Conditional statements are not always written with the "if" clause first. Here are some examples. All these conditionals mean the same thing.

General Form	Example
If p, then q.	If $x^2 = 25$, then $x < 10$.
p implies q.	$x^2 = 25$ implies $x < 10$.
p only if q.	$x^2 = 25$ only if $x < 10$.
q if p.	$x < 10$ if $x^2 = 25$.

If a conditional and its converse are both true they can be combined into a single statement by using the words "if and only if." A statement that contains the words "if and only if" is called a **biconditional.** Its basic form is shown below.

$$p \text{ if and only if } q.$$

Every definition can be written as a biconditional as the statements below illustrate.

Definition: Congruent segments are segments that have equal lengths.

Biconditional: Segments are congruent if and only if their lengths are equal.

Classroom Exercises

State the hypothesis and the conclusion of each conditional.

1. If $2x - 1 = 5$, then $x = 3$.
2. If she's smart, then I'm a genius.
3. $8y = 40$ implies $y = 5$.
4. $RS = \frac{1}{2}RT$ if S is the midpoint of $\overline{RT}$.
5. $\angle 1 \cong \angle 2$ if $m\angle 1 = m\angle 2$.
6. $\angle 1 \cong \angle 2$ only if $m\angle 1 = m\angle 2$.

7. Combine the conditionals in Exercises 5 and 6 into a single biconditional.

Provide a counterexample to show that each statement is false. You may use words or draw a diagram.

8. If $\overline{AB} \cong \overline{BC}$, then B is the midpoint of $\overline{AC}$.
9. If a line lies in a vertical plane, then the line is vertical.
10. If a number is divisible by 4, then it is divisible by 6.
11. If $x^2 = 49$, then $x = 7$.

State the converse of each conditional. Is the converse true or false?

12. If today is Friday, then tomorrow is Saturday.
13. If $x > 0$, then $x^2 > 0$.
14. If a number is divisible by 6, then it is divisible by 3.
15. If $6x = 18$, then $x = 3$.

16. Give an example of a false conditional whose converse is true.