Name _____ Date _____

Core Concepts

Conditional Statement

A **conditional statement** is a logical statement that has two parts, a *hypothesis p* and a *conclusion q*. When a conditional statement is written in **if-then form**, the "if" part contains the **hypothesis** and the "then" part contains the **conclusion**.

Words   If p, then q.   **Symbols** $p \rightarrow q$ (read as "p implies q")

Notes:

Negation

The **negation** of a statement is the *opposite* of the original statement. To write the negation of a statement p, you write the symbol for negation ($\sim$) before the letter. So, "not p" is written $\sim p$.

Words   not p **Symbols** $\sim p$

Notes:

Related Conditionals

Consider the conditional statement below.

Words	If p, then q.	**Symbols**	$p \rightarrow q$

Converse   To write the **converse** of a conditional statement, exchange the hypothesis and the conclusion.

Words	If q, then p.	**Symbols**	$q \rightarrow p$

Inverse   To write the **inverse** of a conditional statement, negate both the hypothesis and the conclusion.

Words	If not p, then not q.	**Symbols**	$\sim p \rightarrow \sim q$

2.1 **Notetaking with Vocabulary** (continued)

Related Conditionals (continued)

Contrapositive To write the **contrapositive** of a conditional statement, first write the converse. Then negate both the hypothesis and the conclusion.

Words If not q, then not p. **Symbols** $\sim q \rightarrow \sim p$

A conditional statement and its contrapositive are either both true or both false. Similarly, the converse and inverse of a conditional statement are either both true or both false. In general, when two statements are both true or both false, they are called **equivalent statements**.

Notes:

Biconditional Statement

When a conditional statement and its converse are both true, you can write them as a single *biconditional statement*. A **biconditional statement** is a statement that contains the phrase "if and only if."

Words p if and only if q **Symbols** $p \leftrightarrow q$

Any definition can be written as a biconditional statement.

Notes: