A remark.

Please note that the statement

$$P \implies Q$$

is equivalent to the statement

$$(\text{not } P) \text{ or } Q,$$

which in turn is equivalent to the statement

$$(\text{not } Q) \implies (\text{not } P).$$

Please note that the negation to any of 3 statements above is

$$P \text{ and } (\text{not } Q).$$

Thus in order to prove

$$P \implies Q$$

you can prove either directly

$$P \implies Q$$

(that is to assume that P is true and provide chain of arguments proving Q:
$P \implies R_1 \implies R_2 \implies R_3 \implies ... \implies R_n \implies Q$);
or to prove that

$$(\text{not } Q) \implies (\text{not } P);$$

or to argue by contradiction, that is to prove that the negation is false. In order to prove that the negation is false, you should assume that the negation is true, that is to assume that both P and (not Q) are true and to get a contradiction.