

Section 3.1

Logic Statement

A **statement** is a declarative sentence that is either true or false, but not true and false.

Example 1

Determine if each sentence is a statement.

- 1) Ohio is a state in the United States.

Statement: This sentence can be classified as true or false

- 2) Elephants are pink.

Statement: This sentence can be classified as true or false

- 3) How are you?

Not a Statement: Questions are not statements

- 4) $3 + 4 = 7$

Statement: This sentence can be classified as true or false

Compound Statements

A compound statement is a statement formed by joining two or more statement together.

Connectors

Connector	Symbol	Type of connector
Or	\vee	Disjunctive
And	\wedge	Conjunctive
If-then	\rightarrow	Conditional
If and only if	\leftrightarrow	Biconditional
Negation	\sim	Negation

Negating Statements

The negation of a statement has the opposite meaning of the statement.

Example 2

Find the negation of the following statements

1) The flower is red

Negation: The flower is not red

2) The number 12 is a prime number

Negation: The number 12 is not a prime number

3) The Highlands won the basketball game.

Negation: The highlands didn't win the basketball game.

4) Some elephants are grey

Negation: All elephants are not grey

Example 3

Consider the following statements

p: The game is in Charlottesville

a: The game is shown on ABC

b: The game is shown on ESPN

c: The Hokies are favored to win

Write the following symbolic statements in words.

1) $p \wedge b$

The game is shown on ESPN and the game is in Charlottesville.

$$2) \sim p \rightarrow c$$

If the game is not in Charlottesville, then the Hokies are favored to win.

Example 4

Use the symbols from example 3 to write the statements in symbolic form.

1) The game is in Charlottesville and it's on ABC.

$$p \wedge a$$

2) The game is in Charlottesville and the Hokies are not favored to win.

$$p \wedge \sim c$$
