

Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

Talwara Township, Hoshiarpur | +91 9463672753 | tarunclasses.in

Set Theory

Subjects : Maths

Previous Year Questions of JEE
Mains

Maths - Section A (MCQ.)

- Let $A = \{x : |x^2 - 10| \leq 6\}$ and $B = \{x : |x - 2| > 1\}$. Then
 - $A \cup B = (-\infty, 1] \cup (2, \infty)$
 - $A - B = [2, 3)$
 - $A \cap B = [-4, -2] \cup [3, 4]$
 - $B - A = (-\infty, -4) \cup (-2, 1) \cup (4, \infty)$
- Let $A = \{(\alpha, \beta) \in \mathbf{R} \times \mathbf{R} : |\alpha - 1| \leq 4 \text{ and } |\beta - 5| \leq 6\}$ and $B = \{(\alpha, \beta) \in \mathbf{R} \times \mathbf{R} : 16(\alpha - 2)^2 + 9(\beta - 6)^2 \leq 144\}$
 - $B \subset A$
 - $A \cup B = \{(x, y) : -4 \leq x \leq 4, -1 \leq y \leq 11\}$
 - neither $A \subset B$ nor $B \subset A$
 - $A \subset B$
- Let $A = \{1, 2, 3, \dots, 10\}$ and $B = \{\frac{m}{n} : m, n \in A, m < n \text{ and } \gcd(m, n) = 1\}$. Then $n(B)$ is equal to :
 - 36
 - 31
 - 37
 - 29
- Let A and B be two finite sets with m and n elements respectively. The total number of subsets of the set A is 56 more than the total number of subsets of B . Then the distance of the point $P(m, n)$ from the point $Q(-2, -3)$ is
 - 10
 - 6
 - 4
 - 8
- Let $A = \{n \in [100, 700] \cap \mathbf{N} : n \text{ is neither a multiple of 3 nor a multiple of 4}\}$. Then the number of elements in A is
 - 300
 - 280
 - 310
 - 290
- In a survey of 220 students of a higher secondary school, it was found that at least 125 and at most 130 students studied Mathematics; at least 85 and at most 95 studied Physics; at least 75 and at most 90 studied Chemistry; 30 studied both Physics and Chemistry; 50 studied both Chemistry and Mathematics; 40 studied both Mathematics and Physics and 10 studied none of these subjects. Let m and n respectively be the least and the most number of students who studied all the three subjects. Then $m + n$ is equal to
 - 50
 - 45
 - 78
 - 49
- The number of elements in the set $S = \{(x, y, z) : x, y, z \in \mathbf{Z}, x + 2y + 3z = 42, x, y, z \geq 0\}$
 - 167
 - 169
 - 168
 - 165
- A group of 40 students appeared in an examination of 3 subjects - Mathematics, Physics Chemistry. It was found that all students passed in at least one of the subjects, 20 students passed in Mathematics, 25 students passed in Physics, 16 students passed in Chemistry, at most 11 students passed in both Mathematics and Physics, at most 15 students passed in both Physics and Chemistry, at most 15 students passed in both Mathematics and Chemistry. The maximum number of students passed in all the three subjects is

- A) 10 B) 7 C) 5 D) 11
9. Let the set $C = \{(x, y) \mid x^2 - 2^y = 2023, x, y \in \mathbb{N}\}$. Then $\sum_{(x,y) \in C} (x + y)$ is equal to
A) 46 B) 15 C) 75 D) 45
10. The number of elements in the set $\{n \in \mathbb{N} : 10 \leq n \leq 100 \text{ and } 3^n - 3 \text{ is a multiple of } 7\}$ is
A) 15 B) 14 C) 13 D) 12
11. An organization awarded 48 medals in event 'A', 25 in event 'B' and 18 in event 'C'. If these medals went to total 60 men and only five men got medals in all the three events, then, how many received medals in exactly two of three events?
A) 10 B) 9 C) 21 D) 15
12. The number of elements in the set $\{n \in \mathbb{Z} : |n^2 - 10n + 19| < 6\}$ is
A) 12 B) 18 C) 24 D) 6
13. Let $A = \{n \in \mathbb{N} : H.C.F.(n, 45) = 1\}$ and Let $B = \{2k : k \in \{1, 2, \dots, 100\}\}$. Then the sum of all the elements of $A \cap B$ is
A) 5264 B) 5265 C) 5255 D) 5235
14. Let $A = \{x \in \mathbb{R} : |x + 1| < 2\}$ and $B = \{x \in \mathbb{R} : |x - 1| \geq 2\}$. Then which one of the following statements is NOT true ?
A) $A - B = (-1, 1)$ B) $B - A = \mathbb{R} - (-3, 1)$
C) $A \cap B = (-3, -1]$ D) $A \cup B = \mathbb{R} - [1, 3)$
15. The number of elements in the set $\{x \in \mathbb{R} : (|x| - 3)|x + 4| = 6\}$ is equal to
A) 3 B) 2 C) 4 D) 1
16. Set A has m elements and Set B has n elements. If the total number of subsets of A is 112 more than the total number of subsets of B , then the value of $m \times n$ is
A) 7 B) 4 C) 28 D) 24
17. Let $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^n Y_i = T$ where each X_i contains 10 elements and each Y_i contains 5 elements. If each element of the set T is an element of exactly 20 of sets X_i 's and exactly 6 of sets Y_i 's, then n is equal to
A) 45 B) 15 C) 50 D) 30
18. If $X = \{4^n - 3n - 1 : n \in \mathbb{N}\}$ and $Y = \{9(n - 1) : n \in \mathbb{N}\}$, then $X \cup Y = \dots$
A) X B) Y C) $\mathbb{N}$ D) None of these
19. Let $S = \{1, 2, 3, \dots, 100\}$. The number of non-empty subsets A of S such that the product of elements in A is even is
A) $2^{100} - 1$ B) $2^{50}(2^{50} - 1)$ C) $2^{50} - 1$ D) $2^{50} + 1$
20. Consider the two sets : $A = \{m \in \mathbb{R} : \text{both the roots of } x^2 - (m + 1)x + m + 4 = 0 \text{ are real}\}$ and $B = [-3, 5]$
Which of the following is not true?
A) $A - B = (-\infty, -3) \cup (5, \infty)$ B) $A \cap B = \{-3\}$
C) $B - A = (-3, 5)$ D) $A \cup B = \mathbb{R}$

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1 - D	2 - A	3 - B	4 - A	5 - A	6 - B	7 - B	8 - A	9 - A	10 - A
11 - C	12 - D	13 - A	14 - B	15 - B	16 - C	17 - D	18 - B	19 - B	20 - A

