1. Given the statement, “If it is raining, it is cloudy,” which of the following statements must be true?

   A. If it is cloudy, it is raining.
   
   B. If it is not cloudy, it is not raining.
   
   C. If it is not raining, it is not cloudy.
   
   D. All of the above.
   
   E. None of the above.

**Answer:** The correct answer is “B.”

Here, rain is the dependent variable \((X)\), and clouds are the independent variable \((Y)\). In other words, “If there is \(X\), then there is necessarily \(Y\).” Common sense tells us that this is so: There cannot be rain without rainclouds. Thus, we also know that without the independent variable of clouds, there cannot be the dependent variable, rain: “If there is no \(Y\) (clouds), then there is necessarily no \(X\) (rain).” Thus, “B” is correct. (This is known in formal logic as the “contrapositive” of the original statement, for those logic buffs out there.)

“A” is incorrect. Just because rain relies on clouds, clouds (the independent variable) do not rely on rain (the dependent variable). Again, we all know from common sense that there are cloudy days without rain. “C” is simply the inverse of “A,” which is likewise false: just because it is not raining doesn’t necessarily mean it isn’t cloudy. And because “B” and “B” alone is correct, both “D” and “E” are incorrect.

Note that you cannot necessarily determine the logic of the statement by looking at the grammar. The statement “If it is \(X\), then it is \(Y\)” is ambiguous. It could mean that there can be no \(X\) without \(Y\) (implying that \(Y\) is the independent variable), as in our problem, “If it is raining, it is cloudy.” Conversely, it could mean that \(Y\) necessarily occurs any time there is \(X\) (implying that \(X\) is the independent variable), as in, “If it is raining, it is wet.” You have to consider the logical **relationship** between the variables in the statement, clouds and rain, to confirm the correct reading of the statement.

The bottom line: no one is expecting you to become an expert on formal logic, and it is not necessary to be one to be good at legal analysis. But being familiar with logical structures can help you both with your legal analysis and your legal writing. It is also important to be a close and critical reader. Rushing through is not the approach you want to be taking.
2. Which of the following is an example of circular logic?

A. All children love candy. Because all children are short, all short people love candy.

B. All children love candy. Therefore, children love every type of candy.

C. All children love candy. Because all children are young, and all young people are children, candy is loved by all children.

D. All children love candy. Because candies are sweet, all children love sweets.

**Answer:** The correct answer is “C.”

“C” sets out to prove what it asserts as true as its beginning premise: that all children love candy (which is the same as saying that candy is loved by all children). This is the nature of circular logic: it assumes what it is trying to prove.

Note that the first two clauses of the second sentence—“Because all children are young, and all young people are children”—while it may be true, adds nothing to the logic. The structure of these clauses is, “All A = B and All B = A.” If you took it away, the syllogism’s circularity would become more apparent: “All children love candy...[therefore.] candy is loved by all children.”

Although “A” and “B” reflect logical flaws, they are not **circular**, because they do not assume what they are trying to prove.

The logical flaw in “A” is that, just because all children (who all love candy) are short, that does not mean all short people are children (and thus candy lovers). Dwarves, little people (formerly known as “midgets”), and naturally short adults are all short, and yet are not children, and therefore do not necessarily love candy. (Empirically, it may be the case that not all children are “short”—an arguably ambiguous term—but that may be a flaw in one of the premises, not a flaw in the logic applied to the premises.)

The logical flaw in “B” is that, just because all children love *some* form or forms of candy, that does not mean that all forms of candy are loved by children. There are, for example, tequila flavored lollipops with insect larvae embedded in them, which could well be despised by all children. (Again, this need not be proven true empirically. As a logical matter, it is **possible**, and thus the conclusion does not logically flow from the premises.)

“D” is not flawed logic, and therefore is not circular. It is a statement of the transitive principle, A = B, and B = C, so A = C. Thus, all x (children) love y (candy), and y (candy) = z (sweets), therefore all x (children) love z (sweets). You could debate that some candies are salty or sour, but not really sweet, and so the statement is not necessarily true. Nevertheless, the statement is still not **circular**, and so “C” is still the best answer.
3. Which of the following do NOT follow an “IRAC” format?

A. The issue is whether Bessie chews her cud. Bessie is a cow. All cows chew their cud. Thus, Bessie must chew her cud.

B. The issue is whether Johnny wants to win the Superbowl. All professional football players want to win the Superbowl. Johnny plays for the San Diego Chargers, a professional football team. Thus, Johnny must want to win the Superbowl.

C. Both A and B

D. Neither A nor B.

Answer: The correct answer is “A.”

“IRAC” is an acronym for Issue, Rule, Application Conclusion. These elements must be present, in this order, to be in “IRAC” format. IRAC is an analytic tool, not an end in its own right. This order ensures that you identify your question (issue) before you discuss your answer, and that your answer moves from a statement of general applicability (rule) to a discussion of how that rule applies to the particular fact pattern (application) to generate a conclusion.

Both “A” and “B” are examples of simple syllogisms wherein the conclusion follows logically from the two premises. However, in “A,” the statement of particular applicability (the fact that Bessie is a cow) comes before the statement of general applicability (the rule that all cows chew their cud). By contrast, in “B,” the statement of general applicability (the rule that all pro football players want to win the Superbowl) comes before the statement of particular applicability (the fact that Johnny is a pro football player).

Thus, “B” follows I-R-A-C, whereas “A” follows I-A-R-C. Again, both are, in the strictest logical. But it is best to get in the habit of following IRAC format, as that is the best way to ensure that you are addressing legal issues (which involve application of rules to facts) in the proper way.

Because “A” is the only one of the two that does not follow IRAC, “B,” “C,” and “D” are incorrect.