

Statement, Converse, Contrapositive

The **converse** of an implication, $p \Rightarrow q$, is the statement $q \Rightarrow p$.

Example:**Original Statement:**

If you don't know where you're going, then any road will get you there. (Lewis Carroll)

Hypothesis (sufficient condition):

p = You don't know where you are going

Conclusion (necessary condition):

q = Any road will get you there.

Converse:

If any road will get you there, then you don't know where you're going.

Using the Law of Detachment, complete the truth tables below.

p	q	$p \Rightarrow q$	$q \Rightarrow p$
T	T		
T	F		
F	T		
F	F		

Contrapositive:

$\neg p$ means "not p " or the negation of p .

The **contrapositive** of an implication, $p \Rightarrow q$, is the statement $\neg q \Rightarrow \neg p$.

p	q	$p \Rightarrow q$	$\neg q \Rightarrow \neg p$
T	T		
T	F		
F	T		
F	F		

Read the statements below.

- a) Translate the statement into if-then form.
- b) Write the converse.
- c) Write the contrapositive.
- d) Identify which statements are true. Explain.

1. All odd numbers are prime.

a) Translate to If-Then: _____

b) Converse: _____

c) Contrapositive: _____

d) Validity: _____

2. Even numbers are divisible by 2.

a) Translate to If-Then: _____

b) Converse: _____

c) Contrapositive: _____

d) Validity: _____
