4. Give the universal set $= \{-7, 3, -1, 0, 5, 6, 8, 9\}$. find:

(i) $A = \{x : x < 2\}$

Ans- $A = \{x : x < 2\} = \{-7, -3, -1, 0\}$

(ii) $B = \{x : -4 < x < 6\}$

Ans $B = \{x : -4 < x < 6\} = \{-3, -1, 0, 5\}$

5. Given the universal set $= \{x : x \in N \text{ and } x < 20\}$, find:

(i) $A = \{x : x = 3p ; p \in N\}$

$x = 3p$

when, $p = 1$, $x = 3 \times 1 = 3$

when, $p = 2$, $x = 3 \times 2 = 6$

when $p = 3$, $x = 3 \times 3 = 9$

when $p = 4$, $x = 3 \times 4 = 12$

when $p = 5$, $x = 3 \times 5 = 15$

when $p = 6$, $x = 3 \times 6 = 18$

$\therefore A = \{3, 6, 9, 12, 15, 18\}$

(ii) $B = \{y : y - 2n + 3, n \in N\}$

$y - 2n + 3$

when $n = 1$, $y = 2 \times 1 + 3$
$\Rightarrow 2 + 3 = 5$

when $n = 2$, $y = 2 \times 2 + 3$
$\Rightarrow 4 + 3 = 7$

when $n = 3$, $y = 2 \times 3 + 3$
$\Rightarrow 6 + 3 = 9$

when, $n = 4$, $y = 2 \times 4 + 3 = 11$

when $n = 5$, $y = 2 \times 5 + 3 = 13$

when $n = 6$, $y = 2 \times 6 + 3 = 15$

when $n = 7$, $y = 2 \times 7 + 3 = 17$

when $n = 8$, $y = 2 \times 8 + 3 = 19$

$B = \{5, 7, 9, 11, 13, 15, 17, 19\}$

(iii) $C = \{x : x \text{ is divisible by } 4\}$

Ans- $C = \{4, 8, 12, 16\}$

6. Find the proper subsets of $\{x : x^2 - 9x - 10 = 0\}$

Ans-
$$x^2 - 9x - 10 = 0$$
$$\Rightarrow x^2 - 10x + x - 10 = 0$$
$$\Rightarrow x(x-10) + 1(x-10) = 0$$
$$\Rightarrow (x-10)(x+1) = 0$$

$$x - 10 = 0 \qquad\qquad x + 1 = 0$$
$$\Rightarrow x = 10 \qquad\qquad \Rightarrow x = -1$$

Given set $= \{-1, 10\}$

Proper subsets of this set $= \varphi, \{-1\}, \{10\}$

7. Given, $A = \{\text{Triangles}\}$, $B = \{\text{Isosceles triangles}\}$, $C = \{\text{Equilateral triangles}\}$. State whether the following are true or false. Give reasons

(i) $A \subset B$ ~~$A \subseteq B$~~ A C B

Ans- It is a false statement because since each triangle is not isosceles.

(ii) $B \subseteq A$

Ans— It is a true statement because Isoscales $\triangle$ is one of the triangles.

(iii) $C \subseteq B$

Ans— It is a true statement because since each equilateral triangle is Isosceles also.

(iv) $B \subset A$

Ans— It is a true statement because Isoscales $\triangle$ is one of the triangles.

(v) $C \subset A$

Ans— It is a true statement because ~~since~~ ~~each~~ equilateral triangle is ~~isosceles~~ one of the triangles.

(vi) $C \subseteq B \subseteq A$

Ans— It is a true statement because, each equilateral triangle is isosceles also and each isosceles $\triangle$ is a form of triangles.

8. Given A = {Quadrilaterals}, B = {Rectangle}, C = {Squares}, D = {Rhombus}. State giving reasons, whether the following true or False.

A = {Quadrilaterals}

B = {Rectangle}

C = {Squares}

D = {Rhombus}

(i) B ⊂ C

Ans- It is a ~~true~~ false statement because rectangle is not a square also.

(ii) D ⊂ B

Ans- It is a false statement because rhombus is not a rectangle also.

(iii) C ⊆ B ⊆ A

Ans- It is a true statement because every square is a rectangle also and every rectangle is a quadrilateral also.

(iv) $D \subset A$

Ans: It is a true statement because Rhombus is one of the quadrilaterals.

(v) $B \supseteq C$

Ans: It is a true statement because square is a rectangle also.

(vi) $A \supseteq B \supseteq D$

Ans: It is a false statement because rhombus is not a rectangle also.