

## Translations for Chapter 9 exercises:

#1

1.  $C \supset (I \supset \sim B)$
2.  $C \supset I$
3.  $C \therefore \sim B$

Many students will mistranslate the first premise, because they have forgotten how to render the phrase "provided that." See number 21 in the dictionary, page 237. The first premise could also be  $I \supset (C \supset \sim B)$  or  $(C \bullet I) \supset \sim B$ .

#2

1.  $A \supset I$
2.  $I \supset M$
3.  $M \supset C \therefore A \supset C$

The key phrase here is "for the following reasons." This phrase indicates that the first statement is the conclusion and the sentences after the phrase are the premises.

#3

1. I
2. F
3.  $I \supset (F \supset P) \therefore P \vee R$

The key phrase here is "This is so, because. . ." It tells us the first sentence is the conclusion and the two statements after "because" are the premises.

#5 A challenging formal proof.

1.  $V \supset C$
2.  $(V \bullet C) \supset L$
3.  $[(V \bullet C) \bullet L] \supset T$
4.  $\{[(V \bullet C) \bullet L] \bullet T\} \supset A \therefore V \supset A$

The parentheses, brackets and brace need to be this way in order for the proof to be done. Notice that  $(V \bullet C)$  in the second premise is repeated and stays

consistent in premises 3 and 4. For a hint on the proof (the most difficult in all of Chapter 9), notice that the major connective of all the statements is ( $\supset$ ).

#6

1.  $(T \vee O) \supset \sim E$
2.  $E \vee R$
3.  $(R \bullet \sim D) \supset W$
4.  $T$
5.  $\sim D \therefore W \vee \sim R$

An easy proof after the first step, but the very first step may require a little insight.

#7

1.  $E \supset A$
2.  $P \supset C$
3.  $\sim A$
4.  $\sim E \supset \sim C \therefore \sim P$

A good test on whether you remember how to translate **necessary conditions** and **if-statements** where the "if" is in the middle of the sentence. (See #s 17 and 22 in the dictionary, p. 237). The phrase "**it follows that**" indicates the conclusion.

#8

1.  $E \supset M$
2.  $L \supset V$
3.  $(E \vee L) \bullet \sim(E \bullet L)$
4.  $\sim M \therefore V$

See page 256 if you have forgotten how to translate an **exclusive disjunction**.

#9

1.  $\sim(V \supset T)$
2.  $\sim(V \supset T) \supset (V \bullet \sim T)$
3.  $(S \supset T) \bullet \sim[T \supset (V \vee S)]$
4.  $(S \supset T) \supset \sim(S \bullet \sim T) \therefore (V \bullet \sim T) \bullet \sim(S \bullet \sim T)$

Notice that  $\sim V \supset T$  would be wrong for the first premise and the antecedent of the second premise. That would say, "If an argument is not valid, then the premises are true." That would be as dumb as someone saying, "If you fail the final, then you will pass the course." Remember, think about the difference between  $\sim(F \supset C)$  and  $\sim F \supset C$ .

#10

1.  $(F \bullet C) \supset Q$
2.  $(P \bullet S) \supset (F \bullet C)$
3.  $\sim(P \bullet S) \supset (\sim P \bullet \sim S)$
4.  $(\sim P \bullet \sim S) \supset \sim H$
5.  $\sim Q$
6.  $\sim P \supset \sim E \quad \therefore (\sim H \bullet \sim E) \vee (L \vee R)$

Believe it or not, #s 9 and 10 are easy proofs. Both translations though take patience.