Introduction to Logical Reasoning

Workshop on Natural Deduction

Part I: For each argument, use natural deduction to construct a formal proof of validity.
(Each proof can be done in just **two** steps.)

1. 1. $(W \vee X) \rightarrow Y$.
   2. W.
   $\therefore$ Y.

2. 1. $D \rightarrow E$.
   2. $(E \rightarrow F) \,\&\, (F \rightarrow D)$.
   $\therefore$ $D \rightarrow F$.

Part II: For the following argument, use natural deduction to construct a formal proof of validity.
(The proof can be done in just **three** steps.)

1. 1. $Q \rightarrow R$.
   2. $R \rightarrow S$.
   3. $\sim S$.
   $\therefore$ $\sim Q \bullet \sim R$.

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Part III: Each of the following problems presents a valid argument in English. Translate each into the language of symbolic logic, putting it into argumentative form. Then use natural deduction to construct that argument's formal proof of validity.

1. Either the journalism students **love** logic, or the journalism students **study** hard only if the professor **quizzes** them on the material. But if the journalism students do not **love** logic, then the professor **quizzes** them on the material only if he wants them to **understand** the material. The journalism students do not **love** logic. Therefore, if the journalism students **study** hard then the professor wants them to **understand** the material. (L, S, Q, U)

2. If the **journalism** students love logic, then the **business** students love logic. If both the **journalism** and **business** students love logic, then either the **computer** science or **mathematics** students love logic. If the **computer** science or **mathematics** students love logic, then the professor is not **sad**. If the **journalism** students loving logic is a sufficient condition for the professor not being **sad**, then the dean is **pleased**. As a result, the dean is **pleased**. (J, B, C, M, S, P)