answer: D

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14. If A and B are two sets, then $A \cap (A \cup B)'$ is equal to -

A. A

B. B

C. ϕ

D. $A \cap B`$

Answer: C

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Fillers

1. The set $\{x \in R : 1 \leq x < 2\}$ be written as .....

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2. How many elements has P(A), if $A = \varphi$?

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3. If A and B are finite sets, such that $A \subset B$, then $n(A \cup B)$ is equal to . . . . . .

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4. If A and B are any two sets, then A - B is equal to . . . . . .

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5. Power set of the set $A = \{1, 2\}$ is . . . . . .

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6. If the sets $A = \{1, 3, 5\}, B = \{2, 4, 6\}$ and $C = \{0, 2, 4, 6, 8\}$. Then, the universal set of all the three sets A, B and C can be .....

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7. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}, A = \{1, 2, 3, 5\}, B = 2, 4, 6, 7\}$ and $C = \{2, 3, 4, 8\}$. Then

(i) $(B \cup C)'$ is ....., (ii) $(C - A)'$ is .....

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8. For all sets A and B, $A - (A \cap B)$ is equal to .....

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9. Match the following sets for all sets A, B and C

	Column I		Column II
(i)	$((A' \cup B') - A)'$	(a)	$A - B$
(ii)	$[(B' \cup (B' - A)]'$	(b)	A
(iii)	$(A - B) - (B - C)$	(c)	B
(iv)	$(A - B) \cap (C - B)$	(d)	$(A \times B) \cap (A \times C)$
(v)	$A \times (B \cap C)$	(e)	$(A \times B) \cup (A \times C)$
(vi)	$A \times (B \cup C)$	(f)	$(A \cap C) - B$

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True And False

1. IF A any set, then $A \subset A$.

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2. If $M = \{1, 2, 3, 4, 5.6, 7, 8, 9\}$ and $B = \{1, 2, 3, 4, 5.6, 7, 8, 9\}$, then $B \not\subset M$.

A. True

B. False

C. cant say

D. None of these

Answer: A

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3. The sets $\{1, 2, 3, 4\}$ and $\{3, 4, 5, 6\}$ are equal

A. True

B. False

C. Cant say

D. None of these

Answer: B

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4. $Q \cup Z = Q$, where Q is the set of rational numbers and Z is the set of integers.

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5. Let sets R and T be defined as

$R = \{x \in Z \mid x \text{ is divisible by } 2\}$

$T = \{x \in Z \mid x \text{ is divisible by } 6\}$. Then, $T \subset R$

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6. Given $A = [0, 2]$, $B = [x \in R \mid 0 \leq x \leq 2\}$. Then, $A = B$.

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