

1. Give, if possible, an example of a true conditional sentence for which
 - a. the converse is true.
Example: If some roses are red, then some violets are blue
 - b. the converse is false.
Example: If all dogs can't swim, then some paper is white
 - c. the contrapositive is false.
This cannot happen. A conditional sentence and its contrapositive always have the same truth value.
 - d. the contrapositive is true.
Any True statement will work.
Example: If Bicycles have six wheels, then elephants can't fly.
2. Give an English translation for each. The universe is given in parentheses.
 - a. $(\exists!x)(x \geq 0 \wedge x \leq 0)$. (Real numbers)
There exists a unique real number x , such that x is both greater than or equal to 0, and less than or equal to 0.
 - b. $(\forall x)(x \text{ is prime} \wedge x \neq 2 \Rightarrow x \text{ is odd})$. (Natural numbers)
Every prime number except 2 is odd.