Sets Ex 1.3 Q1

(i)   This set is non-empty as 10 is an even natural number divisible by 5.

(ii)   As 2 belongs to this set, so it is non-empty.

(iii) $x^2 - 2 = 0 \Rightarrow x^2 = 2 \Rightarrow x = \pm\sqrt{2} \notin Q,$ the set of rational numbers
So, this set is empty.

(iv)   This set is empty as there is no natural number x such that $x < 8$
and simultaneously $x > 12$.

(v)   This set is empty as any two parallel lines never intersect each other.

Sets Ex 1.3 Q2

(i)   Infinite, since with a common centre infinitely many circles can be
drawn in a plane.

(ii)   Finite, as there are only 26 letters of English Alphabet.

(iii)   Infinite, $\because$ $\{x \in N : x > 5\} = \{6, 7, 8, ...\}$ Which is infinite.

(iv)   Finite, $\because \{x \in N : x, 200\} = \{1, 2, 3, ...199\}$ Which is finite.

(v)   Infinite, $\because$ $\{x \in Z : x < 5\} = -\{..., -3, -2, -1, 0, 1, 2, 3, 4,\}$ Which is infinite.

(vi) $\{x \in R : 0 < x < 1\}$ is an infinite set $\because$ an interval is an infinite set.

Sets Ex 1.3 Q3

$A = \{1, 2, 3\}$

$B = \{x \in R : (x - 1)^2 = 0\}$

   $= \{x \in R : x = 1, 1\}$

   $= \{1\}$

$C = \{1, 2, 3\}$ ($\because$ repetition is not allowed in a set)

$D = \{x \in R : x^3 - 6x^2 + 11x - 6 = 0\}$

   $= \{x \in R : (x - 1)(x^2 5x + 6) = 0\}$ $[\because x = 1$ satisfies the above equation$]$

   $= \{x \in R : (x - 1)(x - 2)(x - 3) = 0\}$

   $= \{x \in R : x = 1, 2, 3\}$

   $= \{1, 2, 3\}$

Hence the set A, C and D are equal.

Sets Ex 1.3 Q4

$A = \{a, e, p, r\}$

$B = \{a, e, p, r\}$ (repetition of 'p' is not allowed)

$C = \{e, o, p, r\}$

as $A = B \neq C,$ $\therefore$ the sets are not equal

*********** END *********