BRAIN INTERNATIONAL SCHOOL

SUBJECT : MATHEMATICS CLASS : XI JUNE 2021

CHAPTER : SETS , RELATIONS AND FUNCTIONS

Q1. Describe the set $\{x \in N : x \text{ is a } perfect \text{ } square, 10 < x < 20\}$ in Roster form.

Q2. Describe the set $\{-1, 1\}$ in set builder form.

Q3. Which of the following sets are disjoint :
$A = \{2, 1, 4\},\ B = \{-1, 5, 1\},\ C = \{1, 9\},\ D = \{x \in N | x < 3\},\ E = \{x :$
$x \text{ is an odd natural number greater than } 3\}$.

Q4. State "True" or "False", for each of the following :

(i) $\{1\} \in \{1, 2, 3\}$
(ii) $1 \in \{1, 2\}$
(iii) $\{x \in N \mid x + 8 = 8\} \subseteq Z$
(iv) $\{b, c\} \subset \{a, \{b, c\}\}$

Q5. Let $U = \{x \in N \mid x \leq 9\}$; $A = \{x : x \text{ is an even number}, 0 < x < 10\}$; $B = \{2, 3, 5, 7\}$
Verify that, $(A \cup B)' = A' \cap B'$.

Q6. Two finite sets have m and n elements. The total number of subsets of the first set is 112 more than the total number of subsets of the second set. The value of m and n are respectively

(i) 4, 7
(ii) 7, 4
(iii) 4, 4
(iv) 7, 7

Q7. Given set $A = \{1, 2, 3, 4 \ldots, 100\}$.

(i) Write the subset X of A, whose elements are multiples of 7.
(ii) Write the subset Y of A, whose elements are represented by $x + 3, when\ n \in A$.

Q8. In a survey conducted on a group of 1800 people it is found that 1200 people liked product A and 900 people liked product B. What is the least number of people who liked both the products A and B, given that 500 people did not like any of the product.

Q9. 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 and 4 had taken Physics and Chemistry and 3 had taken all the three subjects. Find the number of students that had taken none of the subjects.

Q10. Given $R = \{(x, y) : y = x - 3,\ x, y \in Z\}$. State which of the ordered pairs belong to the relation

(i) (5, 2)
(ii) (1, 2)

(iii) (0, -3)
(iv) (7, -4)
(v) (-4, 1)

Q11. Find domain and range of the relation R given by,
$R = \left\{(x, y) : y = x + \frac{6}{x},\ xy \in N, x < 6\right\}$

Q12. If $(x - 1, y + 3) = (2, x + 4)$, find x and y.

Q13. Find the range of the function $(x) = \frac{|x-5|}{5-x}$.

Q14. If $A \times B = \{(a, 1), (a, 2), (b, 1), (b, 2)\}$. Find the sets A and B and hence find $B \times A$.

Q15. Let $A = \{1, 2, 3, 6, 9, 18\}$. Find the set R such that
$R = \{(a, b) \mid\ a,\ b \in A\ and\ a\ is\ a\ multiple\ of\ b\}$.

Q16. Let $A = \{1, 2, 3\}, B = \{3, 4\}\ and\ C = \{4, 5, 6\}$, find :

(i) $A \times (B \cap C)$

(ii) $(A \times B) \cup (A \times C)$

Q17. Re-define, the function given by $f(x) = |x - 1| + |1 + x|, -2 \leq x \leq 2$.

Q18. A relation R is defined on the set of integer as $R = \{(x, y) \mid x^2 + y^2 = 64\}$.

Q19. Let $f(x) = x^2 - x\ and\ g(x) = x$ be two functions defined in the domain $R^+ \cup \{0\}$. Find

(i) $(f + g)(0)$

(ii) $(f - g)(-1)$

(iii) $(fg)\left(\frac{1}{2}\right)$

(iv) $\left(\frac{f}{g}\right)(4)$

Q20. Let $A = \{1, 2, 3\}, B = \{4\}\ and\ C = \{5\}$, verify that, $A \times (B \cup C) = (A \times B) \cup (A \times C)$

Q21. Write the relation R in set $A = \{x \in Z, \mid x| \leq 5\}$, defined as
$R = \{(a, b)\ \in A \times A \mid b = 2a + 3\}$. Find domain and range.