Problem Set 2

Name: _____

Due by **the start of class on Monday, December 2nd.**. Lateness penalties (as specified on the syllabus) will apply to submissions after that time, unless you supply documentation of an illness or family emergency.

Please either write neatly in dark ink (not pencil) or type.
If you type:

- You will get an exciting stamp of thanks. (It won't say "Thanks". It will be much more exciting.)
- You are welcome to submit your work via e-mail as a PDF.

You may not discuss these questions with anyone else. The work you submit must be your own.

Proofs:

Do the following proofs using the following rules **ONLY**: Conjunction, Simplification, Modus Ponens, Disjunctive Syllogism, Addition, Modus Tollens, Hypothetical Syllogism, and Constructive Dilemma. 10 pts each.

a. $\{(B \vee F) \supset (A \supset G), (B \vee E) \supset (G \supset K), B \bullet \sim H\} \vdash A \supset K$

b. $\{(\sim A \vee D) \supset (B \supset F), (B \vee C) \supset (A \supset E), A \vee B, \sim A\} \vdash E \vee F$

c. $\{(\sim S \vee B) \supset (S \vee K), (K \vee \sim D) \supset (H \supset S), \sim S \bullet W\} \vdash \sim H$

Proofs:

Do the following proofs using the following rules **ONLY**: Conjunction, Simplification, Modus Ponens, Disjunctive Syllogism, Addition, Modus Tollens, Hypothetical Syllogism, Constructive Dilemma, Commutation, Association, Double Negation, Conditional Exchange, and De Morgan's. 10 pts each.

d. $\{\sim(A \bullet B), \sim\sim A\} \vdash \sim B$

e. $\{A \supset B\} \vdash \sim B \supset \sim A$

f. $\{A \supset (B \supset C)\} \vdash (A \bullet B) \supset C$

Proofs:

Do the following proofs using all 18 rules. 20 pts each. Some of these are quite fun (i.e. challenging) so make sure you give yourself plenty of time to work through them!

g. $\{N \supset O,\ N \supset P\} \vdash N \supset (O \bullet P)$

h. $\{Q \supset (R \supset S), Q \supset (T \supset \sim U), U \supset (R \vee T)\} \vdash Q \supset (U \supset S)$

i. $\{(E \vee F) \supset (C \bullet D), (D \vee G) \supset H, E \vee G\} \vdash H$

j. $\{(N \vee O) \supset (C \bullet D), (D \vee K) \supset (P \vee \sim C), (P \vee G) \supset \sim(N \bullet D)\} \vdash \sim N$