

CHAPTER TWO: THE BASICS OF CRITICAL REASONING

GMAT Critical Reasoning

The focus of this book is on GMAT Critical Reasoning, and each Verbal section contains a total of 10 to 14 Critical Reasoning questions. When the total time allotted is weighed against the total number of questions in the Verbal section, you have an average of approximately one minute and forty-five seconds to complete each question. Of course, the amount of time you spend on each question will vary with the difficulty of each question. For virtually all students the time constraint is a major obstacle, and as we progress through this book we will discuss time-saving techniques that you can employ within the section.

On average, you have 1 minute and 45 seconds to complete each question.

Critical Reasoning Question Directions

The directions for Critical Reasoning problems are short and seemingly simple:

“For this question type, select the best of the given answer choices.”

Because these directions always precede first Critical Reasoning question in a Verbal section, you should familiarize yourself with them now. Once the GMAT begins, *never* waste time reading the question directions in any section.

Let’s examine the directions more closely. Consider the following phrase: “select the best of the answer choices given.” By stating up front that answers have comparative value and some are better than others, the makers of the test compel you to read every single answer choice before making a selection. If you read only one or two answer choices and then decide you have the correct one, you could end up choosing an answer that has some merit but is not as good as a later answer. One of the test makers’ favorite tricks is to place a highly attractive wrong answer choice immediately before the correct answer choice in the hopes that you will pick the wrong answer choice and then move to the next question without reading any of the other answers.

Always read each of the five answer choices before deciding which answer is correct.

What is notable about the directions is what is *not* stated. No mention is made of whether to accept all statements as true, nor is any comment made about what you should assume about each question. A bit later in this chapter we will address the truth of the statements in each passage, but let’s take a moment to talk about the assumptions that underlie each problem. In general, standardized tests such as the GMAT operate on “commonsense” grounds; that is, you should only assume things that would be considered common sense or widely known to the general public. The implication is that you can make some assumptions when working with questions, but not other assumptions.

Assumptions are a critical part of GMAT Critical Reasoning, and we will talk about assumptions in more detail in a later chapter.

Here's a good example of what they expect you to assume: when "television" is introduced in a stimulus, they expect you to know, among other things, what a TV show is, that TV can portray the make-believe or real, what actors do, and that TV is shown by beaming signals into TV sets in homes and elsewhere.

The question to the right is presented for demonstration purposes only. For those of you who wish to try the problem now, the correct answer is listed in the first sidebar on the next page.

Of course, the GMAC does not hand out a list of what constitutes a reasonable assumption! Even outside of the GMAT, the test makers do not clearly state what assumptions are acceptable or unacceptable for you to make, mainly because such a list would be almost infinite. For GMAT purposes, approaching each question you can take as true any statement or idea that an average person would be expected to believe on the basis of generally known and accepted facts. For example, in a question you can assume that the sky sometimes becomes cloudy, but you cannot assume that the sky is always cloudy (unless stated explicitly by the question). GMAT questions will *not* require you to make assumptions based on extreme ideas (such as that it *always* rains in Seattle) or ideas not in the general domain of knowledge (such as the per capita income of residents of France). Please note that this does not mean that the GMAT cannot set up scenarios where they discuss ideas that are extreme or outside the bounds of common knowledge. Within a Critical Reasoning question, the test makers can and do discuss complex or extreme ideas; in these cases, they will give you context for the situation by providing additional information. However, be careful about assuming something to be true (unless you believe it is a widely accepted fact or the test makers indicate you should believe it to be true). This last idea is one we will discuss in much more detail as we look at individual question types.

The Parts of a Critical Reasoning Question

Every Critical Reasoning question contains three separate parts: the stimulus, the question stem, and the five answer choices. The following diagram identifies each part:

1. Most large dogs are gentle, but most large dogs scare _____ Stimulus
people. In addition, all dogs who scare people are
reliable protectors.
- Which of the following can be logically concluded _____ Question Stem
from the passage above?
- (A) Most dogs that are reliable protectors are gentle.
(B) Some gentle dogs are reliable protectors.
(C) All dogs that are reliable protectors are large _____ Answer Choices
dogs.
(D) Some dogs that are not gentle scare people.
(E) All large dogs are reliable protectors.

As a technical note, on the GMAT CAT an empty answer bubble appears next to each answer, and there is no letter in the bubble. However, for the convenience of discussion, throughout this book we will present problems with the answer choices lettered (A) through (E).

Approaching the Questions

When examining the three parts, students sometimes wonder about the best strategy for attacking a question: should I read the question stem first? Should I preview the five answer choices? The correct answer is *Read the parts in the order given*. That is, first read the stimulus, then read the question stem, and finally read each of the five answer choices. Although this may seem like a reasonable, even obvious, approach we mention it here because some GMAT texts advocate reading the question stem before reading the stimulus. We are certain that these texts are seriously mistaken, and here are a few reasons why:

1. Understanding the stimulus is the key to answering any question, and reading the question stem first tends to undermine the ability of students to fully comprehend the information in the stimulus. On easy questions this distraction tends not to have a significant negative impact, but on more difficult questions the student often is forced to read the stimulus twice in order to get full comprehension, thus wasting valuable time. Literally, by reading the question stem first, students are forced to juggle two things at once: the question stem and the information in the stimulus. That is a difficult task when under time pressure. The bottom line is that any viable strategy must be effective for questions at all difficulty levels, but when you read the question stem first you cannot perform optimally. True, the approach works with the easy questions, but those questions could have been answered correctly regardless of the approach used.
2. Reading the question stem first often wastes valuable time since the typical student will read the stem, then read the stimulus, and then read the stem again. Unfortunately, there simply is not enough time to read every question stem twice.
3. Some question stems refer to information given in the stimulus, or add new conditions to the stimulus information. Thus, reading the stem first is of little value and often confuses or distracts the student when he or she goes to read the stimulus.
4. On stimuli with two questions, reading one stem biases the reader to look for that specific information, possibly causing problems while doing the second question, and reading both stems before reading the stimulus wastes entirely too much time and leads to confusion.
5. For truly knowledgeable test takers there are situations that arise where the question stem is fairly predictable. One example—and there are others—is with a question type called Resolve the Paradox. Usually, when you read the stimulus that accompanies these questions, an obvious paradox or discrepancy is presented. Reading the question stem beforehand does not add anything to what you would have known just from reading the stimulus. In later chapters we will discuss this situation and others where you can predict the question stem with some success.

The correct answer to the problem on the previous page is answer choice (B).

In our experience, the vast majority of high-scoring GMAT takers read the stimulus first.

6. Finally, we believe that one of the main principles underlying the read-the-question-stem-first approach is flawed. Many advocates of the approach claim that it helps the test taker identify and skip (by simply guessing instead of doing the question) the “harder” question types such as Parallel Reasoning or Method of Reasoning. However, test data show that questions of any type can be hard or easy. Some Parallel Reasoning questions are phenomenally easy whereas some Parallel Reasoning questions are extremely difficult. In short, the question stem is a poor indicator of difficulty because question difficulty is more directly related to the complexity of the stimulus and the corresponding answer choices.

Understandably, reading the question stem before the stimulus sounds like a good idea at first, but for the majority of students (especially those trying to score in the 600s and above), the approach is a hindrance, not a help. Solid test performance depends on your ability to quickly comprehend complex argumentation; do not make your task harder by reading the question stem first.

Analyzing the Stimulus

As you read the stimulus, initially focus on making a quick analysis of the topic under discussion. What area has the author chosen to write about? You will be more familiar with some topics than with others, but do not assume that everything you know “outside” of the stimulus regarding the topic is true and applies to the stimulus. For example, say you work in a real estate office and you come across a GMAT question about property sales. You can use your work experience and knowledge of real estate to help you better understand what the author is discussing, but do not assume that things will operate in the stimulus exactly as they do at your workplace. Perhaps property transactions in your state are different from those in other states, or perhaps protocols followed in your office differ from those elsewhere. In a GMAT question, look carefully at what the author says about the topic at hand; statements presented as facts on the GMAT can and do vary from what occurs in the “real world.” This discrepancy between the “GMAT world” and the “real world” is one you must always be aware of: although the two worlds overlap, things in the GMAT world are often very different from what you expect. From our earlier discussion of commonsense assumptions we know that you can assume that basic, widely-held facts will hold true in the GMAT world, but by the same token, you cannot assume that specialized information that you have learned in the real world will hold true on the GMAT. We will discuss “outside information” in more detail when we discuss GMAT question types.

Next, make sure to read the entire stimulus very carefully. The makers of the GMAT have extraordinarily high expectations about the level of detail you should retain when you read a stimulus. Many questions will test your knowledge of small, seemingly nitpicky variations in phrasing, and reading carelessly is GMAT suicide. In many respects, the requirement forced upon

Reading closely is a critical GMAT skill.

you to read carefully is what makes the time constraint so difficult to handle. Every test taker is placed at the nexus of two competing elements: the need for speed (caused by the timed element) and the need for patience (caused by the detailed reading requirement). How well you manage these two elements strongly determines how well you perform. In the previous chapter we discussed how to practice using time elements, so make sure to use those ideas as you work through practice questions both in this book and in your other test materials.

Finally, analyze the structure of the stimulus: what pieces are present and how do those pieces relate to each other? In short, you are tasked with knowing as much as possible about the statements made by the author, and in order to do so, you must understand how the test makers create GMAT arguments. We will discuss argumentation in more detail in a moment.

Stimulus Topics

The spectrum of topics covered by Critical Reasoning stimuli is quite broad. Previous stimuli topics have ranged from art to business to medicine and science. According to the makers of the test, “Questions are based on materials from a variety of sources. No familiarity with the specific subject matter is needed.”

Despite the previous statement, many GMAT students come from a humanities background and these test takers often worry about stimuli containing scientific or medical topics. Remember, the topic of a stimulus does not affect the underlying logical relationship of the argument parts. And, the GMAT will not assume that you know anything about advanced technical or scientific ideas. For example, while the GMAT may discuss mathematicians or the existence of a difficult problem in math, you will not be asked to make calculations nor will you be assumed to understand esoteric terminology. Any element beyond the domain of general public knowledge will be explained for you, as in the following example:

Researcher: Einstein’s *Annus Mirabilis Papers*, the 1905 works that introduced some of his most notable and recognizable theories, were at first overlooked by many physicists of the time, and flatly rejected by others. These works were so important, however, that years...

The partial stimulus above is a good example of how the test makers will supply information they feel is essential to understanding the question. In this case, the reader is not expected to understand either the content or historical importance of the *Annus Mirabilis Papers*, and so the test makers conveniently furnish that information. Thus, although on occasion you will see a stimulus that references an ominous looking word or idea (examples include *high-density lipoprotein* and *pironoma*, you will not need to know or be assumed to know anything more about those elements than what you are told by the test makers.

GMAT argumentation is one of the main topics of this book, and will be discussed in every chapter.

Some specific topics do recur, and we will note those in future chapters.

When you read a science-based stimulus, focus on understanding the relationship of the ideas and do not be intimidated by the terminology used by the author. As we will ultimately find, reading an GMAT stimulus is about seeing past the topic to analyze the structural relationships present in the stimulus. Once you are able to see these relationships, the topic will become less important.

Arguments versus Fact Sets

GMAT stimuli fall into two distinct categories: those containing an argument and those that are just a set of facts. Logically speaking, an argument can be defined as a set of statements wherein one statement is claimed to follow from or be derived from the others. Consider the following short example of an argument:

All professors are ethical. Mason is a professor. So Mason is ethical.

The first two statements in this argument give the reasons (or “premises”) for accepting the third statement, which is the conclusion of the argument.

Fact sets, on the other hand, are a collection of statements without a conclusion, as in the following example:

“The Jacksonville area has just over one million residents. The Cincinnati area has almost two million residents. The New York area has almost twenty million residents.”

The three sentences above do *not* constitute an argument because no conclusion is present and an argument, by definition, requires a conclusion. The three sentences merely make a series of assertions without making a judgment. Notice that reading these sentences does not cause much of a reaction in most readers. Really, who cares about the city sizes? This lack of a strong reaction is often an indication that you are not reading an argument and are instead reading just a set of facts.

When reading Critical Reasoning stimuli, you should seek to make several key determinations, which we call the Critical Reasoning Primary Objectives™. Your first task is to determine if you are reading an argument or a fact set.

Primary Objective #1: Determine whether the stimulus contains an argument or if it is only a set of factual statements.

To achieve this objective, you must recognize whether a conclusion is present. Let us talk about how to do this next.

There are many books on logic and argumentation. In this book we attempt to concisely spell out what you need to know to succeed on the GMAT. This is different from philosophical logic, and therefore this section will not teach you argumentation as it is taught in a university.

Fact sets rarely cause a strong reaction in the reader because no persuasion is being used. When an author attempts to persuade you to believe a certain conclusion, there tends to be a noticeable reaction.

Identifying Premises and Conclusions

For GMAT purposes, a premise can be defined as:

“A fact, proposition, or statement from which a conclusion is made.”

Premises support and explain the conclusion. Literally, the premises give the reasons why the conclusion should be accepted. To identify premises, ask yourself, “*What reasons has the author used to persuade me? Why should I believe this argument? What evidence exists?*”

A premise gives a reason why something should be believed.

A conclusion can be defined as:

“A statement or judgment that follows from one or more reasons.”

Conclusions, as summary statements, are supposed to be drawn from and rest on the premises. To identify conclusions, ask yourself, “*What is the author driving at? What does the author want me to believe? What point follows from the others?*”

A conclusion is the point the author tries to prove by using another statement.

Because language is the test maker’s weapon of choice, you must learn to recognize the words that indicate when a premise or conclusion is present. In expressing arguments, authors often use the following words or phrases to introduce premises and conclusions:

Premise Indicators

because
since
for
for example
for the reason that
in that
given that
as indicated by
due to
owing to
this can be seen from
we know this by

Conclusion Indicators

thus
therefore
hence
consequently
as a result
so
accordingly
clearly
must be that
shows that
conclude that
follows that
for this reason

Make sure to memorize these word lists. Recognizing argument elements is critical!

Because there are so many variations in the English language, these lists cannot be comprehensive, but they do capture many of the premise and conclusion indicators used by GMAT authors. As for frequency of appearance, the top two words in each list are used more than any of the other words in the list.

Arguments can contain more than one premise and more than one conclusion.

When you are reading, always be aware of the presence of the words listed

above. These words are like road signs; they tell you what is coming next. Consider the following example:

Humans cannot live on Venus because the surface temperature is too high.

About 75% of GMAT stimuli contain arguments. The remainder are fact sets.

As you read the first portion of the sentence, “Humans cannot live on Venus,” you cannot be sure if you are reading a premise or conclusion. But, as soon as you see the word “because”—a premise indicator—you know that a premise will follow, and at that point you know that the first portion of the sentence is a conclusion. In the argument above, the author wants you to believe that humans cannot live on Venus, and the reason is that the surface temperature is too high.

In our daily lives, we make and hear many arguments. However, unlike on the GMAT, the majority of these arguments occur in the form of conversations (and when we say “argument,” we do not mean a fight!). Any GMAT argument can be seen as an artificial conversation, even the basic example above:

Author: “Humans cannot live on Venus.”

Respondent: “Really? Why is that?”

Author: “The surface temperature of Venus is too high.”

If at first you struggle to identify the pieces of an argument, you can always resort to thinking about the argument as an artificial conversation and that may assist you in locating the conclusion.

Here are more examples of premise and conclusion indicators in use:

1. “The economy is in tatters. Therefore, we must end this war.”

“Therefore” introduces a conclusion; the first sentence is a premise.

2. “We must reduce our budget due to the significant cost overruns we experienced during production.”

“due to” introduces a premise; “We must reduce our budget” is the conclusion.

3. “Fraud has cost the insurance industry millions of dollars in lost revenue. Thus, congress will pass a stricter fraud control bill since the insurance industry has one of the most powerful lobbies.”

This argument contains two premises: the first premise is the first sentence and the second premise follows the word “since” in the second sentence; the conclusion is “congress will pass a

Important note: premises and conclusions can be constructed without indicator words present.

stricter fraud control bill.”

Notice that premises and conclusions can be presented in any order—the conclusion can be first or last, and the relationship between the premises and the conclusion remains the same regardless of the order of presentation. For example, if the order of the premise(s) and conclusion was switched in any of the examples above, the logical structure of the argument would not change.

Also notable is that the premises and the conclusion can appear in the same sentence, or be separated out into multiple sentences. Whether the ideas are together or separated has no effect on the logical structure of the argument.

If a conclusion is present, you *must* identify the conclusion prior to proceeding on to the question stem. Often, the reason students miss questions is because they have failed to fully and accurately identify the conclusion of the argument.

Primary Objective #2: If the stimulus contains an argument, identify the conclusion of the argument. If the stimulus contains a fact set, examine each fact.

One Confusing Form

Because the job of the test makers is to determine how well you can interpret information, they will sometimes arrange premise and conclusion indicators in a way that is designed to be confusing. One of their most confusing forms places a conclusion indicator and premise indicator back-to-back, separated by a comma, as in the following examples:

“Therefore, since...”
“Thus, because...”
“Hence, due to...”

A quick glance would seemingly indicate that what will follow is both a premise and a conclusion. In this instance, however, the presence of the comma creates a clause that, due to the premise indicator, contains a premise. The end of that premise clause will be closed with a second comma, and then what follows will be the conclusion, as in the following:

“Therefore, since higher debt has forced consumers to lower their savings, banks now have less money to loan.”

“Higher debt has forced consumers to lower their savings” is the premise; “banks now have less money to loan” is the conclusion. So, in this instance “therefore” still introduces a conclusion, but the appearance of the conclusion is interrupted by a clause that contains a premise.

Order of presentation has no effect on the logical structure of the argument. The conclusion can appear at the beginning, the middle, or the end of the argument.

Remember, a fact set does not contain a conclusion; an argument must contain a conclusion.

This form is called the “conclusion/premise indicator form.”

Premise and Conclusion Recognition Mini-Drill

Each of the following problems contains a short argument. For each argument, identify the conclusion and the premise(s). Answers on the next page.

1. “Given that the price of steel is rising, we will no longer be able to offer discounts on our car parts.”
2. “The political situation in Somalia is unstable owing to the ability of individual warlords to maintain powerful armed forces.”
3. “Since we need to have many different interests to sustain us, the scientists’ belief must be incorrect.”
4. “So, as indicated by the newly released data, we should push forward with our efforts to recolonize the forest with snowy tree crickets.”
5. “Television has a harmful effect on society. This can be seen from the poor school performance of children who watch significant amounts of television and from the fact that children who watch more than six hours of television a day tend to read less than non-television watching children.”
6. “The rapid diminishment of the ecosystem of the Amazon threatens the entire planet. Consequently, we must take immediate steps to convince the Brazilian government that planned development projects need to be curtailed for the simple reason that these development projects will greatly accelerate the loss of currently protected land.”

Premise and Conclusion Recognition Mini-Drill Answer Key

1. Features the premise indicator “given that.”
Premise: “Given that the price of steel is rising,”
Conclusion: “we will no longer be able to offer discounts on our car parts.”
2. Features the premise indicator “owing to.”
Premise: “owing to the ability of individual warlords to maintain powerful armed forces.”
Conclusion: “The political situation in Somalia is unstable”
3. Features the premise indicator “since.”
Premise: “Since we need to have many different interests to sustain us,”
Conclusion: “the scientists’ belief must be incorrect.”
4. Features the conclusion/premise form indicator “So, as indicated by.”
Premise: “as indicated by the newly released data”
Conclusion: “we should push forward with our efforts to recolonize the forest with snowy tree crickets.”
5. Features the premise indicator “this can be seen from.” The second sentence contains two premises.
Premise 1: “This can be seen from the poor school performance of children who watch significant amounts of television”
Premise 2: “and from the fact that children who watch more than six hours of television a day tend to read less than non-television watching children.”
Conclusion: “Television has a harmful effect on society.” Note how this sentence does not contain a conclusion indicator. Yet, we can determine that this is the conclusion because the other sentence contains two premises.
6. Features the conclusion indicator “consequently” and the premise indicator “for the simple reason that.” There are also two premises present.
Premise 1: “The rapid diminishment of the ecosystem of the Amazon threatens the entire planet.”
Premise 2: “for the simple reason that these development projects will greatly accelerate the loss of currently protected land.”
Conclusion: “we must take immediate steps to convince the Brazilian government that planned development projects need to be curtailed”

Additional Premise Indicators

Additional premises are still, of course, premises. They may be central to the argument or they may be secondary. To determine the importance of the premise, examine the remainder of the argument.

Aside from previously listed premise and conclusions indicators, there are other argument indicator words you should learn to recognize. First, in argument forms, sometimes the author will make an argument and then for good measure add another premise that supports the conclusion but is sometimes non-essential to the conclusion. These are known as *additional premises*:

Additional Premise Indicators

Furthermore
Moreover
Besides
In addition
What's more

Following are two examples of additional premise indicators in use:

1. "Every professor at Fillmore University teaches exactly one class per semester. Fillmore's Professor Jackson, therefore, is teaching exactly one class this semester. Moreover, I heard Professor Jackson say she was teaching only a single class."

The first sentence is a premise. The second sentence contains the conclusion indicator "therefore" and is the conclusion of the argument. The first sentence is the main proof offered by the author for the conclusion. The third sentence begins with the additional premise indicator "moreover." The premise in this sentence is non-essential to the argument, but provides additional proof for the conclusion and could be, if needed, used to help prove the conclusion separately (this would occur if an objection was raised to the first premise).

2. "The city council ought to ease restrictions on outdoor advertising because the city's economy is currently in a slump. Furthermore, the city should not place restrictions on forms of speech such as advertising."

The first sentence contains both the conclusion of the argument and the main premise of the argument (introduced by the premise indicator "because"). The last sentence contains the additional premise indicator "furthermore." As with the previous example, the additional premise in this sentence is non-essential to the argument but provides additional proof for the conclusion.

Counter-Premise Indicators

When creating an argument, an author will sometimes bring up a counter-premise—a premise that actually contains an idea that is counter to the argument. At first glance, this might seem like an odd thing for an author to do. But by raising the counter-premise and then addressing the complaint in a direct fashion, the author can minimize the damage that would be done by the objection if it were raised elsewhere.

Counter-premises can also be ideas that compare and contrast with the argument, or work against a previously raised point. In this sense, the general counter-premise concept discusses an idea that is in some way different from another part of the argument.

Counter-premises, also called adversatives, bring up points of opposition or comparison.

Counter-premise Indicators

But
Yet
However
On the other hand
Admittedly
In contrast
Although
Even though
Still
Whereas
In spite of
Despite
After all

Note that some terms, such as “After all,” could appear on multiple indicator lists because the phrase can be used in a variety of ways. As a savvy GMAT taker, it is up to you to identify the exact role that the phrase is playing in the argument.

Following is an example of a counter-premise indicator in use:

1. “The United States prison population is the world’s largest and consequently we must take steps to reduce crime in this country. Although other countries have higher rates of incarceration, their statistics have no bearing on the dilemma we currently face.”

The first sentence contains a premise and the conclusion (which is introduced by the conclusion indicator “consequently”). The third sentence offers up a counter-premise as indicated by the word “although.”

Additional Premise and Counter-Premise Recognition Mini-Drill

Each of the following problems contains a short argument. For each argument, identify the conclusion, the premise(s), and any additional premises or counter-premises. Answers on the next page.

1. Wine is made by crushing grapes and eventually separating the juice from the grape skins. However, the separated juice contains impurities and many wineries do not filter the juice. These wineries claim the unfiltered juice ultimately produces a more flavorful and intense wine. Since these wine makers are experts, we should trust their judgment and not shy away from unfiltered wine.

2. Phenylketonurics are people who cannot metabolize the amino acid phenylalanine. There are dangers associated with phenylketonuria, and products containing phenylalanine must carry a warning label that states, "Phenylketonurics: contains phenylalanine." In addition, all children in developed societies receive a phenylketonuria test at birth. Hence, at the moment, we are doing as much as possible to protect against this condition.

3. During last night's robbery, the thief was unable to open the safe. Thus, last night's robbery was unsuccessful despite the fact that the thief stole several documents. After all, nothing in those documents was as valuable as the money in the safe.

Additional Premise and Counter-Premise Recognition Mini-Drill Answer Key

1. Features the counter-premise indicator “however” and the premise indicator “since.”

Premise: “Wine is made by crushing grapes and eventually separating the juice from the grape skins.”

Counter-premise: “However, the separated juice contains impurities and many wineries do not filter the juice.”

Premise: “These wineries claim the unfiltered juice ultimately produces a more flavorful and intense wine.”

Premise: “Since these wine makers are experts,”

Conclusion: “we should trust their judgment and not shy away from unfiltered wine.”

2. Features the additional premise indicator “in addition” and the conclusion indicator “hence.” In this problem the additional premise is central to supporting the conclusion.

Premise: “Phenylketonurics are people who cannot metabolize the amino acid phenylalanine.”

Premise: “There are dangers associated with phenylketonuria, and products containing phenylalanine must carry a warning label that states, ‘Phenylketonurics: contains phenylalanine.’ ”

Additional Premise: “In addition, all children in developed societies received a phenylketonuria test at birth.”

Conclusion: “Hence, at the moment, we are doing as much as possible to protect against this condition.”

3. Features the counter-premise indicator “despite”; the additional premise indicator “after all”; and the conclusion indicator “thus.” The additional premise serves to downplay the counter-premise.

Premise: “During last night’s robbery, the thief was unable to open the safe.”

Counter-premise: “despite the fact that the thief stole several documents.”

Additional Premise: “After all, nothing in those documents was as valuable as the money in the safe.”

Conclusion: “Thus, last night’s robbery was unsuccessful ”

Recognizing Conclusions Without Indicators

Many of the arguments we have encountered up until this point have had conclusion indicators to help you recognize the conclusion. And, many of the arguments you will see on the GMAT will also have conclusion indicators. But you will encounter arguments that do not contain conclusion indicators. Following is an example:

The best way of eliminating traffic congestion will not be easily found. There are so many competing possibilities that it will take millions of dollars to study every option, and implementation of most options carries an exorbitant price tag.

An argument such as the above can be difficult to analyze because no indicator words are present. How then, would you go about determining if a conclusion is present, and if so, how would you identify that conclusion? Fortunately, there is a fairly simple trick that can be used to handle this situation, and any situation where you are uncertain of the conclusion (even those with multiple conclusions, as will be discussed next).

Aside from the questions you can use to identify premises and conclusions (described earlier in this chapter), the easiest way to determine the conclusion in an argument is to use the Conclusion Identification Method™:

Take the statements under consideration for the conclusion and place them in an arrangement that forces one to be the conclusion and the other(s) to be the premise(s). Use premise and conclusion indicators to achieve this end. Once the pieces are arranged, determine if the arrangement makes logical sense. If so, you have made the correct identification. If not, reverse the arrangement and examine the relationship again. Continue until you find an arrangement that is logical.

Let us apply this method to the argument at the top of this page. For our first arrangement we will make the first sentence the premise and the second sentence the conclusion, and supply indicators (in italics):

Because the best way of eliminating traffic congestion will not be easily found, *we can conclude that* there are so many competing possibilities that it will take millions of dollars to study every option, and implementation of most options carries an exorbitant price tag.

Does that sound right? No. Let us try again, this time making the first sentence the conclusion and the second sentence the premise:

Because there are so many competing possibilities that it will take millions of dollars to study every option, and implementation of most options carries an exorbitant price tag, *we can conclude that* the best

GMAC says you are expected to possess, in their words, “a college-level understanding of widely used concepts such as argument, premise, assumption, and conclusion.”

way of eliminating traffic congestion will not be easily found.

Clearly, the second arrangement is far superior because it makes sense. In most cases when you have the conclusion and premise backward, the arrangement will be confusing. The correct arrangement always sounds more logical.

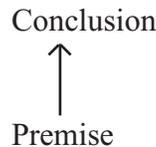
Complex Arguments

Up until this point, we have only discussed simple arguments. Simple arguments contain a single conclusion. While many of the arguments that appear on the GMAT are simple arguments, there are also a fair number of complex arguments. Complex arguments contain more than one conclusion. In these instances, one of the conclusions is the main conclusion, and the other conclusions are subsidiary conclusions (also known as sub-conclusions).

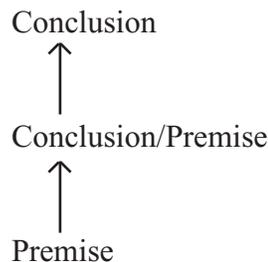
While complex argumentation may sound daunting at first, you make and encounter complex argumentation every day in your life. In basic terms, a complex argument makes an initial conclusion based on a premise. The author then uses that conclusion as the foundation (or premise) for another conclusion, thus building a chain with several levels. Let us take a look at the two types of arguments in diagram form:

A simple argument does not mean that the argument is easy to understand! Simple in this context means that the argument contains only a single conclusion.

In abstract terms, a simple argument appears as follows:



As discussed previously, the premise supports the conclusion, hence the arrow from the premise to the conclusion. By comparison, a complex argument takes an initial conclusion and then uses it as a premise for another conclusion:



Thus, a statement can be both a conclusion for one argument and a premise for another. In this sense, a complex argument can appear somewhat like a ladder, where each level or “rung” is used to build the next level. Given enough time you could build an argument with hundreds of levels. On the GMAT, however,

there are typically three or four levels at most. Let us look at an example of a complex argument:

Because the Vikings have the best quarterback in football, they therefore have the best offense in football. Because they have the best offense in football, they will win the Super Bowl next year.

The makers of the GMAT love to use complex argumentation because the presence of multiple conclusions tends to confuse students, making attractive wrong answer choices easier to create.

In this argument, the first sentence contains a premise followed by a conclusion. This initial conclusion is then used in the second sentence as a premise to make a larger conclusion:

Premise: “Because the Vikings have the best quarterback in football,”
Sub-Conclusion (conclusion of the previous premise/Premise for the following conclusion): “they therefore have the best offense in football.”
Main Conclusion: “they will win the Super Bowl next year.”

As we will see in Chapter Ten while discussing Method of Reasoning questions, one of the most commonly used complex argument forms is to place the main conclusion in the first sentence of the argument, and then to place the sub-conclusion in the last sentence of the argument, preceded by a conclusion indicator. This form is quite useful since it tends to trick students into thinking the last sentence is the main conclusion.

Another form of complex argumentation occurs with two-speaker stimuli. In these questions, two separate speakers are identified, and each presents his or her own argument or comment. Here is an example:

Annika: Recently, two comets were observed to collide in space. Two comets have never been witnessed colliding in space, and so such an occurrence must be extremely rare.

Shan: Not really. Typically no one bothers to try to watch for collisions because the chances for witnessing a collision are rare. This collision was observed only because an observatory was tracking one of the comets very closely.

In the argument above, each speaker presents premises and a conclusion. As often occurs with this form of question, the two speakers disagree.

One of the benefits of a two-speaker stimulus is that the test makers can introduce multiple viewpoints on the same subject. As you might imagine, the presence of multiple viewpoints tends to be confusing, and the extra viewpoints offer the test makers the opportunity to ask a wider variety of questions.

A Commonly Used Construction

Even within a single-speaker stimulus the test makers can raise alternate viewpoints. One of the most frequently used constructions is to raise a viewpoint at the beginning of the stimulus and then disagree with it immediately thereafter. This efficiently raises two opposing views in a very short paragraph. These stimuli are recognizable because they often begin with the phrase, “Some people claim...” or one of the many variations on this theme, including but not limited to the following:

- “Some people propose...”
- “Many people believe...”
- “Some argue that...” or “Some people argue that...”
- “Some critics claim...”
- “Some critics maintain...”
- “Some scientists believe...”

The structure of this opening sentence is remarkably consistent in form, and adheres to the following formula:

A number (some, many, etc.) of *people* (critics, students, teachers, legislators, vegetarians, psychologists etc.) *believe* (claim, propose, argue, etc.) that...

Of course, there are exceptions, as with these opening sentences:

- “Although some people claim...” (starts with “although”)
- “It has been claimed that...” (drops the *number* and *people*)
- “Cigarette companies claim that...” (drops the *number*)

The author can also break up the idea, by inserting contextual information, as in the following example:

“*Some critics* of space exploration programs *claim* that...”

The use of this device to begin a stimulus almost always leads to the introduction of the opposing view, as in the following partial stimulus:

Editorialist: Some people propose that, to discourage smoking, our country’s taxes on cigarette’s and cigarette-related items should be raised. Such a tax, however, would do more harm than good.

The editorialist uses the “Some people propose” device to introduce one opinion of taxes and then in the following sentence counters the idea with the view that turns out to be the editorialist’s main point (“Such a tax, however...”). The remainder of the problem went on to explain the reasoning behind the editorialist’s view.

Given the frequency with which this construction appears at the beginning of stimuli, you should learn to begin recognizing it now. We will again discuss this device in the Main Point section.

Truth versus Validity

Logicians spend a great deal of time discussing validity and truth, even going so far as to create complex truth tables that analyze the validity of arguments. We are not concerned with such methods because they do not apply to the GMAT.

In logic, the terms “strong/weak,” “good/bad,” “valid/invalid,” and “sound/unsound” are used to evaluate arguments. For our purposes, “strong,” “good,” “valid,” and “sound” will be interchangeable and all terms refer to the logical structure of the argument. The same holds true for “weak,” “bad,” “invalid,” and “unsound.”

So far, we have only identified the parts that are used to construct arguments. We have not made an analysis of the reasonableness or soundness of an argument. But, before moving on to argument analysis, you must be able to distinguish between two commonly confused concepts: validity and truth.

When we evaluate GMAT arguments, we are primarily concerned with validity. That is, what is the logical relationship of the pieces of the argument and how well do the premises, if accepted, prove the conclusion? We are less concerned with the absolute, real world truthfulness of either the premises or the conclusion. Some students will at first try to analyze every single GMAT statement on the basis of whether it is an absolutely true statement (does it happen as stated in the real world). For the most part, that is wasted effort. GMAT Critical Reasoning is primarily focused on whether the conclusion follows logically from a set of given premises. In many cases, the GMAT makers will let you work under a framework where the premises are simply accepted as factually accurate, and then you must focus solely on the method used to reach the conclusion. In a sense this could be called relative truthfulness—you are only concerned about whether the conclusion is true relative to the premises, not whether the conclusion is true in an absolute, real world sense. This is obviously a critical point, and one we will analyze later as we discuss different question types.

Argument Analysis

Once you have determined that an argument is present and you have identified the conclusion, you must determine if the argument is a good one or a bad one. This leads to the third Primary Objective:

Primary Objective #3: If the stimulus contains an argument, determine whether the argument is strong or weak.

To determine the strength of the argument, consider the relationship between the premises and the conclusion—do the premises strongly suggest that the conclusion would be true? Does the conclusion feel like an inevitable result of the premises? Or does the conclusion seem to go beyond the scope of the

information in the premises? How persuasive does the argument seem to you? When evaluating argument validity, the question you must always ask yourself is: Do the given facts support the conclusion?

To better understand this concept we will examine two sample arguments. The following argument uses the fact set we used before, with the addition of a conclusion:

“The Jacksonville area has just over one million residents. Cincinnati has almost two million residents. The New York area has almost twenty million residents. Therefore, we should move to Jacksonville.”

The last sentence contains the conclusion, and makes this an argument. Notice how the presence of the conclusion causes you to react more strongly to the stimulus. Now, instead of just reading a set of cold facts, you are forced to consider whether the premises have proven the given conclusion. In this case the author asks you to accept that a move to Jacksonville is in order based on the population of the city. Do you think the author has proven this point?

When considering the above argument, most people simply accept the premises as factually accurate. There is nothing wrong with this (and indeed in the real world they are true). As mentioned moments ago, in GMAT argumentation the makers of the test largely allow authors to put forth their premises unchallenged. The test makers are far more concerned about whether those premises lead to the conclusion presented. In the argument above, there is no reason to doubt the accuracy of the premises, but even if we accept the premises as accurate, we still do not have to accept the conclusion.

Most people reading the argument above would agree that the reasoning is weak. Even though the premises are perfectly acceptable, by themselves they do not prove that “we should move to Jacksonville.” The typical reader will experience a host of reactions to the conclusion: Why Jacksonville—why not a city that is even smaller? What about a larger city? What is so important about population? What about considerations other than population size? Because questions of this nature point to flaws in the argument, we would classify the argument as a poor one. That is, the premises do not prove the conclusion. As shown by this example, the acceptability of the premises does not automatically make the conclusion acceptable. The reverse is also true—the acceptability of the conclusion does not automatically make the premises acceptable.

The following is an example of a strong argument:

“Trees that shed their foliage annually are deciduous trees. Black Oak trees shed their leaves every year. Therefore, Black Oak trees are deciduous.”

An argument can be valid without being true. For example, the following has a valid argument structure but is not “true” in a real world sense:

“All birds can fly. An ostrich is a bird. Therefore, an ostrich can fly.”

Questions such as the ones posed in this paragraph suggest that the author has made unwarranted assumptions while constructing the argument. We will discuss assumptions in more detail later.

In this argument, the two premises lead directly to the conclusion. Unlike the previous argument, the author’s conclusion seems reasonable and inevitable based on the two premises. Note that the strength of this argument is based solely on the degree to which the premises prove the conclusion. The truth of the premises themselves is not an issue in determining whether the argument is valid or invalid.

Inferences and Assumptions

When glancing through GMAT questions, you will frequently see the words *inference* and *assumption*. Let us take a moment to define the meaning of each term in the context of GMAT argumentation.

Most people have come to believe that the word *inference* means probably true or likely to be true. Indeed, in common usage *infer* is often used in the same manner as *imply*. On the GMAT these uses are incorrect. In logic, an inference can be defined as something that *must be true*. Thus, if you are asked to identify an inference of the argument, you must find an item that must be true based on the information presented in the argument.

Earlier we discussed assumptions in the context of commonsense assumptions that you can bring into each problem. In argumentation, an assumption is simply the same as an *unstated* premise—what must be true in order for the argument to be true. Assumptions can often have a great effect on the validity of the argument.

Assumptions are a part of every argument, and we will discuss them in detail in Chapter Nine.

Separating an inference from an assumption can be difficult because the definition of each refers to what “must be true.” The difference is simple: an inference is what follows from an argument (in other words, a conclusion) whereas an assumption is what is taken for granted while making an argument. In one sense, an assumption occurs “before” the argument, that is, while the argument is being made. An inference is made “after” the argument is complete, and follows from the argument. Both concepts will be discussed in more detail in later chapters, but for the time being you should note that all authors make assumptions when creating their arguments, and all arguments have inferences that can be derived from the argument.

Actually, the GMAC is just the “producer” of the GMAT. The actual question construction is done by outside companies such as Pearson VUE and ACT, Inc.

The Mind of an GMAT Author

Let us take a moment to differentiate the makers of the test from the author of each stimulus. The maker of the test is the GMAC, the organization that oversees the protocols under which the GMAT is constructed, administers the test, and processes and distributes the results. The stated purpose of the test makers is to examine your ability to analyze arguments, in an attempt to assess your suitability for business school. The author of the stimulus is the person from whose point of view each piece is written or the source from which the piece is drawn. Sometimes the persona of the author is made abundantly clear

to you because the stimulus is prefaced by a short identifier, such as *Division Manager* or *Reviewer*, or even a proper name such as *Roland* or *Sharon*. The source of a stimulus can also be made clear by similar identifiers, such as *Advertisement* or *Editorial*.

GMAT students sometimes confuse the aim of the test makers with the way those aims are executed. We know that the GMAC has an active interest in testing your ability to discern both good and bad reasoning. The makers of the exam intentionally present flawed arguments because they want to test whether you are easily confused or prone to be swayed by illogical arguments. This often raises situations where you are presented with arguments that are false or seemingly deceptive in nature. This does not mean that the *author* of the piece is part of the deception. The role of a GMAT author is simply to present an argument or fact set. GMAT authors (as separated from the test makers) do *not* try to deceive you with lies. Although GMAT authors may end up making claims that are incorrect, this is not done out of a willful intention to deceive. Deception on the *author's* part is too sophisticated for the GMAT—it is beyond the scope of GMAT stimuli, which are too short to have the level of complexity necessary for you to detect deception if it was intended. So, you need not feel as if the author is attempting to trick you in the making of the argument. This is especially true when premises are created. For example, when a GMAT author makes a premise statement such as, “19 percent of all research projects are privately funded,” this statement is likely to be accurate. A GMAT author would not *knowingly* create a false premise, and so, when examining arguments the likelihood is that the premises are not going to be in error and you should not look at them as a likely source of weakness in the argument. This does not mean that authors are infallible. GMAT authors make plenty of errors, but most of those mistakes are errors of reasoning that occur in the process of making the conclusion.

Not only do GMAT authors not attempt to deceive you, they believe (in their GMAT-world way) that the arguments they make are reasonable and solid. *When you read an GMAT argument from the perspective of the author, he or she believes that their argument is sound.* In other words, they do not knowingly make errors of reasoning. This is a fascinating point because it means that GMAT authors, as part of the GMAT world, function as if the points they raise and the conclusions they make have been well-considered and are airtight. This point will be immensely useful when we begin to look at certain forms of reasoning.

Consider the following argument: “My mail was delivered yesterday, so it will also be delivered today.”

Although this argument is flawed (it could be Sunday and the mail will not be delivered), the author has not intentionally made this error. Rather, the author has made the conclusion without realizing that he has committed an error.

Read the Fine Print

One of the aims of the GMAT is to test how closely you read. This is obviously an important skill for anyone in business (who wants an employee who makes a critical mistake in a big negotiation?). One of the ways the GMAT tests whether you have this skill is to probe your knowledge of exactly what the author said. Because of this, you must read all parts of a problem incredibly closely, and you must pay special attention to words that describe the relationships under discussion. For example, if an author concludes, “Therefore, the refinery can achieve a greater operating efficiency,” do not make the mistake of thinking the author implied that greater operating efficiency *will* or *must* be achieved. The GMAT makers love to examine your comprehension of the exact words used by the author, and that leads to the fourth Primary Objective:

Primary Objective #4: Read closely and know precisely what the author said. Do not generalize!

When it comes to relationships, the makers of the GMAT have a wide variety of modifiers in their arsenal. The following are two lists of words that should be noted when they appear, regardless of whether they appear in the premises or conclusion.

These word lists do not require memorization. They are presented to give you a broad idea of the type of words that can take on an added importance in GMAT questions.

Quantity Indicators

all
every
most
many
some
several
few
sole
only
not all
none

Probability Indicators

must
will
always
not always
probably
likely
would
not necessarily
could
rarely
never

Quantity indicators refer to the amount or quantity in the relationship, such as “some people” or “many of the laws.” Probability indicators refer to the likelihood of occurrence, or the obligation present, as in “The Mayor should resign” or “The law will never pass.” Many of the terms fit with negatives to form an opposing idea, for example, “some are not” or “would not.”

Words such as the Quantity and Probability Indicators are critical because they are a ripe area for the GMAT makers to exploit. There are numerous examples of incorrect answer choices that attempt to capitalize on the meaning of a single word in the stimulus, and thus you must commit yourself to a careful examination of every word on the test.