



1. Which of the following collections are sets? Justify your answer.
 - a) The collections of prime numbers less than 13
 - b) The collection of most difficult problems in mathematics.
 - c) The collection of all triangles in a plane.
 - d) The collection of all girls in SBDVA
 - e) The collection of 4 girls in SBDVA
 2. Insert the appropriate symbol \in or \notin in the following
 - (a) $5 \dots \{1, 3, 5, 7\}$
 - (b) $7 \dots \{x : x \in R, x^2 = 1\}$
 - (c) $0 \dots \{ \}$
 - (d) $2 \dots \{x : x \text{ is a prime number}\}$
 3. Write the following in roaster form
 - (a) $\{x : x \in N, x \geq 5 \text{ and } x \leq 2\}$
 - (b) $\{x : x \text{ is a letter of the word MATHEMATICS}\}$
 - (c) $\{x : x \in R \text{ and } 3x + 1 = 5\}$
 - (d) $\{x : x \in N \text{ and } 3x - 1 = 6\}$
 4. Write the following sets in set builder form
 - (a) $\{1, 2, 3, 4, 5, 6\}$
 - (b) $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \dots\right\}$
 - (c) $\{W, O, L, F\}$
 - (d) $\{2, 6, 4, 8, 10\}$
 - (e) $\{1, 4, 9, 16, \dots\}$
 5. Which of the following are finite or infinite sets:
 - (a) Set of even prime numbers.
 - (b) $\{x : x \in R \text{ and } x \geq 5\}$
 - (c) $\{x : x \in R \text{ and } x^2 = -1\}$
 - (d) Set of animals living on the earth
 - (e) Set of all lines parallel to x-axis.
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6. Which of the following sets are empty or non-empty sets
- (a) The set of odd prime numbers.
 - (b) The set of odd natural numbers divisible by 2.
 - (c) $\{x: x \in N \text{ and } 2x=1\}$
 - (d) $\{x: x \in R \text{ and } 2x=1\}$
7. If $A = \{1, 2, 3, \{3, 4, 5\}, \{5, 6\}, 7\}$ then which of the following are true
- (a) $2 \in A$
 - (b) $\{1, 2\} \in A$
 - (c) $\{3, 4, 5\} \subset A$
 - (d) $\{\{5, 6\}, 7\} \subset A$
 - (e) $\phi \in A$
 - (f) $\phi \subset A$
 - (g) $\{\phi\} \subset A$
8. If $A = \{\phi, \{\phi\}\}$ then which of the following are true
- (a) $\phi \in A$
 - (b) $\phi \subset A$
 - (c) $\{\phi\} \in A$
 - (d) $\{\phi\} \subset A$
 - (e) $\{\phi, \{\phi\}\} \in A$
 - (f) $\{\phi, \{\phi\}\} \subset A$
 - (g) $\{\{\phi\}\} \subset A$
9. If $A = \{1, 2\}$ then write all the subsets of A .
10. If $A = \{a, b, c\}$ then write the power set of A .
11. Two finite sets have m and n elements. The total number of subsets of first set is 112 more than the total number of subsets of second set. Find the values of m and n (HOTS)
12. Write the all possible subsets of $A = \{1, 2, 3, 4\}$ which are not the subsets of $\{1, 3, 5, 7\}$. (HOTS)
13. If A and B are two sets such that $P(A) = P(B)$ then show that $A = B$ (HOTS)
14. If power set of a set A has only one element then write set A . (HOTS)
15. If $A \subset \phi$ then prove that $A = \phi$. (HOTS)



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16. Prove that $A \subset B, B \subset C, C \subset A \Rightarrow A = C$ **(HOTS)**

17. If $A = \{8^n - 7n - 1 : n \in \mathbb{N}\}$ and $B = \{49(n-1) : n \in \mathbb{N}\}$ then show that $A \subset B$. **(HOTS)**

18. Write the following in set builder form

- (a) $[2, 4]$ (b) $[2, 4)$ (c) $(2, 4]$ (d) $(2, 4)$ (e) $(2, \infty)$ (f) $[2, \infty)$ (g) $(-\infty, 2)$

19. Write the following in interval form

(a) $\{x : x \in \mathbb{R} \text{ and } 2 \leq x < 9\}$ (b) $\{x : x \in \mathbb{R} \text{ and } 3 < x \leq 7\}$

(c) $\{x : x \in \mathbb{R} \text{ and } x \geq 5\}$ (d) $\{x : x \in \mathbb{R} \text{ and } x < -7\}$

(e) $\{x : x \in \mathbb{R}\}$

20. If $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 4, 5, 7\}$, $B = \{2, 4, 9, 10\}$, $C = \{2, 5, 7, 9\}$ then find

(i) A' (ii) $A - B$ (iii) $A \cup B$ (iv) $A \cap B$ (v) $A' \cap B'$ (vi) $A' \cup B'$

(vii) $A \cap B'$ (viii) $A \cup (B \cap C)$ (ix) $(A \cup B) \cap (A \cup C)$ (x) $A \cap (B \cup C)$

(xi) $(A \cap B) \cup (A \cap C)$ (xii) $(A - B) \cup (A - C)$ (xiii) $A - (B \cap C)$

21. Show that the following four conditions are equivalent **(Hots)**

(i) $A \subset B$ (ii) $A - B = \phi$ (iii) $A \cup B = B$ (iv) $A \cap B = B$

22. Using properties of sets, show that (i) $A \cup (A \cap B) = A$ and (ii) $A \cap (A \cup B) = A$ **(Hots)**

23. Show that $A \cup B = A \cap B \Rightarrow A = B$

24. 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 $B = C$

25. For any two sets A and B , prove that: **(Hots)**

(i) $(A - B) \cup B = A \cup B$ (ii) $(A - B) \cap B = \phi$ (iii) $A \cup (B - A) = A \cup B$

(iv) $(A \cap B) \cup (A - B) = A$ (v) $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

26. For any three sets A, B and C , prove that **(Hots)**

(i) $(A - B) \cup (A - C) = A - (B \cap C)$

(ii) $(A - B) \cap (A - C) = A - (B \cup C)$

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

(iv) $A - (B - C) = (A - B) \cup (A \cap C)$



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27. 35 children of a class draw a word map. 26 use blue colour and some use green colour. If 19 use both the colours and each student uses at least one colour, find the number of children who use green colour. In map, blue colour represents water and green colour represents trees. Why should we preserve water and trees?

(Value Based)

28. In a group of 950 persons, 750 can speak Hindi and 460 can speak English. How many can speak

(i) both Hindi and English? (ii) only Hindi? (iii) only English?

29. In a group of people, 50 speak both English and Hindi and 30 people speak English but not Hindi. All people speak at least one of the two languages. How many speak English?

30. In a group, 150 students know Hindi and 60 know English and 10 know both Hindi and English. If there are 30 students who know neither of the two languages, how many students are there in the group?

31. In a group of 40 students, 26 take samosa, 18 take burger and 8 take neither of the two. How many take both samosa and burger? Is taking burger and samosa good for health?

(Value Based)

32. In a group of 50 persons, 14 drink fruit juice but not cold drink, 30 drink fruit juice and each person likes at least one of the two drinks. Find (i) how many drink both fruit juice and cold drink? (ii) how many drink cold drink but not fruit juice? Which drink out of the two is healthier?

33. A market research group conducted a survey of 1000 consumers and reported that 720 consumers liked product A and 450 consumers liked product B. What is the least number that must have liked both the products?

(Hots)

34. Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct? Car A uses CNG as a fuel and car B uses petrol as a fuel. Which car is eco-friendly?

35. In a survey of 25 students, it was found that 15 had taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Mathematics and Chemistry, 9 had taken Mathematics and physics, 4 had taken Physics and Chemistry and 3 had taken all the three subjects. Find the number of students who had taken

(i) only Chemistry (ii) only Mathematics (iii) only Physics (iv) only one of the subjects
(v) only Physics and Chemistry (vi) only Mathematics and Physics (vii) only mathematics and Chemistry
(viii) only two of the subjects (ix) at least on subject (x) none of the subjects

36. In a town of 1000 families, it was found that 40% families buy newspaper X, 20% families buy newspaper Y and 10% families buy newspaper Z, 5% families buy X and Y, 3% buy Y and Z and 4% buy X and Z. If 12% families buy all the three papers, find the number of families which buy

(i) X only (ii) Y only (iii) none of X,Y and Z.

37. In a group of 84 persons, each plays at least one game viz., tennis, badminton and cricket. 28 of them play cricket, 40 play tennis and 48 play badminton. If 6 play both cricket and badminton and 4 play tennis and badminton and no one play all the tree games, find the number f persons who paly cricket but not tennis.

(Hots)

38. A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only 3 men got medals in all the three sports, how many received medals in exactly two sports? What is the importance of sports in life?

(Value Based)



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39. From 50 students taking examinations in Mathematics, Physics and Chemistry, each of the student has passed in at least one of the subject, 37 passed Mathematics, 24 Physics and 43 Chemistry. At most 19 passed Mathematics and Physics, at most 29 Mathematics and Chemistry and at most 20 Physics and Chemistry. What is the largest possible number that could have passed all three examinations? **(Hots)**