



INDIAN SCHOOL AL WADI AL KABIR

DEPARTMENT OF MATHEMATICS 2017 – 2018

Holiday Home Work – Class XI

- List all the element of the set $A = \{ x : x \text{ is an integer } x^2 \leq 4 \}$
- Write the following as interval
(i) $\{x : x \in \mathbb{R}, -4 < x \leq 6\}$, (ii) $\{x : x \in \mathbb{R}, 3 \leq x \leq 4\}$
- If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$, $C = \{11, 13, 15\}$ then find $(A \cap B) \cap (B \cup C)$
- If $U = \{a, e, i, o, u\}$, $A = \{a, e, i\}$, $B = \{e, o, u\}$ and $C = \{a, i, u\}$
Then verify that $A \cap (B - C) = (A \cap B) - (A \cap C)$
- In a town of 50000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B and 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 papers. Find the no. of families which buy (i) A only (ii) B only (iii) none of A, B, and C.
- Write the following intervals in set builder form: $(-3, 0)$ and $[6, 12]$
- If $X = \{a, b, c, d\}$, $Y = \{f, b, d, g\}$ then find $X - Y$ and $Y - X$
- A and B are two sets such that $n(A - B) = 20 + x$, $n(B - A) = 3x$ and $n(A \cap B) = x + 1$.
Draw a Venn diagram to illustrate this information.
If $n(A) = n(B)$, Find (i) the value of x (ii) $n(A \cup B)$
- In a survey of 100 students, the no. of students studying the various languages were found to be English only 18, English but not Hindi 23, English and Sanskrit 8, English 26, Sanskrit 48, Sanskrit and Hindi 8, no language 24. Find (i) How many students were studying Hindi? (ii) How many students were studying English and Hindi?
- In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice.
- There are 210 members in a club. 100 of them drink tea and 65 drink tea but not coffee, each member drinks tea or coffee. Find how many drink coffee, How many drink coffee, but not tea.

12. Write down all possible proper subsets of the set $\{1, \{2\}\}$.
13. In a class of 25 students, 12 have taken mathematics, 8 have taken mathematics but not biology. Find the no. of students who have taken both mathematics and biology and the no. of those who have taken biology but not mathematics each student has taken either mathematics or biology or both.
14. There are 20 students in a chemistry class and 30 students in a physics class. Find the number of students which are either in physics class or chemistry class in the following cases. (i) Two classes meet at the same hour (ii) The two classes met at different hours and ten students are enrolled in both the courses.
15. 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 three subjects. Find the no. of students that had taken (i) only chemistry (ii) only mathematics (iii) only physics (iv) physics and chemistry but mathematics (v) mathematics and physics but not chemistry (vi) only one of the subjects (vii) at least one of three subjects (viii) None of three subjects.
16. In a school there are 20 teachers who teach mathematics or physics. Of these 12 teach mathematics and 4 teach both physics and mathematics. How many teach physics?
17. Let $U = \{1, 2, 3, 4, 5, 6\}$ $A = \{2, 3\}$ and $B = \{3, 4, 5\}$ Find $A' \cap B'$, $A \cup B$ and hence show that $(A \cup B)' = A' \cap B'$
18. In a class of 50 students, 30 students like Hindi, 25 like science and 16 like both. Find the no. of students who like (i) Either Hindi or science (ii) Neither Hindi nor science.
19. A survey shows that 73% of the Indians like apples, whereas 65% like oranges. What % Indians like both apples and oranges?
20. 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 three men got medal in all the three sports, how many received medals in exactly two of the three sports?
21. If A, B, and C, are three sets and U is the universe set such that $n(U) = 1000$, $n(A) = 300$, $n(B) = 300$ and $n(A \cap B) = 200$ find $n(A' \cap B')$

22. Write down all the subsets of the set $\{1,2,3\}$
23. Draw Venn diagram for $(A \cap B)'$
24. If $A = \{1, 2, 3\}$, $B = \{1, 2, 3, 4\}$ and $R = \{(x, y) : (x, y) \in A \times B, y = x + 1\}$ then
(i) find $A \times B$ (ii) write domain and Range
25. Let $R = \{(x, -y) : x, y \in W, 2x + y = 8\}$ then
(i) Find the domain and the range of R
(ii) Write R as a set of ordered pairs.
26. If $f(x) = \frac{x^2 - 3x + 1}{x - 1}$, find $f(-2) + f\left(\frac{1}{3}\right)$
27. If $A = \{1, 2\}$ find $(A \times A \times A)$
28. If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$ find
(i) $A \times (B \cup C)$ (ii) $A \times (B \cap C)$ (iii) $(A \times B) \cap (B \times C)$
29. If $f(x) = x - \frac{1}{x}$ Prove that $[f(x)]^3 = f(x^3) + 3f\left(\frac{1}{x}\right)$
30. Let $R = \{(x, y) : y = x + 1\}$ and $y = \{0, 1, 2, 3, 4, 5\}$ list the elements of R
31. $f(x) = \left\{x^3 - \frac{1}{x^3}\right\}$ Prove that $f(x) + f\left(\frac{1}{x}\right) = 0$
32. If $y = \frac{6x-5}{5x-6}$. Prove that $f(y) = x, x \neq \frac{6}{5}$
33. Let $f : x \rightarrow y$ be defined by $f(x) = x^2$ for all $x \in X$ where $X = \{-2, -1, 0, 1, 2, 3\}$ and $y = \{0, 1, 4, 7, 9, 10\}$ write the relation $f(x)$ in the roster form. Is f a function?
34. Find the domain and the range of the function $f(x) = \frac{x+2}{|x+2|}$
35. Find the domain and the range of the function $f(x) = \frac{x^2}{x^2+1}$
36. If A, B are two sets such that $n(A \times B) = 6$ and some elements of $A \times B$ are $(-1, 2), (2, 3), (4, 3)$ then find $A \times B$ and $B \times A$

37. If the ordered Pairs $(x - 1, y + 3) = (2, 4x + 4)$, find x and y .
38. A Function f is defined by $f(x) = 2x - 3$ find $f(5)$
39. Let $f = \{(0,-5), (1, -2), (2,1), (3,4), (4,7)\}$ be a linear function from z into z find f
40. Find the domain and the range of the function $f(x) = 3x^2 - 5$ Also find $f(-3)$
41. Find the domain and the range of the function $f(x) = \sqrt{x - 1}$
42. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 3, 4\}$ let R be the relation, is greater than from A to B . Write R as a set of ordered pairs. find domain (R) and range (R)
43. Let N be the set of natural numbers and the relation R be define in N by $R = \{(x, y) : y = 2x, x, y \in N\}$. What is the domain, co domain and range of R ? Is this relation a function?
44. Let $A = \{1, 2\}$ and $B = \{3, 4\}$. Write $A \times B$. How many subsets will $A \times B$ have? List them
45. Let $A = \{1, 2\}$, $B = \{1, 2, 3, 4\}$, $C = \{5, 6\}$ and $D = \{5, 6, 7, 8\}$. Verify that
- $A \times (B \cap C) = (A \times B) \cap (A \times C)$
 - $A \times C$ is a subset of $B \times D$
46. Let $A = \{1,2,3, 4,5,6\}$ define a relation R from A to A by $R = \{(x, y) : y = x + 1, x, y \in A\}$
- write R in the roaster form
 - write down the domain co domain and range of R
 - Represent R by an arrow diagram
47. Find the linear relation between the components of the ordered pairs of the relation R where $R = \{(2,1), (4, 7), (1, -2) \dots\dots\dots\}$
48. Find the domain and the range of the following functions:
- $f(x) = \sqrt{x^2 - 1}$,
 - (ii) $f(x) = \sqrt{16 - x^2}$,
 - (iii) (iii) $f(x) = \frac{1}{\sqrt{16 - x^2}}$