RELATIONS & FUNCTIONS

1. If $(\frac{x}{3} + 1, y - \frac{2}{3}) = (\frac{5}{3}, \frac{1}{3})$, find the values of x and y.

   Ans. Given, $(\frac{x}{3} + 1, y - \frac{2}{3}) = (\frac{5}{3}, \frac{1}{3})$

   Since the ordered pairs are equal, the corresponding elements will also be equal.

   Therefore, $\frac{x}{3} + 1 = \frac{5}{3}$ and $y - \frac{2}{3} = \frac{1}{3}$

   $\Rightarrow \frac{x}{3} = \frac{5}{3} - 1$ $\Rightarrow y = \frac{2}{3} + \frac{1}{3}$

   $\Rightarrow \frac{x}{3} = \frac{2}{3}$ $\Rightarrow y = \frac{3}{3}$

   $\Rightarrow x = 2$ $\Rightarrow y = 1$

   Therefore, x=2 and y=1

2. If the set A has 3 elements and the set B= {3,4,5}, then find the number of elements in (AxB).

   Ans. Given,

   Set A has 3 elements and the elements of set B are 3,4 and 5.

   $\Rightarrow$ Number of elements in set B=3

   Number of elements in (AxB)

   = (Numbers of elements in A) x (Numbers of elements in B)

   =3x3=9

   Thus, the number of elements in (AxB) is 9.

   HOME WORK:

   NCERT BOOK:EX-**2.1**: (3,4,6)

3. Let A={1,2,3,...,14}. Define a relation R from A to A by R={(x,y):3x-y=0, where x,y∈A}.Write down its domain, codomain and range.

   Ans. Given,

   R={(x,y):3x-y=0, where x,y∈A}

   i.e., R={(x,y):3x=y, where x,y∈A}

   Therefore, R={(1,3),(2,6),(3,9),(4,12)}

   The domain of R is the set of all first elements of the ordered pair in the relation.

   ∴ Domain of R={1,2,3,4}

   ∴Range of R={3,6,9,12}

   ∴Codomain of R=A={1,2,3,...,14}.

4. Define a relation R on the set N of natural numbers by R={(x,y):y=x+5, x is a natural number less than 4; x,y∈N}. Depict this relationship using roster form. Write down the domain and the range.

   Ans. R={(x,y):y=x+5, x is a natural number less than 4; x,y∈N}

   The natural number less than 4 are 1,2, and 3.

   ∴R={(1,6),(2,7),(3,8)}

   ∴Domain of R={1,2,3}

   ∴Range of R={6,7,8}

   HOME WORK:

   NCERT BOOK:EX-**2.2**:(3,5,6,8).

5. The following relations are function? Give reasons. If it is a function,determine its domain and range.
    i.   {(2,1),(5,1),(8,1),(11,1),(14,1),(17,1)}

    Ans. {(2,1),(5,1),(8,1),(11,1),(14,1),(17,1)}

    Here, domain={2,5,8,11,14,17} and range={1}.

6. Find the domain and range of the real function $f(x)=\sqrt{(9-x^2)}$.
    Ans. $f(x)=\sqrt{(9-x^2)}$
    Since $\sqrt{(9-x^2)}$ is defined for all real numbers that are greater than or equal to -3 or less than or equal to 3, the domain of f(x) is {x:-3≤x≤3} or [-3,3].
    For any values of x such that -3≤ x ≤3, the value of f(x) will lie between 0 and 3.
    ∴ The range of f(x) is {x:0≤x≤3} or [0,3].

7. A function f is defined by f(x)=2x-5. Write down the values of
    i.   f(0)
    ii.   f(7)
    iii.   f(-3)

Ans. i.   f(0)=2x0-5=0-5=-5

    ii.   f(7)=2x7-5=14-5=9
    iii.   f(-3)=2x(-3)-5=-6-5=-11

    HOME WORK:

    NCERT BOOK:EX-**2.3**: 1(ii,iii),2(i)