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examples of contrapositive

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Recall that the contrapositive of an implication $p \implies q$ is the equivalent implication $\neg q \implies \neg p$, which is read: "not q implies not p". The following are examples of the contrapositive and converse of a logical statement:

1. Let p be the statement "it is raining" and let q be "the ground is getting wet". Then the statement "if it is raining then the ground is getting wet" is equivalent to "if the ground is not getting wet then it is not raining". Notice that these are both true statements. Notice also that the converse would be "if the ground is getting wet then it is raining" (which is not necessarily true!).

2. Let $f : S \to T$ be a function of sets and let S be finite. The contrapositive statement of "if f is surjective then T is finite" (a true statement) would be the implication "if T is not finite then f is not surjective" (also a true statement). The converse would be "if T is finite then f is surjective" (a false statement).