

M260 1.3

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## Valid and Invalid Arguments

An argument is a sequence of \_\_\_\_\_. The final \_\_\_\_\_ is called the \_\_\_\_\_. The other \_\_\_\_\_ are called the \_\_\_\_\_.

An argument form is valid means no matter what \_\_\_\_\_ are substituted for the \_\_\_\_\_, if the resulting \_\_\_\_\_ are all true then the \_\_\_\_\_ is \_\_\_\_\_.

An argument is valid if its \_\_\_\_\_.

List the steps in testing an argument for validity.

1. \_\_\_\_\_
2. . . \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

Construct a truth table for the argument form below. Be carefully label the premises and conclusion:

$p \vee (q \vee r)$ ;

$\sim r$ ;

$\therefore p \vee q$

p	q	r		

Is the argument form valid? \_\_\_\_\_

Construct a truth table for the argument form:

$$p \rightarrow q \vee \sim r;$$

$$q \rightarrow p \wedge r;$$

$$\therefore p \rightarrow r$$

p	q	r		

Is the argument form valid? \_\_\_\_\_

List the standard rules of inference:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

Give the rules of inference in symbolic form using p, q, and r for statement variables:

Modus Ponens:

Modus Tollens:

Generalization:

Specialization:

Elimination:

Transitivity:

Division into Cases:

Rule of Contradiction:

Write an example for each of the rules of inference:

Modus Ponens:

Modus Tollens:

Generalization:

Specialization:

Elimination:

Transitivity:

Division into Cases:

Rule of Contradiction:

### **Inference Example**

Where are my glasses?

- a. If my glasses are on the kitchen table, then I saw them at breakfast.
- b. I was reading the newspaper in the living room or I was reading the newspaper in the kitchen.
- c. If I was reading the newspaper in the living room, then my glasses are on the coffee table.
- d. I did not see my glasses at breakfast.
- e. If I was reading my book in bed, then my glasses are on the bed table.
- f. If I was reading the newspaper in the kitchen, then my glasses are on the kitchen table

Assign statement variables for the underlined statements:

p = \_\_\_\_\_

q = \_\_\_\_\_

r = \_\_\_\_\_

s = \_\_\_\_\_

t = \_\_\_\_\_

u = \_\_\_\_\_

v = \_\_\_\_\_

Which are the target statements? \_\_\_\_\_

Express statements a through f in terms of the statement variables:

- a. \_\_\_\_\_ d. \_\_\_\_\_  
b. \_\_\_\_\_ e. \_\_\_\_\_  
c. \_\_\_\_\_ f. \_\_\_\_\_

Identify a given statement, prior argument, or rule of inference to justify each step of the deductive sequence:

- 1.  $p \rightarrow q$  from ( )  
 $\sim q$  from ( )  
 $\therefore \sim p$  by \_\_\_\_\_
- 2.  $s \rightarrow p$  from ( )  
 $\sim p$  from ( )  
 $\therefore \sim s$  by \_\_\_\_\_
- 3.  $r \vee s$  from ( )  
 $\sim s$  from ( )  
 $\therefore r$  by \_\_\_\_\_
- 4.  $r \rightarrow t$  from ( )  
 $r$  from ( )  
 $\therefore t$  by \_\_\_\_\_

The converse error argument form:

Make a truth table to illustrate the converse error argument.


Give an example of the converse error:

The inverse error argument form:

Make a truth table to illustrate the inverse error argument.


Give an example of the inverse error:

Contradiction Rule: If the supposition that p is \_\_\_\_\_ leads to a contradiction then p is \_\_\_\_\_.