

SOME LOGIC FACTS

Converse of $A \rightarrow B$ is $B \rightarrow A$. CONVERSE MAY OR MAY NOT BE TRUE.

Contrapositive of $A \rightarrow B$ is $\neg(B) \rightarrow \neg(A)$.
CONTRAPOSITIVE OF A STATEMENT IS ALWAYS TRUE IF THE STATEMENT IS TRUE.

$A \rightarrow B$ is equivalent to $\neg(A) \vee B$

Negative of $A \rightarrow B$ is " $A \wedge \neg(B)$ "

If " $A \vee B$ " is true then ONE OF THEM must be true.

If " $A \wedge B$ " is true then BOTH must be true.

CHECK VALIDITY: (Exercises from 1.4)

1. If I study hard, then I get A's.

I study hard.

Hence (it is true that) I get A's.

(Valid. $p \rightarrow q$ and p is true)

2. If I study hard, then I get A's.

If I don't get rich, then I don't get A's.

Hence I get rich.

(Invalid. Only two conditional statements, no basis for conclusion)

3. I study hard if and only if I get rich.

I get rich.

Hence I study hard.

(Valid. $p \leftrightarrow q$ and p is true)

4. If I study hard or I get rich, then I get A's.
I get A's.
Hence I don't study hard.

(Invalid. First of all, converse need not be true.
"I get A's" has no impact on "I study hard")

5. If I study hard, then I get A's or I get rich.
I don't get A's and I don't get rich.
Hence I didn't study hard.

(Valid. Contrapositive is always true).