XII- Mathematics Assignment – Relations and Functions.

Q1. Define one-one and onto function. give example and also draw diagram.

Q2. What is the range of the function

$$f(x) = \frac{|x-1|}{x-1} \ ?$$

Q3. Let $A = \{1, 2, 3\}$, $B = \{4, 5, 6, 7\}$ and let $f = \{(1,4), (2,5), (3,6)\}$ be a function from A to B. State whether f is one-one or not.

Q4. Let $f: N \longrightarrow N$ be defined as

$$f(n) = \frac{n+1}{2}, \quad \text{if } n \text{ is odd}$$

$$= \frac{n}{2}, \quad \text{if } n \text{ is even}$$

$$\forall \ n \in N$$

Find whether the function is bijective

Q5. Let $A = R - \{3\}$ and $B = R - \{1\}$. The function $f: A \rightarrow B$ defined by $f(x) = \frac{x-2}{x-3}$. Is f one-one and onto? Justify your answer.

Q6. $f: R \to R$ defined by $f(x) = 3-4x$
Prove f is a bijective function ie, one one and onto

Q7 Is the following function
$$f(x) = 1+x^2, \quad f: R \to R$$
is one-one, onto. [No]

Q8. Test the injectivity and Surjectivity of
$$f: N \to N : f(x) = x^2$$
[ANS: One-one, not onto]

Q9. Show that the function $f: R \to R$ given by $f(x) = x^3$ is injective.

Q10. If $f: R \to R$ Such that
$$f(x) = x^2 - 3x + 2.$$ Find $f(f(x))$

[ANS: $x^4 - 6x^3 + 10x^2 - 3x$]