Answer on Question #44545 – Math - Discrete Mathematics

Problem.

In the context of admission to IGNOU, give examples of the following:
i) an implication;
ii) the converse of (i) above;
iii) a two-way implication which is true;
iv) a statement involving both ∀ and ∃.
v) the contrapositive of (i) above.

Solution.

Suppose that a, b in i, ii, iii, v are real numbers.

i) If $a = b$, then $a^2 = b^2$.
$a = b \Rightarrow a^2 = b^2$.

ii) If $a^2 = b^2$, then $a = b$.
$a^2 = b^2 \Rightarrow a = b$.

iii) $a = b + 1$ if and only if $b = a - 1$.
$a = b + 1 \Leftrightarrow b = a - 1$.

iv) For any real number a exist real b, such that $a = b + 1$.
$\forall a \in \mathbb{R}\, \exists b \in \mathbb{R}: a = b + 1$.

v) If $a^2 \neq b^2$, then $a \neq b$.
$a^2 \neq b^2 \Rightarrow a \neq b$.