Five Mark Questions

Relations and Functions

1. Check the injectivity and surjectivity of the function $f : R \to R$ defined by $f(x) = 3 - 4x$. Is it a bijective function? **(A 21)**
2. Verify whether the function $f : N \to N$ defined by $f(x) = x^2$ is one-one, onto and bijective.
3. Show that the function $f : R_* \to R_*$ defined $f(x) = \frac{1}{x}$ is one-one and onto, where R_* is the set of all non-zero real numbers.
4. Show that the Modulus function $f : R \to R$ given by $f(x) = |x|$, is neither one-one nor onto.
5. Prove that the Greatest integer function $f : R \to R$ given by $f(x) = [x]$ is neither one-one nor onto.
6. Show that the signum function $f : R \to R$, given by $f(x) = \begin{cases} -1 & if \quad x < 0 \\ 0 & if \quad x = 0 \\ 1 & if \quad x > 0 \end{cases}$ is neither one-one nor onto.
7. Check the injectivity and surjectivity of the function $f : R \to R$ defined by $f(x) = 1 + x^2$. Is it a bijective function?
8. Verify whether the function $f : R - \{3\} \to R - \{1\}$, defined by $f(x) = \frac{x-2}{x-3}$ is one-one and onto or not. Justify your answer.
9. Show that $f : N \to N$,given by $f(1) = f(2) = 1$ and $f(x) = x - 1$, for every $x > 2$, is onto but not one-one.
10. Verify whether the function $f : Z \to Z$ defined by $f(x) = x^2$ is one-one, onto and bijective.
11. Verify whether the function $f : R \to R$ defined by $f(x) = x^2$ is one-one, onto and bijective.
12. Verify whether the function $f : N \to N$ defined by $f(x) = x^3$ is one-one, onto and bijective.
13. Verify whether the function $f : Z \to Z$ defined by $f(x) = x^3$ is one-one, onto and bijective.
14. Verify whether the function $f : R \to R$ defined by $f(x) = x^3$ is one-one, onto and bijective.
15. Verify whether the function $f : R \to R$ given by $f(x) = 2x$, is one-one, onto and bijective.

    Verify whether the function $f : N \to N$ given by $f(x) = 2x$, is one-one, onto and bijective.