

Bhavan's Gandhi Vidhyashram, Kodaikanal
Grade 11 - Mathematics – Main - Holiday Assignments – 2018-2019

Name: _____

Answer all the questions given below:

1. Write the following sets in the roster form.
 - (i) $A = \{x: x \text{ is a positive integer less than } 10 \text{ and } 2x-1 \text{ is an odd number}\}$
 - (ii) $C = \{x : x^2 + 7x - 8 = 0, x \in \mathbb{R}\}$

2. State which of the following statements are true and which are false. Justify your answer.
 - (i) $37 \notin \{x \mid x \text{ has exactly two positive factors}\}$
 - (ii) $28 \in \{y \mid \text{the sum of the all positive factors of } y \text{ is } 2y\}$
 - (iii) $7,747 \in \{t \mid t \text{ is a multiple of } 37\}$

3. If X and Y are subsets of the universal set U , then show that
 - (i) $Y \subset X \cup Y$ (ii) $X \cap Y \subset X$ (iii) $X \subset Y \Rightarrow X \cap Y = X$

4. Given that $N = \{1, 2, 3, \dots, 100\}$, then
 - (i) Write the subset A of N , whose elements are odd numbers.
 - (ii) Write the subset B of N , whose element are represented by $x+2$, where $x \in N$.

5. Given that $E = \{2, 4, 6, 8, 10\}$. If n represents any member of E , then, write the following sets containing all numbers represented by (i) $n + 1$ (ii) n^2

6. Let $X = \{1, 2, 3, 4, 5, 6\}$. If n represent any member of X , express the following in the form of sets:
 - (i) $n \in X$ but $2n \notin X$ (ii) $n+5 = 8$ (iii) n is greater than 4.

7. Draw the Venn diagrams to illustrate the following relationship among sets E , M and U , where E is the set of students studying English in a school, M is the set of students studying Mathematics in the same school, U is the set of all students in that school.
 - i. All the students who study Mathematics study English, but some students who study English do not study Mathematics.
 - ii. There is no student who studies both Mathematics and English.
 - iii. Some of the students study Mathematics but do not study English, some study English but do not study Mathematics, and some study both.
 - iv. Not all students study Mathematics, but every students studying English studies Mathematics.

8. For all sets A , B and C Is $(A \cap B) \cup C = A \cap (B \cup C)$? Justify your statement.

9. Use the properties of sets to prove that for all the sets A and B.
- $$A - (A \cap B) = A - B$$
10. For all sets A, B and C, Is $(A-B) \cap (C-B) = (A \cap C) - B$? Justify your answer.
11. Let A, B and C be sets. Then show that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
12. Let P be the set of prime numbers and let $S = \{t : 2^t - 1 \text{ is a prime}\}$.
Prove that $S \subset P$.
13. 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?
14. Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of m and n respectively are _____
15. The set $(A \cup B \cup C) \cap (A \cap B' \cap C')' \cap C'$ is equal to _____
16. Let $A = \{1, 2, 3, 4\}$ and $B = \{5, 7, 9\}$.
Determine (i) $A \times B$ (ii) $B \times A$ (iii) Is $A \times B = B \times A$? (iv) Is $n(A \times B) = n(B \times A)$?
17. Find x and y if: (i) $(4x + 3, y) = (3x + 5, - 2)$ (ii) $(x - y, x + y) = (6, 10)$
18. If $A = \{2, 4, 6, 9\}$ and $B = \{4, 6, 18, 27, 54\}$, $a \in A$, $b \in B$, find the set of ordered pairs such that 'a' is factor of 'b' and $a < b$.
19. Find the domain and range of the relation R given by
(i) $R = \{(x, y) : y = x + \frac{6}{x}; \text{ where } x, y \in \mathbb{N} \text{ and } x < 6\}$.
20. Find x and y if: (i) $(4x+3, y) = (3x + 5, - 2)$ (ii) $(x - y, x + y) = (6, 10)$

All the best and Happy Holidays