



INDIAN SCHOOL DARSAIT

DEPARTMENT OF MATHEMATICS



Subject : Mathematics Topic : Relations and Functions Date of Worksheet :6/6/2017

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Name of the Student : _____ Class & Division : XI Roll Number : ____

| S.No. | Questions | Marks |
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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 $a \in A$ and $b \in B$ is called the cartesian product of the sets A and B and is denoted by $A \times B$.
- iii) A relation R from A to B is a subset of $A \times B$.
- 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 $f: A \rightarrow R, f(x) = x^2 + 1$ where $A = \{-1, 0, 2, 4\}$. Find the range. 1
3. Find the domain of each of the following real valued functions 2
 - i) $f(x) = \frac{3x-2}{x+1}$ ii) $f(x) = \frac{2x+1}{x^2-9}$ iii) $\frac{x^2+2x+1}{x^2-8x+12}$
 - iv) $f(x) = \sqrt{x-2}$ v) $f(x) = \sqrt{9-x^2}$ vi) $f(x) = \frac{x^2+3x+5}{x^2-5x+4}$
4. Find the domain and range of each of the following real valued functions 4
 - i) $f(x) = \frac{1}{\sqrt{x-5}}$ ii) $f(x) = \sqrt{16-x^2}$ iii) $f(x) = \frac{4-x}{x-4}$ iv) $f(x) = \frac{x^2}{1+x^2}$



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5. If $f(x) = x^2 + x - 1$ and $g(x) = 4x - 7$, be real functions then find: 1
i) $(f + g)(2)$ ii) $(f - g)(7)$ iii) $(fg)(-5)$ iv) $\left\{ \frac{f}{g} \right\}(4)$
6. If $f(x) = [x]$ where $g(x) = |x|$ where $[x]$ is greater integer function and $|x|$ is modulus function then find $(fg)\left[\frac{7}{2}\right] - (gf)\left[\frac{-7}{2}\right]$ 6
7. If f, g, h are real functions defined by $f(x) = \sqrt{x+1}$, $g(x) = \frac{1}{x}$ and $h(x) = 2x^2 - 3$, then find the values of $(2f + g - h)(1)$ and $(2f + g - h)(0)$ 4
8. If f is a real function defined by $f(x) = \frac{x-1}{x+1}$, then prove that 4
$$f(2x) = \frac{3f(x)+1}{f(x)+3}$$

Section C (Hots):

1. Find the domain of the function $f(x)$ defined by 4
$$f(x) = (\sqrt{4-x}) + \frac{1}{\sqrt{x^2-1}}$$
2. Let A be a subset of N and $f: A \rightarrow A$ be defined by 4
 $f(n)$: the highest prime factor of n . If range of f is A , determine A . Is A uniquely determined.