How to Approach Analytical Reasoning Questions

In working through an Analytical Reasoning section of the LSAT, you’ll want to do two things: get the answer to the questions right and use your time efficiently. In this section, you’ll get advice on how to do both.

Analytical Reasoning questions test your ability to reason within a given set of circumstances. These circumstances are described in the “setup.” A setup consists of sets of elements (people, places, objects, tasks, colors, days of the week, and so on) along with a list of conditions designed to impose some sort of structure, or organization, on these elements (for example, putting them into an ordered sequence from first to last, or selecting subgroups from a larger group, or pairing elements from one set with elements from another set). The different structures allowed by the setup are the “outcomes.”

Consider the following setup:

Each of five students—Hubert, Lori, Paul, Regina, and Sharon—will visit exactly one of three cities—montreal, Toronto, or Vancouver—for the month of March, according to the following conditions:

1. Sharon visits a different city than Paul.
2. Hubert visits the same city as Regina.
3. Lori visits Montreal or else Toronto.
4. If Paul visits Vancouver, Hubert visits Vancouver with him.
5. Each student visits one of the cities with at least one of the other four students.

This setup features two sets of elements: a set of students and a set of cities. There are five conditions that constrain how the members of these two sets are associated with each other. The kind of structure that is to be imposed on the elements is this: each student must be paired with exactly one of the cities in strict accordance with the conditions.

Note. Analytical Reasoning setups all have one crucial property in common: there is always more than one acceptable outcome. For example, in the example involving students and the cities they visit, the conditions do not work together to restrict each of the students to visiting a particular city and no other. Instead, there is more than one structure that satisfies all of the requirements of the setup.

Analytical Reasoning questions test your ability to determine what is necessary, what is possible, and what is impossible within the circumstances of the setup.

Questions that you are likely to be asked, based on setups such as the one above, are questions like these:

Which one of the following must be true for March?
Which one of the following could be false in March?
If Sharon visits Vancouver, which one of the following must be true for March?
If Hubert and Sharon visit a city together, which one of the following could be true in March?

In other words, you’ll need to determine what can or must happen, either in general or else in specified circumstances (such as Sharon visiting Vancouver or Hubert and Sharon visiting a city together). And now we’ll look at how you go about doing this.

Figure Out the Setup

The first thing you need to get very clear about is what exactly is supposed to happen to the elements in the setup. So first you need to recognize which parts of the setup serve only as background information.

In the example above, the five students and the three cities are the things you have to associate with one another. What happens to them makes the difference between one outcome and another. But the month of March, which is mentioned both in the original setup and in each of the questions cited, is merely background information, as is the fact that the visitors are all students. The overall setup allows for a number of different arrangements for the visits. But none of the differences is in any way related to the fact that the visits happen in March, just as none of the differences is in any way related to the fact that the visitors are students. The month could just as well have been April, and the visitors could just as well have been professors or tourists. Changing these things would not change the way the setup and the questions function.

Now, what happens to the elements in the setup? Looking at the students first, we find that each of them is to visit just one of the cities. Looking at the cities, you might at first assume that each city will be visited by at least one of the students. However, notice that there is actually nothing that says that each of the cities has to be visited. Consider the implications of the last condition. This condition essentially says that no student can visit a city alone. This means that, for all three cities to be visited by at least two students, there would have to be at least six students. In actual fact, there are only five. So we know that there cannot be student visitors in all three cities. And the first of the conditions tells us that the students cannot all visit the same city, since Sharon and Paul cannot visit the same city as each other.

1 December 1992 LSAT, section 1, questions 1–6.
So we now know, in general outline, what an acceptable outcome will look like: one of the three cities will be visited by three of the students, one of them by two, and one of them by none. This is the type of implication that can be very useful to work out as you read the conditions, even before you start to answer the questions. It underscores the importance of reading through the setup carefully in order to work through its implications and understand how it works.

### How to Represent What Happens (Some Time-saving Tips)

Because we have worked out some of the implications of the setup, we now have an idea of the basic shape of the acceptable outcomes. At this point, it might be possible for some people to figure out the answers to individual questions in their heads. Generally, however, this requires enormous powers of concentration and creates opportunities for error. For most people, trying to work these problems in their heads would be an extremely bad idea. Virtually everyone is well advised to use pencil and paper in solving Analytical Reasoning questions.

The time allotted for Analytical Reasoning questions gives you an average of less than 1½ minutes per question. Time management, therefore, is important. Since it does take time to sketch out solutions on paper, you should do whatever you can to use your time economically. Here are some time-saving tips that many people find useful:

- **Abbreviate the elements by using just their initials.** The elements in lists of names or places or objects will usually have different initials. When elements such as days of the week don’t have different initials, be ready to devise abbreviations that will allow you to distinguish them. (For example, in a set of questions involving days of the week, you might use “T” for “Tuesday” and “Th” for “Thursday.”)

- **Just as you would use initials to represent the elements, you should work with shorthand versions of the conditions.** Familiarize yourself with the most common types of conditions and devise your own shorthand way of representing them. For example, one frequent kind of condition stipulates that something that happens to one member of a pair of elements also happens to the other member. In the example above, the condition saying that “Hubert visits the same city as Regina” is of this type. You might decide that your shorthand for this condition will be “H = R.” And for the condition that reads, “If Paul visits Vancouver, Hubert visits Vancouver with him,” you might use “if Pv then Hv” or “P(V) → H(V).”

  Your shorthand versions of the conditions are the versions that you will be working with, so make sure that they correctly represent what the original conditions actually mean. The time spent in setting the conditions down in this way is more than offset by the time you’ll save through the economy of working with the conditions in a form in which they can be quickly and easily taken in at a glance.

- **A quick check of the abbreviated setup conditions will sometimes show that one or more of the elements in the setup isn’t mentioned in any of the conditions.** Don’t take this as an indication that there must be a mistake somewhere. Rather, take it at face value: those elements are not specifically constrained. You might devise a special notation for this situation. For example, you could circle those initials and include them at the bottom of your list of setup conditions. Or you might just make a shorthand list of all the elements, whether they are mentioned in the conditions or not.

- **In your shorthand system, find a striking way to represent what cannot happen.** For example, if you encounter a condition of the form “Greg cannot give the first presentation,” this might be simply abbreviated as “G not 1” or even “G(1),” where the asterisk is the symbol you use to represent “not.”

- **You might find it useful to represent certain conditions in more than one form.** For example, you may decide that whenever you find a condition like “If Paul is selected, Raoul is also selected,” you will automatically put down, as your shorthand version, both “P → R” and “not R → not P,” since (as we’ll see later) the two are logically equivalent and you might find it helpful to be reminded of this fact when you’re answering the questions.

- **You will very likely use certain elementary diagramming techniques, for example, using the elements in one set as headers and the elements in the other as entries under those headers.** Try to think a bit about which diagramming techniques are effective for you. For example,
in the case of the setup involving students and cities, you might diagram an outcome as follows:

\[
\begin{array}{ccc}
M & T & V \\
H, R, S & L, P & \\
\end{array}
\]

Or you might diagram it like this:

\[
\begin{array}{c}
M: H, R, S \\
T: L, P \\
V: \\
\end{array}
\]

But you might not want to end up with this diagram:

\[
\begin{array}{cccc}
H & M & L & T \\
R & P & T & M \\
S & M & & \\
\end{array}
\]

Although this last diagram presents the same information as the other two, you might well feel that it does so less usefully. For example, the last diagram does not capture the fact that one of the cities will not be visited by any of the students as graphically as the other two diagrams do. Develop strategies ahead of time that will lead you to create diagrams that you work with easily and well. There is no one way to do this, just as there is no one right way to abbreviate conditions. The only way to find out what works for you is to practice diagramming a number of setups before taking the test.

- For some questions, you might find that it is helpful to quickly write out your abbreviations for the active elements in the set—H R P L S, for example—before you begin to work out the solution. Then you can cross out each element as you satisfy yourself that you have accounted for it in the current solution. This method is especially helpful if the list of elements is too long for you to keep track of in your head or if you have already marked up your original list of elements.

### Orientation Questions

Most Analytical Reasoning sets begin with a question in which each answer choice represents a complete possible outcome, or sometimes just part of an outcome. The question asks you to select the answer choice that is an acceptable outcome (one that doesn’t violate any part of the setup). You can think of questions of this kind as “orientation questions” since they do a good job of orienting you to the setup conditions.

For such questions, probably the most efficient approach is to take each condition in turn and check to see whether any of the answer choices violates it. As soon as you find an answer choice that violates a condition, you should eliminate that answer choice from further consideration—perhaps by crossing it out in your test booklet. When you have run through all of the setup conditions in this fashion, one answer choice will be left that you haven’t crossed out: that is the correct answer.

Here’s an orientation question relating to the setup in our example:

**Which one of the following could be true for March?**

(A) Hubert, Lori, and Paul visit Toronto, and Regina and Sharon visit Vancouver.
(B) Hubert, Lori, Paul, and Regina visit Montreal, and Sharon visits Vancouver.
(C) Hubert, Paul, and Regina visit Toronto, and Lori and Sharon visit Montreal.
(D) Hubert, Regina, and Sharon visit Montreal, and Lori and Paul visit Vancouver.
(E) Lori, Paul, and Sharon visit Montreal, and Hubert and Regina visit Toronto.

Let’s take the setup conditions in order from first to last. First, check the first condition against each option:

**Condition 1: Sharon visits a different city than Paul.**

Condition 1 is met in (A) through (D) but violated in (E), since in (E) Sharon is scheduled to visit the same city as Paul. So you cross out (E) and do not check it any further. Now take the second condition:

**Condition 2: Hubert visits the same city as Regina.**

Condition 2 is violated in (A), since in (A) Hubert is scheduled to visit a different city than Regina. Cross out (A) and don’t consider it any further. Condition 2 is not violated in (B), (C), or (D). (Remember, you don’t need to check (E) since you’ve already ruled it out.) Proceed in the same way with the rest of the conditions:

**Condition 3: Lori visits Montreal or else Toronto.**

**Condition 4: If Paul visits Vancouver, Hubert visits Vancouver with him.**

**Condition 5: Each student visits one of the cities with at least one of the other four students.**
Condition 3 is violated in (D), since in (D) Lori is scheduled to visit Vancouver. Cross out (D). Condition 4 is violated in neither (B) nor (C), the only answer choices you are still checking. (The fact that condition 4 is violated in (D) is irrelevant at this point: you’ve already crossed out (D)). This leaves condition 5 to decide between (B) and (C). Condition 5 is violated in (B), since in (B) Sharon is scheduled to be the lone student visitor to Vancouver. Thus (B) gets crossed out. The only answer choice not crossed out is (C), which is consequently the correct answer. No further checking of (C) is needed. You’ve already checked (C) against each of the setup conditions. You are done. With this sort of question, there is no need for diagramming; all you needed to refer to was your abbreviated list of the conditions.

Another way of approaching an orientation question is to consider each answer choice in turn to see whether it violates any of the conditions. This will lead you to the correct answer relatively quickly if the correct answer is (A), and less quickly the further down the correct answer is. On balance, this is probably a less efficient way of finding the answer to orientation questions. Efficiency matters, because the more time you can save doing relatively straightforward questions such as these, the more time you have available to solve more challenging questions.

Caution. The method of checking each condition against the answer choices is what you want to use with orientation questions. However, as we’ll see below, this is generally not the approach you’ll want to take with other types of questions. Keep in mind that your objective in answering the questions is to select the correct answer and move on to the next question, not to prove that the incorrect answer choices are wrong. (Also remember that not every set of questions includes an orientation question. When there is an orientation question, it will always be the question right after the setup.)

Questions That Include the Phrase “Any One of Which”

Another kind of question is concerned with complete and accurate lists of elements “any one of which” has some specific characteristic. A question of this kind might ask:

Which one of the following is a complete and accurate list of students any one of which could visit Vancouver in March?

The answer choices might be:

(A) Hubert, Lori, Regina
(B) Hubert, Regina, Sharon
(C) Paul, Regina, Sharon
(D) Hubert, Paul, Regina, Sharon
(E) Hubert, Lori, Paul, Regina, Sharon

What this question asks you to do is take each of the students in the setup and ask, “Could he/she visit Vancouver in March?” It doesn’t matter whether any of the other students on the list could also visit Vancouver at the same time. You just need to ask whether there is an acceptable outcome in which the student you’re considering visits Vancouver. If the answer is yes, that student needs to be included on the list, and if the answer is no, that student needs to stay off the list. If you do this systematically and correctly, the list you eventually end up with will be complete: no student who belongs on that list will have been left out. And it will be accurate: the list will not include any student who does not belong there. The correct answer is the list of all the students for whom the answer is “yes.”

Sometimes the task of checking individually whether each element in the setup belongs on this list may seem daunting, but the task can often be simplified. For example, looking at the setup conditions, you notice that the third condition bars Lori from visiting Vancouver. So the two answer choices that include Lori—(A) and (E)—can immediately be crossed out.

Similarly, the second condition directly rules out (C). Condition 2 requires that Hubert visit the same city as Regina, so if we know that it is possible for one of them to visit Vancouver, it must be possible for the other to visit Vancouver too. This is what the condition requires. So (C), which includes Regina but not Hubert, is either incomplete or inaccurate.

This leaves us with (B) and (D). They both include Hubert, Regina, and Sharon. Don’t waste time checking these elements. Since you have already determined that they are bound to be part of the correct answer, none of them will help you determine which of the remaining two answer choices is the correct one.

Note. In general, when dealing with questions that include the phrase “any one of which” there is no point in checking an element that appears in all of the answer choices that you are still considering. It can’t help you tell the correct answer from the incorrect ones.
Since the only thing that distinguishes (B) from (D) is that (D) includes Paul, the only point you need to check is whether Paul can visit Vancouver. Since he can, (B) is incomplete and thus incorrect. The correct answer is (D). In this case, when it came down to just (B) and (D), it turned out that checking one element was enough to allow you to identify the correct answer. If it had turned out that Paul could not visit Vancouver, then the correct answer would have been (B). As this case illustrates, it is generally worth your while to use time-saving strategies.

Note. In questions that include the phrase “any one of which,” if some element appears in only one of the answer choices still under consideration, check that element first. That way, if this element does belong on the list, you are done. Since any list, in order to be complete, would have to include this element, the answer choice that contains this element is the correct answer. On the other hand, if it turns out that the element doesn’t belong on the list, then any remaining answer choices that include it should be crossed off.

Questions That Ask About What Must Be True

Many Analytical Reasoning questions ask about what must be true. Something that must be true is something that is true of every single acceptable outcome. In other words, there cannot be an acceptable outcome in which this thing is false. But this does not mean—and this is an important point—that to find the correct answer you should somehow mechanically draw up all of the acceptable outcomes and then look through them to identify the one answer choice that these outcomes all have in common. Don’t try to do this.

The reason you should avoid determining all of the acceptable outcomes is not that it will give incorrect results. If used with care and without error, it will lead you to the correct answer. The problem is that it is usually far too time-consuming.

So what should you do instead? This depends on the form of the question. Does the question ask what must be true under certain specified circumstances, or does it ask what must be true under the basis of the setup alone, no matter what the circumstances are? Let’s take a look at each of these two possibilities separately.

What Must Be True Under Certain Specified Circumstances

Consider the following example:

If Sharon visits Vancouver, which one of the following must be true for March?

The answer choices are:

(A) Hubert visits Montreal.
(B) Lori visits Montreal.
(C) Paul visits Montreal.
(D) Lori visits the same city as Paul.
(E) Lori visits the same city as Regina.

In this question, we start with the supposition that Sharon visits Vancouver and then ask if anything follows from that. In fact, something does follow. Consider the first condition, which tells us that Sharon visits a different city than Paul. From these two pieces of information, we can conclude that Paul visits either Montreal or Toronto, but not Vancouver (because Sharon visits Vancouver and Paul cannot visit the same city that she does). This is our first result, and checking this result against the answer choices, we find that we can’t answer the question yet. In particular, we don’t know whether (C) has to be true. We have only determined that it can be true.

Next, note that Paul is not the only one who visits Montreal or Toronto, but not Vancouver. The third condition tells us that this is true of Lori as well. And from the discussion in Figuring Out the Setup we know that only two cities will be visited by any of the students. Vancouver is one of those cities, since we are supposing that Sharon visits Vancouver. We don’t know whether the other city is Montreal or Toronto. But we do know that whichever it is, it has to be the city that both Paul and Lori visit, since neither of them visits Vancouver.

Checking this second result against the answer choices, we find that we are done. Our second result guarantees the truth of answer choice (D) (“Lori visits the same city as Paul”). There is an unbroken chain of inference that takes us from the specific supposition of the question to (D). There was no need to check the other answer choices. Nor was there any need to work out even a single complete acceptable outcome. The moral of the story is: use your time wisely.
A check of the incorrect answer choices, if one had been done, would have revealed a situation that is fairly typical in the case of questions about what must be true. Some of the answer choices—(B) and (C)—are things that can be true but don’t have to be true, and some of them—(A) and (E)—are things that can’t be true. Among the incorrect answer choices, you might encounter any combination of things that can’t be true and things that can be true but don’t have to be.

So what generally applicable strategies can be extracted from the way the question above was answered?

When approaching a question about what must be true under certain specified circumstances, the first thing to do is to see what inferences, if any, you can draw on the basis of the setup conditions and how they interact with the specified circumstances. Having drawn any immediately available inferences, check them against the answer choices. If, on the basis of those inferences, one of the answer choices has to be true, you’re done. Remember that your objective is to select the correct answer and move on to the next question, not to prove that the incorrect answer choices are wrong.

If none of the immediately available inferences matches any of the answer choices, try to see what can be inferred from the inferences you’ve already made (in conjunction with the setup conditions). Check this second round of inferences against the answer choices. If any of these inferences match one of the answer choices, you’re done. This is what happened in the example above. Keep doing this until you’re done.

As you work through the rest of the questions, keep trying to draw further inferences. There is a complementary strategy to pursue as you go along: Look for any answer choices that you can eliminate on the basis of inferences you have already established by working on previous questions. Cross out any incorrect answer choices that you come across in this way.

When considering “what must be true,” sometimes it is possible to rule out an incorrect answer choice by constructing an acceptable outcome in which that answer choice is not true. To see how this would work, consider the example above, which asks what must be true if Sharon visits Vancouver. Suppose you were trying to rule out (B) (“Lori visits Montreal”) by constructing an acceptable outcome in which (B) is false. You’d start with the following partial diagram:

\[
\begin{array}{ccc}
M & T & V \\
L & P & S \\
\end{array}
\]

The starting point for the question is that Sharon visits Vancouver, so we represent this in the diagram. Now, to have an outcome in which (B) is false, Lori has to visit either Toronto or Vancouver. But Lori visiting Vancouver is ruled out by the third condition, so if Lori doesn’t visit Montreal, she must visit Toronto. Since we then have Lori visiting Toronto and Sharon visiting Vancouver, the city visited by none of the students must be Montreal. This is how we established the partial diagram above.

Continue by drawing further inferences from the conditions. From the first condition we can infer that Paul has to visit Toronto. We add Paul to the diagram as follows:

\[
\begin{array}{ccc}
M & T & V \\
L, P & V & S \\
\end{array}
\]

From the second condition we know that Hubert and Regina have to visit the same city. But that city can’t be Toronto, because that would mean that only one person would visit Vancouver, contrary to the fifth condition. So Hubert and Regina must visit Vancouver, along with Sharon. This gives us the following outcome:

\[
\begin{array}{ccc}
M & T & V \\
L, P & H, R, S \\
\end{array}
\]

This is an outcome in which (B) is false but that satisfies all the setup conditions plus the specific circumstance introduced in the question. So (B) does not have to be true and can thus be eliminated.

### What Must Be True on the Basis of the Setup Conditions Alone

Not all of the questions that ask about what must be true ask what must be true under particular circumstances specified in the question. Some questions ask about what must be true merely on the basis of the setup.

An example of a question that asks about what must be true on the basis of the setup alone is the following:

*Which one of the following must be true for March?*

A correct answer would be:

*Hubert visits a different city than Lori.*

This follows directly from the setup conditions. Hubert cannot visit the same city as Lori, because if he did, that city would receive visits from four of the students: Hubert, Regina (who, by the second condition, visits the same city as Hubert), Lori, and either Paul or Sharon (since only two cities get visited, and Paul and Sharon cannot visit the same city, on account of the first condition). But that would mean that only one student—either Paul or Sharon—would visit one of the cities, and the fifth condition would then be violated. So we know that Hubert must visit a different city than Lori.

Questions that ask about what must be true on the basis of the setup alone have an interesting property:
you can add the correct answer to what you have already inferred from the setup. Something that must be true on the basis of the setup alone is nothing but a logical consequence of how the setup conditions interact. Of course, before you use this result to help you answer other questions, you want to be very sure that the answer you selected is indeed the correct one.

Note. In addition to questions about what must be true, you may encounter questions such as the following:

Which one of the following must be false? Which one of the following CANNOT be true? Each of the following could be true EXCEPT:

In all of these cases, the correct answer is something that is not true in even a single acceptable outcome. So among the incorrect answer choices you will find things that must be true as well as things that could be true.

Questions That Ask About What Could Be True

Many Analytical Reasoning questions ask about what could be true rather than about what must be true. Something that could be true is something that is true in at least one acceptable outcome, even if there are many acceptable outcomes in which it is false. This means that the incorrect answer choices are all things that cannot be true in any acceptable outcome.

As with questions about what must be true, some questions ask what could be true under certain specified circumstances and others ask what could be true on the basis of the setup alone.

What Could Be True Under Certain Specified Circumstances

Consider the following question:

If Regina visits Toronto, which one of the following could be true in March?

The five answer choices are:

(A) Lori visits Toronto.
(B) Lori visits Vancouver.
(C) Paul visits Toronto.
(D) Paul visits Vancouver.
(E) Sharon visits Vancouver.

How do you approach a question like this? A first step is to quickly check to see if any of the answer choices can be immediately ruled out as being in direct violation of one of the setup conditions. In this case, you would rule out (B) as directly violating the third condition, which requires that Lori visit either Montreal or Toronto.

Next, turn to the circumstance specified in the question—in this case, that Regina visits Toronto—and work from that. If Regina visits Toronto, Hubert also visits Toronto, as required by the second condition. Since by the first condition Sharon visits a different city than Paul, either Sharon or Paul will also visit Toronto, because only two cities are visited by any of the students. Toronto will thus be visited by three of the students.

So which city will be visited by just two students, Montreal or Vancouver? Since one of those two students must be Lori, it has to be Montreal; it cannot be Vancouver, because of the third condition. This means that none of the students visits Vancouver. So the answer choices specifying a visit to Vancouver (that is, (B), (D), and (E)) cannot be true. That leaves us with (A) and (C). But since we also know that Lori visits Montreal, we know that (A) cannot be true. So we know that (C) has to be the correct answer.

The approach above is to start with the setup conditions and then turn to the specific circumstance specified in the question and see what can be inferred from it in conjunction with the setup conditions. The emphasis here is not on what can be inferred to be the case, but on what cannot be the case, because the goal is to eliminate the incorrect answer choices and find the one that can be true. All of the incorrect answer choices must be false. It is also possible to arrive at the correct answer by a different method. Assume that the answer choices, each in turn, are true. In four of the five cases, this assumption will lead you into a contradiction, thereby showing that the answer choice cannot be true.

Using this method to answer the question above, you would start by assuming that (A) is true. That is, you would assume that Lori visits Toronto. So Toronto would be visited by both Lori and Regina. By the second condition, if Regina visits Toronto, so does Hubert. That means that the other city visited would be visited by Paul and Sharon. But the first condition rules this out.
So under the circumstance specified by the question—that Regina visits Toronto—Lori cannot visit Toronto.

Next you assume that (B) is true—namely, that Lori visits Vancouver. But this is immediately ruled out by the third condition.

You then assume that (C) is true—that Paul visits Toronto. So Toronto would be visited by Paul, Regina (as specified in the question), and Hubert (as specified by the second condition). That leaves Sharon and Lori to visit Montreal. This outcome satisfies all of the setup conditions, and is thus acceptable. Thus you know that (C) could be true, and you’re done.

What Could Be True on the Basis of the Setup Conditions Alone

An example of a question that asks about what could be true on the basis of the setup alone is the following:

Which one of the following could be true for March?

The answer choices are:

(A) Hubert and Lori both visit Toronto.
(B) Paul and Sharon both visit Vancouver.
(C) Regina and Sharon both visit Montreal.
(D) Hubert visits Toronto and Paul visits Vancouver.
(E) Regina visits Montreal and Sharon visits Vancouver.

The first step, as usual, is to check if any of the answer choices can be immediately ruled out as being in direct violation of one of the setup conditions. In this case, (B) can be eliminated on those grounds, because it is in direct violation of the first condition. In addition, (D) can be eliminated as being in violation of the fourth condition.

That leaves us with (A), (C), and (E). You will have to evaluate these three answer choices one by one to see which one cannot be eliminated.

Conditional Statements

Often one or more of the setup conditions is in the form of a conditional statement. Conditional statements say that if something is the case, then something else is the case. For example, “If Theo is on the committee, then Vera is also on the committee.” To work efficiently and effectively with Analytical Reasoning questions it is important to have a clear understanding of how to reason correctly with conditional statements and to know what errors to avoid.

Note. In addition to questions about what could be true, you may encounter questions such as the following:

Which one of the following could be false?
Each of the following must be true EXCEPT:

In both of these cases, the correct answer is something that is not true in at least one acceptable outcome. Thus, all of the incorrect answer choices will be things that must be true.

You might also encounter a question that asks:

Which one of the following could be, but need not be, true?

In these cases, the correct answer is something that is true in at least one acceptable outcome but which is also false in at least one acceptable outcome. Both things that must be true and things that cannot be true are incorrect answer choices for this sort of question.

Conditional relationships (“conditionals”) can be expressed in a variety of ways. The following are all equivalent ways of stating the same conditional:

(1) If Theo is on the committee, then Vera is also on the committee.
(2) If Vera is not on the committee, then Theo is not on the committee.
(3) Theo is not on the committee if Vera is not on the committee.
(4) Theo is not on the committee unless Vera is on the committee.
(5) Theo is on the committee only if Vera is on the committee.

All of these, despite the differences in their formulation, express exactly the same conditional relationship between Theo’s being on the committee and Vera’s being on the committee. What they all tell you is that Theo’s being on
the committee guarantees that Vera is on the committee. But none of them tells you that Vera’s being on the committee guarantees that Theo is on the committee.

Note. The fact that all of the formulations displayed above are logically equivalent is not intuitively obvious. For most people, there is a marked difference in focus between some of these. For example, (1) seems to invite getting the facts about Theo straight first and if it turns out that Theo is on the committee, this tells you something about Vera. By contrast, (4) seems to invite finding out whether Vera is on the committee and if it turns out that she is not, this tells you that Theo is not on the committee either. Looking at things this way, it is easy to miss the underlying equivalence. But familiarity with, and automatic reliance on, this equivalence is crucial for dealing effectively with many Analytical Reasoning questions. So time that you spend now becoming thoroughly familiar with these equivalences is time well spent. Come test day, you’ll be able to handle conditionals no matter how they’re worded.

How does a conditional—regardless of how it happens to be formulated—work in drawing inferences? What are the kinds of additional information that, taken in conjunction with a conditional, yield proper inferences? Let’s look at an example. Take the conditional “If Theo is on the committee, then Vera is on the committee.” There are basically four cases to consider: 1. Theo is on the committee; 2. Theo is not on the committee; 3. Vera is on the committee; and 4. Vera is not on the committee. Each of these cases is discussed in turn below:

1. Theo is on the committee. If this is true, then given the conditional (in any of its formulations), it’s guaranteed that Vera is also on the committee. The conditional says as much. This case is straightforward.

2. Theo is not on the committee. If this is true, you cannot use the conditional (regardless of how it is formulated) to derive any legitimate inferences about Vera. In particular, you cannot conclude that Vera is not on the committee. As far as the conditional goes, Theo’s not being on the committee is consistent both with Vera’s being on the committee and with her not being there. The conditional is simply silent about whether or not Vera is on the committee.

3. Vera is on the committee. If this is true, you cannot use the conditional (regardless of how it is formulated) to derive any legitimate inferences about Theo. In particular, you cannot conclude that Theo is also on the committee.

In fact, we have just made this point in the discussion of point 2 above. As we said there, Theo’s not being on the committee is consistent with Vera’s being on the committee. In the same way, Vera’s being on the committee is consistent with Theo’s not being on the committee.

4. Vera is not on the committee. If this is true, you can use the conditional (in any of its formulations) to derive a legitimate inference about Theo. You can infer that Theo is not on the committee either. This is because if Theo were on the committee without Vera also being on the committee, then the conditional, “If Theo is on the committee, Vera must also be on the committee,” would be violated. So, to sum this up, if Vera is not on the committee, the only way not to violate the conditional is for Theo not to be on the committee either.

Note. Sometimes Analytical Reasoning questions call for inferences involving more than one conditional. Suppose you’re given two conditionals like the following:

If Theo is on the committee, Vera is on the committee.

If Vera is on the committee, Ralph is on the committee.

From these you can legitimately infer

If Theo is on the committee, Ralph is on the committee.

and

If Ralph is not on the committee, Theo is not on the committee.

Note that these inferences can be derived no matter how the conditionals on which they are based are formulated. So for example, from these versions:

If Vera is not on the committee, then Theo is not on the committee.

Unless Ralph is on the committee, Vera is not on the committee.

you can make the same two inferences as above:

If Theo is on the committee, Ralph is on the committee.

and

If Ralph is not on the committee, Theo is not on the committee.
Wordings Used in Analytical Reasoning Questions

In Analytical Reasoning questions, the language used in presenting the setup and asking the questions must be precise and unambiguous. As a result, many things are spelled out at greater length and in more detail than they would be in most other kinds of writing. For example, in a setup that talks about a group of people who will give presentations at a meeting, it will probably be stated explicitly that each person makes only one presentation and that the people give their presentations one after another. Here are some other examples:

- **at some time before/immediately before**
  
  These expressions typically occur in place of “before” alone. This is because if you were simply told that “Smith’s presentation comes before Jeng’s presentation,” it might be unclear whether someone else’s presentation could occur between them. And so it might not be clear whether some outcome is acceptable or not. The use of phrases like “immediately before” is intended to avoid such ambiguity.

  If you’re told, “Smith’s presentation comes immediately before Jeng’s presentation,” you know that no other presentation can occur between those two. On the other hand, if you’re told, “Smith’s presentation comes at some time before Jeng’s presentation,” you know that another presentation can, but doesn’t have to, occur between those two. If another presentation had to occur between Smith’s and Jeng’s presentations, this would have to be said explicitly.

  Similarly, you may be told that Smith’s office is on “a higher floor” than Jeng’s office (which allows for the possibility that the two offices are on adjacent floors and for the possibility that they are on nonadjacent floors), or you may be told that Smith’s office is on the floor “immediately above” Jeng’s office (which ensures that there are no other floors between the ones on which Smith’s office and Jeng’s office are located).

  Or you might be told that within a row of offices, Smith’s office is “the office” between Jeng’s office and Robertson’s office. This would tell you something different than if you were told that Smith’s office is “an office” between Jeng’s office and Robertson’s office. In the first case, the use of the definite article “the” indicates that there is only one office between Jeng’s and Robertson’s offices, namely, Smith’s office. In the second case, however, it is left open whether there are any offices in addition to Smith’s office between those of Jeng and Robertson.

- **at least/at most/exactly**

  There are times when simply being told that there must be three people on a certain committee would leave you uncertain whether this means that there can be more than three people on the committee or that there must be exactly three people on the committee. This kind of uncertainty is avoided by using precise language to talk about numbers. If the point is that three is the minimum number of committee members, you would typically be told that there must be at least three people on the committee. If three is the maximum number of committee members, then typically you would be told that there are at most three people on the committee. Otherwise, you would typically be told that there are exactly three people on the committee.

- **respectively/not necessarily in that order**

  If you were asked to evaluate whether the statement “If Y is performed first, the songs performed second, third, and fourth could be T, X, and O,” if (2) is what is meant. And by saying, “If Y is performed first, the songs performed second, third, and fourth, respectively, could be T, X, and O,” if (2) is what is meant.

More Points to Consider

Here are several points to keep in mind. Some have been mentioned earlier and some are additional notes and tips.

- Always keep in mind that your objective is to select the correct answer, not to produce a comprehensive account of all of the logical possibilities available under the circumstances specified in the question. Arriving at the correct answer almost never requires working out all of the possible outcomes.

- As you draw inferences on the basis of how the question-specific circumstances interact with the setup conditions, keep checking the answer choices. At any point, you might be able to identify the correct answer. Or you might be able to eliminate some answer choices as incorrect. If you have succeeded in identifying the correct answer, you are done even if there are still further inferences you could draw or if there are some answer choices that you have not yet been able to eliminate. There is no need for you to prove that those answer choices are incorrect. By the same token, if you have succeeded in eliminating all but one answer choice, you are done even if you have not independently shown that the remaining answer choice is correct.
Remember that when dealing with Analytical Reasoning questions, anything is acceptable that is not prohibited by the setup conditions or by what is implied by the setup conditions along with any circumstances specified in the question. Do not make any unwarranted assumptions, however natural they might seem. For example, if you are told that a committee must include an expert on finance and an expert on marketing, do not take it for granted that the committee’s expert on finance must be a different person from the committee’s expert on marketing.

In Analytical Reasoning questions, careful and literal reading is of critical importance. Even though time management is important, it is even more important not to read too quickly. To give a specific example of the kind of problem that can arise, consider the following two statements: “F and G cannot both go on vacation during July” and “Neither F nor G can go on vacation during July.” There are a number of superficial resemblances between them. However, the two are not equivalent, and mistaking one for the other would almost certainly lead to errors. If F goes on vacation in July and G does not, the first condition is not violated, but the second one is.

Recall the earlier discussion of active elements in the setup that aren’t mentioned in any of the conditions. It isn’t necessary for all of the individual elements to be explicitly constrained by the setup conditions. If a particular element is not explicitly mentioned in the conditions, this means that the element is constrained only by what happens with the other elements. It does not mean that the set of setup conditions is incomplete or otherwise defective.

Suppose you are asked a question like, “Which one of the following must be advertised during week 2,” based on a setup involving seven products to be advertised during a four-week period. Suppose further that you determine that product H must be advertised during week 2, but that H does not appear among the answer choices. Does this mean that the question is defective? No. In this case it could be that G is also a product that must be advertised during week 2, and G is one of the answer choices. Keep in mind that there can only be one correct answer among the answer choices, but there can be more than one correct answer to the question.

There are occasionally questions that ask about acceptable outcomes but only present partial outcomes in the answer choices. For example, the setup might be concerned with dividing a group of people into subgroups 1 and 2. The question might ask which one of the answer choices is an acceptable subgroup 1. In a case like this, if you look for violations of setup conditions only within the group that actually appears in the answer choices, you might find more than one that seems acceptable. But remember that what has to be acceptable is an outcome as a whole—the composition of both subgroup 1 and subgroup 2. So, even though subgroup 2 is not displayed in any of the answer choices, you still need to check it for violations of the setup conditions. That is, you would need to work out the outcome for subgroup 2 for those answer choices that you cannot otherwise eliminate as incorrect.

Recall the earlier discussion of what must be true on the basis of the setup conditions alone. It is extremely important that you keep in mind the point made there—that circumstances specified in an individual question hold for that question only. Very occasionally, a question will direct you to suppose that one of the original setup conditions were replaced with a different one. Such changes to the setup conditions also apply only to the question in which they are described, and never carry over to any other questions.