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 exactly *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 argument, use natural deduction to construct a formal proof of validity.
(This proof can be done in exactly *three* steps.)

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

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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. (Each proof can be done in no more than *four* steps. I'm not saying the exact number)

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)