

Subject n°20 – Logical implication

Please do not write on the subject paper and don't forget to give back the examination paper at the end of the test.

1°) « *A implies B* » is logically equivalent to « *non A or B* ».

For example : when the police come to arrest a thief who is holding a pistol, the police officer shouts :

« *Don't step forward, or I shoot* ».

a) To which *implication* is this sentence equivalent ?

b) What is the *contrary* of this implication ?

c) Can you give other simple examples of *implications* in maths (or in real life) and their *contrary* ?

2°) A father (whose job is logician) is fed up with his son who doesn't eat his soup at dinner, and he tells him : « *If you don't eat your soup, then you go to bed without dessert* ». The son, scared by this threat, finally eats his soup, and then the father sends him to bed *without* dessert.

a) In the previous situation, is the father *logically* correct ? Explain your answer.

b) What is the *contrapositive* of the father's *implication* ? Is it true or not ?

c) What is the *reciprocal* of the father's *implication* ? Is it true or not ?

d) Can you give other simple examples, in maths (or in real life), of true *implications* which have a *false* reciprocal ?