INDIAN SCHOOL DARSAIT
DEPARTMENT OF MATHEMATICS

Subject : Mathematics   Topic : Relations and   Date of Worksheet :17/5/2019
                           Functions

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S.No.	Questions	Marks

Section A (Basics):

i) An ordered pair consists of two objects or elements in a given fixed order

ii) The set of all ordered pairs (a, b) such that a ϵ A and b ϵ B is called the cartesian product of the sets A and B and is denoted by A × B .

iii) A relation R from A to B is a subset of A × B.

iv) A relation f from A to B is called a function if every element of A has one and only one image.

Section B :

1. If x, y $\in$ {1, 2, 3, 4} then which of the following are functions in the given set?   2
    i) $f_1 = \{(x,y): y = x + 1\}$ iii) $f_2 = \{(x,y): x + y < 4\}$
    ii) $f_3 = \{(x,y): y < x\}$ iv) $f_4 = \{(x,y): x + y = 5\}$

2. Let f: A→R, f (x) = x² + 1 where A=$\{-1, 0, 2, 4\}$. Find the range.   1

3. Find the domain of each of the following real valued functions   2
    i)   f(x) = $\dfrac{3x - 2}{x + 1}$ ii) f(x) = $\dfrac{2x + 1}{x^2 - 9}$ iii) $\dfrac{x^2 + 2x + 1}{x^2 - 8x + 12}$

    iv)   f (x) = $\sqrt{x - 2}$ v) f(x) = $\sqrt{9 - x^2}$ vi) f (x) = $\dfrac{x^2 + 3x + 5}{x^2 - 5x + 4}$

4. Find the domain and range of each of the following real valued functions   4

    i) f(x)= $\dfrac{1}{\sqrt{x - 5}}$ ii) f(x) = $\sqrt{16 - x^2}$ iii) f(x) = $\dfrac{4 - x}{x - 4}$ iv) f(x) = $\dfrac{x^2}{1 + x^2}$

5.   If f(x)=x² + x − 1 and g(x) = 4x − 7, be real functions then find: 1

   i)(f + g) 2   ii) (f − g) (7)   iii) (fg) (- 5)   iv) $\left\{\dfrac{f}{g}\right\}$ (4)

6.   If f(x) = $[x]$ where g(x)=$|x|$ where $[x]$ is greater integer function and $|x|$ is modulus   6
   function then find (fg) $\left[\dfrac{7}{2}\right]$ - (gf) $\left[\dfrac{-7}{2}\right]$

7.   If f,g,h are real functions defined by f(x) = $\sqrt{x+1}$, g(x) = $\dfrac{1}{x}$ and h(x) = 2x² − 3, then   4
   find the values of (2f + g − h)(1) and (2f +g − h) (0)

8.   If f is a real function defined by f(x) = $\dfrac{x-1}{x+1}$, then prove that   4

   f(2x) = $\dfrac{3f(x)+1}{f(x)+3}$

Section C (Hots):

1.   Find the domain of the function f(x) defined by   4

   f(x) = ($\sqrt{4-x}$) + $\dfrac{1}{\sqrt{x^2-1}}$

2.   Let A be a subset of N and f: A → A be defined by   4
   f(n) : the highest prime factor of n. If range of f is A, determine A. Is A uniquely
   determined.

   ALL THE BEST DEAR CHILDREN: