

SET ASSIGNMENT 1

1. Describe the following sets by roster method:

i. $\{x : 25x^2 + 30x + 7 = 0, x \in Q\}$

iv. $\{x : x^2 + x + 1 = 0, x \in C\}$

ii. $\{x : 7x + 9 < 55, x \in N\}$

v. $\{x : |x| < 3, x \in Z\}$

iii. $\{x : |x| = 4, x^2 + 16 = 0, x \in N\}$

2. Describe the following sets by property method:

i. $\{3, 5, 9, 17, 33\}$

iii. $\{5, 7, 11, 13, 17\}$

ii. $\left\{\frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \frac{1}{12}\right\}$

3. Which of the following sets are null sets:

i. $A = \{x : x < 1 \text{ and } x > 3\}$

ii. $B = \{x : x^2 = 9 \text{ and } 3x = 7\}$

iii. $C = \{x : x^2 - 1 = 0, x \in R\}$

iv. $D = \{x : x \text{ is an even prime number}\}$

4. Which of the following are singleton sets:

i. $A = \{x : 3x - 2 = 0, x \in Q\}$

ii. $B = \{x : x^3 - 1 = 0, x \in R\}$

iii. $C = \{x : 30x - 59 = 0, x \in N\}$

iv. $D = \{x : |x| = 1, x \in Z\}$

5. Write all the proper subsets of the set $\{-1, 3, 4\}$.

6. If $A = \{3, 6, 8, 15, 19\}$ and $B = \{1, 2, 6, 8, 14, 15\}$, then verify that $A \Delta B = (A \cup B) - (A \cap B)$.

7. If $A = \{x : x^3 - 1 = 0\}$, $B = \{x : x^2 + x + 1 = 0\}$ find $A \cap B$ when x is a (i) real number (ii) complex number.

8. Write the following intervals in set builder form:

a) $[-2, 3]$

b) $(0, 5]$

c) $(-1, 3)$

d) $[-2, 3]$

9. Write the following intervals in the roster form:

a) $\{x : x \in R, -2 < x < 0\}$

b) $\{x : x \in R, 2 \leq x < 4\}$

c) $\{x : x \in R, 2 < x \leq 4\}$

d) $\{x : x \in R, -3 \leq x \leq 5\}$

10. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$; $A = \{1, 2, 3\}$; $B = \{2, 3, 5\}$; $C = \{3, 5, 7\}$, then prove that:

i) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

ii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

11. Using the above sets, find the following questions:

i) $A - (B \cup C)'$

ii) $A \cap (B \cap C)'$

12. If $A = \{1, 2, 3, 4, 5\}$, then the number of proper subsets of A is a) 120 b) 30 c) 31 d) 32.

13. If A and B are two given sets, then $A \cap (A \cap B)^c$ is equal to

a) A

b) B

c) $(A \cap B)^c$

d) ϕ

14. If $A = \{1, 2, 3, 4\}$ and $B = \{3, 4, 5, 6\}$, then shows that $n(A \Delta B) = n(A) + n(B) - 2n(A \cap B)$.

15. Draw the Venn diagrams for the following sets:

a) $A - (B \cup C)'$

b) $A \cup (B \cap C)$

c) $A \cap (B \cup C)$

d) $(A \cup B) - (A \cap B)$.