

Example 5: Let  $p$  and  $q$  represent the following simple statements:

$p$ : The word is run.

$q$ : The word has 396 meanings.

Write each of the compound statement below in its symbolic form.

a. The word has 396 meanings if and only if the word is run.

b. The word is not run if and only if the word does not have 396 meanings.

Example 6: Let  $p$  and  $q$  represent the following simple statements:

$p$ : He earns 105,000 yearly.

$q$ : He is often happy.

Write each of the following symbolic statements in words.

a.  $\sim(p \wedge q)$

b.  $\sim q \wedge p$

c.  $\sim(q \rightarrow p)$

#### Expressing Symbolic Statements with Parentheses in English

Groupings in symbolic statements are determined as follows:

- Unless parentheses follow the negation symbol,  $\sim$ , only the statement that immediately follows it is negated.
- When translating symbolic statements into English, the simple statements in parentheses appear on the same side of the comma.
- If a symbolic statement appears without parentheses, group statements before and after the most dominant connective, where dominance is defined as follows:

|                |                               |                |                  |
|----------------|-------------------------------|----------------|------------------|
| 1. Negation    | 2. Conjunction<br>Disjunction | 3. Conditional | 4. Biconditional |
| Least dominant |                               |                | Most dominant    |

Example 7: Let  $p$  and  $q$  represent the following simple statements:

$p$ : The plant is fertilized.

$q$ : The plant is not watered.

$r$ : The plant wilts.

Write each of the symbolic statements in words.

a.  $(p \wedge \sim q) \rightarrow \sim r$

b.  $p \wedge (\sim q \rightarrow \sim r)$