

DELHI PUBLIC SCHOOL, JAMMU

SESSION: 2021-22

ASSIGNMENT

Class : XI

Month : May

Subject: Mathematics

(SETS, RELATION AND FUNCTIONS)

1. Which of the following sets are null sets
 - (a) $\{x: |x| < -4, x \in \mathbb{N}\}$
 - (b) 2 and 3
 - (c) Set of all prime numbers between 15 and 19
 - (d) $\{x: x < 5, x > 6\}$
2. Two finite sets have N and M elements. The number of elements in the power set of first set is 48 more than the total number of elements in power set of the second test. Then the value of M and N are
 - (a) 7, 6
 - (b) 6, 4
 - (c) 7, 4
 - (d) 6, 3
3. In a class of 50 students, 10 did not opt for math, 15 did not opt for science and 2 did not opt for either. How many students of the class opted for both math and science.
 - (a) 24
 - (b) 25
 - (c) 26
 - (d) 27
4. A relation R is defined from the set of integers to the set of real numbers as $(x, y) \in R$ if $x^2 + y^2 = 16$ then the domain of R is
 - (a) (0, 4, 4)
 - (b) (0, -4, 4)
 - (c) (0, -4, -4)
 - (d) None of these
5. A function $f(x)$ is said to be an odd function if
 - (a) $f(-x) = f(x)$
 - (b) $f(-x) = -f(x)$
 - (c) $f(-x) = k * f(x)$ where k is a constant
 - (d) None of these
6. In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Math. How many opt for none of the three subjects?
 - (a) 19
 - (b) 41
 - (c) 21
 - (d) 57
7. Write the following sets in set builder form:
 - a) $\{1, 1/2, 1/3, 1/4, 1/5, \dots\}$
 - b) $\{0, 3, 6, 9, 12, \dots\}$
 - c) $\{10, 11, 12, 13, 14, 15\}$
 - d) $\{1/2, 2/5, 3/10, 4/17, 5/26, 6/37, 7/50\}$

e) $\{1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9, 9/10\}$

f) $\{1, 1/4, 1/9, 1/25, \dots\}$

g) $\{1, 4, 9, 16, 25, \dots\}$

8. Write the following sets in Roster form:

a) The set of square of integers

b) The set of vowels in the word 'EQUATION'

c) $\{x: x \text{ is a positive integer and a divisor of } 9\}$

d) $\{x: x \in \mathbb{Z} \text{ and } |x| \leq 2\}$

e) $\{x: x \text{ is a letter of the word 'PROPORTION'}\}$

f) $\{x: x = \frac{n}{n^2+1} \text{ and } 1 \leq n \leq 3, \text{ where } n \in \mathbb{N}\}$

g) $A = \{x: x \in \mathbb{Z} \text{ and } x^2 \leq 10\}$

h) $B = \{x: x = \frac{1}{2n-1}, 1 \leq n \leq 5\}$

i) $\{x: x \text{ is a two digit natural number such that the sum of its digits is } 9\}$

j) $\{x: x \in \mathbb{Z}, x^2 \leq 4\}$.

9. Write down the power set of $A = \{1, \{3\}, 4\}$.

10. If \mathbb{R} is the set of real numbers and \mathbb{Q} is the set of irrational numbers then what is $\mathbb{R} - \mathbb{Q}$.

11. Draw appropriate Venn diagram of $(A \cup B)'$.

12. Two finite sets have m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. Find the values of m and n .

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

14. If $U = \{x: x \in \mathbb{N} \text{ and } x \leq 10\}$, $A = \{x: x \text{ is prime}\}$, and $B = \{x: x \text{ is a factor of } 24\}$, verify the following results.

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

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

15. Find the domain and range of $f(x) = \frac{x}{1+x^2}$.