Answer on Question #46069 – Math – Algebra

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.

i) An implication:

$$If\ \ x = y\ \ then\ \ x^3 = y^3\ \ or\ \ x = y\ \rightarrow\ x^3 = y^3\ .$$

ii) The converse of (i) above:

$$If\ \ x^3 = y^3\ \ then\ \ x = y\ \ or\ \ x^3 = y^3\ \rightarrow\ x = y\ .$$

iii) a two-way implication which is true:

$$x = 2y\ \ if\ and\ only\ if\ \ y = \frac{1}{2}x\ \ \ or\ \ x = 2y\ \leftrightarrow y = \frac{1}{2}x\ .$$

iv) a statement involving both ∀ and ∃:

$$for\ any\ integer\ \ n\ exist\ integer\ m, such\ that\ \ m = 2n\ ,\ \ or$$

$$\forall\ n \in Z\ \exists\ m \in Z: m = 2n.$$

v) the contrapositive of (i) above.

$$If\ x^3 \neq y^3\ \ then\ x \neq y\ \ or\ \ x^3 \neq y^3\ \rightarrow\ x \neq y\ .$$