18 LOGICAL REASONING sufficient assumption & supporting principle

In this lesson, we are going to discuss two question types: Sufficient Assumption and Supporting Principle. For these two types of questions, what we want to do is figure out what is wrong, and then search for an answer to *completely* fix the issue. That's what Sufficient Assumption and Supporting Principle questions are asking us to do—find the answer that completely fixes the issues in the argument.

You should expect 2 or 3 Sufficient Assumption questions, and 3 or 4 Supporting Principle questions per exam.

You'll note from the information on the side that these two question types are not that common. The reason we're covering just these two question types here is because we are also going to use this lesson to expand our discussion of **conditional logic**. In fact, we'll start with this. Most Sufficient Assumption questions involve conditional logic, and Sufficient Assumption questions most commonly present the most challenging conditional logic issues.

Conditional logic: We discussed conditional logic rules in Lesson 13. We will be expanding on that discussion in this lesson.

Below are a few simple, flawed arguments. Imagine the gap in between the reasoning and the conclusion as a "hole" that needs to be fixed. What is an answer that would completely fill that hole? Can you perhaps come up with *multiple* ways to state what might fill that hole? Finally, for extra credit, can you perhaps come up with an answer that fills the hole, and then goes slightly above and beyond filling the hole? If you're not quite sure what I mean by that, don't worry about it. We'll discuss it shortly.

fill the hole

Think about the point, the support, and the hole between the two. Try to come up with answers that will completely fill the hole—answers that leave no gap between the support and the point.

Sharon must be great at figuring out mysteries. After all, she is the police chief.

All carnivores eat meat. Therefore, all carnivores eat beef.

Bill is a vegetarian. For that reason, he must hate the taste of meat.

Most Texans own hats. Therefore, some Texans own hat racks.

Conditional Logic 101

In Lesson 13, we introduced and discussed conditional reasoning in terms of four major characteristics:

fill the hole answers

Here are a few of the many ways we could represent the gap fillers:

The police chief is required to be good at figuring out mysteries. • (+A bit more) All police chiefs are great at solving mysteries.

Bill is a vegetarian only if he hates the taste of meat. • (+ A bit more) Every vegetarian hates the taste of meat.

All people who eat meat eat beef.

Every person[a] who owns hats owns a hat rack.

[a] *Can you see why "some people" or "most people" wouldn't fill the gap? Neither would ensure that Texans own hat racks.*

1. contrapositives

Those who are not good at figuring out mysteries cannot be police officers.

Those who do not hate the taste of meat are never vegetarians.

If you don't eat beef, you don't eat any meat at all.

No one without a hat rack owns a hat.

1. Conditional Rules Are Rules That Only Apply Sometimes

To be more specific, they are rules that are set off by a "trigger," more formally known as the *sufficient condition*. Why is it called the sufficient condition? Because it is sufficient, or enough, to guarantee the outcome. Speaking of which, the second characteristic we discussed was...

2. Conditional Statements Represent Guarantees

On the LSAT, "if" is a powerful and absolute word—it represents a guarantee. If the trigger takes effect or, more formally, if the sufficient condition is met, the outcome must result. This idea is fundamental to the make-up of the entire Logical Reasoning section.

It is the "guarantee" part of conditional statements that makes them so important to Logical Reasoning. One way to describe all flawed arguments is to say that they are arguments in which the author *thinks* the support is sufficient, or enough, when in fact it's not.

Notice how we fixed all of the flawed arguments from our "fill the hole" example—we needed to meld the support and premise with some sort of ironclad joint, and that's what a conditional statement provides. Notice that each correct response has a guarantee in it, and that guarantee can be thought of in terms of a trigger and a consequence.

3. Conditional Statements Provide Inferences

All conditional statements provide inferences known as contrapositives, and you can think of the original condition and the contrapositive as two different sides of the same coin. For challenging questions, the test writers will commonly give us our gap fillers in terms of their contrapositives. Consider these four answers[1] we could have gotten instead of the four answers we got above. Do you see that they give us the same information—the guarantee we needed?

4. Conditional Statements Link Up

Remember that there were certain games that had a lot of conditional rules, and when this was the case it was often necessary to link these conditions up in order to answer questions. There are certain Logical Reasoning questions that work this way as well. When you see multiple conditional statements in one stimulus, you know that a part of your job will be to see how these statements link up and how they don't.

Conditional Logic Language

What's mentioned on the left represents all of the major "rules" that you need to know for conditional logic, but that's not all that makes conditional logic on the Logical Reasoning section challenging. In fact, many people would argue that a bigger challenge is consistently interpreting conditional statements correctly.

There are various ways in which the test writers can write conditional relationships. Some of these ways make the relationship obvious, while others don't. In fact, there are certain conditional statements that force everyone, even those who have a wealth of formal logic experience, to stop and have to think carefully. In large part, this is because these conditional statements involve words to which, in real life, we give contextual (that is, not universal or absolute) meaning. "Only if" is a statement we use for different meanings in real life, and that's a big reason that it causes us so much trouble. Another word that similarly causes our brains to get fuzzy is the word "unless."

Let's break down the different ways in which conditional statements can be written, and work on developing a system for thinking about them whenever we are uncertain. We'll start by taking a close-up look at just one conditional statement.

"ALL EMPLOYEES MUST WASH THEIR HANDS."

If one is an employee, one must wash his or her hands.

E ⟶ **W**

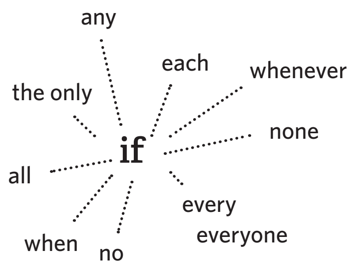
employee — wash

The trigger is known as the "sufficient condition" because it is *enough* to guarantee the outcome. In logic terms, "sufficient" is a powerful word (far more powerful than the word "necessary"). In this case, the word "all" gave us a sense of sufficiency. It tells us that if you have a certain characteristic (are an employee) there is a certain guaranteed result (you have to wash your hands). "If" is the most common word that starts a sufficient condition, but keep in mind that words like "all," "any," and "every," and their negative counterparts "no" and "none," are similar indicators of sufficiency.

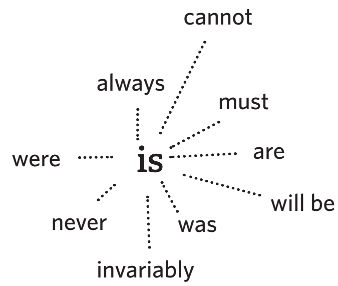
Just like certain words inform us of a sufficient condition, certain other words tell us that there is some sort of guarantee. In this case, the word "must" serves this function—it is absolute and gives us the guarantee. The most basic guarantee word is actually "is," and all its other forms (were, was, will be, etc.). "The car is red" can be thought of in conditional terms—if something is the car, then it is red. Keep in mind that just because one *can* think of a statement in conditional terms doesn't mean one *should*. In most instances, you don't want to think of the word "is" in a conditional sort of way.

Finally, certain words indicate that we have the "result" part of a conditional statement, more formally known as the "necessary consequent." Imagine this sentence rewritten as, "If you are an employee, you need to wash your hands." Note that the "need to" indicates what must be the result of being an employee. Another way to say it would be "Employees are required to wash their hands." In this case, "required to" informs us of what must be the consequence of being an employee.

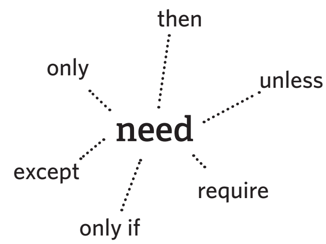
Keep in mind that many conditional statements (such as our example) contain more than one of these conditional markers.



words that indicate sufficiency



words that indicate guarantees



words that indicate a necessary result

translating well

We are going to need to translate conditional statements in the stimuli and in the answer choices. Here's how we want to think through them:

STEP ONE: For the purpose of translating conditional statements, it's best to think of them as **guarantees**. As you read a conditional statement, figure out what the two (or sometimes three) factors at issue are, then think about what the guarantee is in the situation. Does A guarantee B, or does B guarantee A? In most cases, this should help you see clearly the correct way to think about a conditional statement.

STEP TWO: There are two phrases, UNLESS and ONLY IF, that can get us all twisted around no matter how much we practice them. Never fear! A great way to combat these is to memorize a couple of **conditional mantras**. Just fit your difficult phrase into the structure of your mantra, and it should help you see how to translate the statement correctly. The process is modeled in the third example on the side.

conditional mantras

If you have these two phrases memorized, and know how to use them, they can be very helpful in a bind. Of course, you can use any other phrases you want, and come up with mantras for other conditional phrases that you find dizzying. **The key is that the mantras make it clearly obvious to you how you should correctly think about the guarantee.**

"You can't drive **UNLESS** you are at least sixteen" or "**UNLESS** you are at least sixteen, you can't drive." **Drive → ≥ 16**

These above statements do not mean everyone over sixteen can drive.

"He will eat fish **ONLY IF** it is dead" or "**ONLY IF** a fish is dead will he eat it." **Eat → Dead**

These statements do not mean that he'll eat any fish as long as it's dead.

EXAMPLES

"Every American likes television."

Does this guarantee that if you like television, you are American? No. Does it guarantee that if you are American, you like television? Yes.

American → like television

"Getting into the house requires a key."

Does this mean that if you have a key you are guaranteed to get into the house? No. (Maybe you had the wrong key.) Does this mean that if you get into the house you are guaranteed to have had a key? Yes.

Get in → have key

"No act can be seen as altruism unless the person seeing it is himself selfless."

Does this mean that if you see an act as altruistic, you are selfless? Hmmm. Does this mean that if you are selfless, you will see an act as altruistic? Hmmm. Does this mean if you are not selfless, you will not see an act as altruistic? Hmmm. Let's stop there. If you feel like you are turned around enough to possibly make a mistake, consider quickly how the statement relates to your conditional mantra.

We know...	*So...*
"You can't drive unless you are at least sixteen."	"No act can be seen as altruism unless the person seeing it is himself selfless."
is	must be
Drive → at least 16	altruism → selfless

Yes! We nailed it! Having a mantra to structure your thinking can help you when the abstract situation makes jelly out of your internal conditional sense.

Drill: Translating Conditional Statements

Directions: Match the statement to the correct interpretation.

D = DUCK   W = LIKE WATER

D → W, ~~W~~ → ~~D~~   W → D, ~~D~~ → ~~W~~   D → ~~W~~, W → ~~D~~   ~~D~~ → W, ~~W~~ → D

1. All ducks like water.
2. If you like water, you are a duck.
3. No duck doesn't like water.
4. Every animal that likes water is a duck.
5. No duck likes water.
6. Any animal that likes water is not a duck.
7. Unless an animal is a duck, it will not like water.
8. Ducks need to like water.
9. One does not like water only if one is a duck.
10. In order to like water, you must be a duck.

T = TUESDAY   W = GO TO WORK

T → W, ~~W~~ → ~~T~~   W → T, ~~T~~ → ~~W~~   T → ~~W~~, W → ~~T~~   ~~T~~ → W, ~~W~~ → T

1. If it's Tuesday, I'll go to work.
2. I never go to work on Tuesday.
3. I'll go to work only if it's Tuesday.
4. Unless it is Tuesday, I will go to work.
5. I go to work every Tuesday.
6. I only work on Tuesdays.
7. Any day that I am not working is not a Tuesday.
8. If it's not Tuesday, I don't work.
9. All Tuesdays are days I go to work.
10. Any day I go to work is a Tuesday.

A = AMERICAN   C = LOVES CHEESE

A → C, ~~C~~ → ~~A~~   C → A, ~~A~~ → ~~C~~   A → ~~C~~, C → ~~A~~   ~~A~~ → C, ~~C~~ → A

1. Every American loves cheese.
2. Only Americans love cheese.
3. No American loves cheese.
4. Unless you love cheese, you are not American.
5. People love cheese only if they are American.
6. Only those who love cheese are American.
7. Anyone who loves cheese is an American.
8. If you are American, you must love cheese.
9. Loving cheese is required of all Americans.
10. Anyone who is not American loves cheese.

Drill: Translating Conditional Statements

Directions: Match the statement to the correct interpretation.

D = DATE **F = FUNNY**

D → F, ~~F~~ → ~~D~~

F → D, ~~D~~ → ~~F~~

D → ~~F~~, F → ~~D~~

~~D~~ → F, ~~F~~ → D

1. Sarah only dates funny guys.
2. If you are funny, Sarah will date you.
3. Sarah will never date a funny guy.
4. Every guy Sarah dates is not funny.
5. Unless you are funny, Sarah will not date you.
6. All guys that Sarah dates are funny.
7. Sarah will go out with a guy only if he is funny.
8. If Sarah won't date you, that means you are funny.
9. Every funny guy has dated Sarah.
10. No funny guy has ever dated Sarah.

W = WHALE **M = LOVES MUSIC**

W → M, ~~M~~ → ~~W~~

M → W, ~~W~~ → ~~M~~

W → ~~M~~, M → ~~W~~

~~W~~ → M, ~~M~~ → W

1. All whales love music.
2. Only whales truly love music.
3. No whale loves music.
4. One cannot love music unless one is a whale.
5. One cannot be a whale unless one loves music.
6. One can love music only if one is a whale.
7. One can be a whale only if one loves music.
8. Every whale secretly does not love music.
9. All animals other than whales love music.
10. Every music lover is a whale.

solutions note that you may have thought of some of these in terms of their contrapositives

	1	2	3	4	5	6	7	8	9	10
DUCKS & WATER	D → W	W → D	D → W	W → D	D → ~~W~~	W → ~~D~~	W → D	D → W	~~W~~ → D	W → D
TUESDAYS & WORK	T → W	T → ~~W~~	W → T	~~W~~ → T	T → W	W → T	T → W	W → T	T → W	W → T
AMERICANS & CHEESE	A → C	C → A	A → ~~C~~	A → C	C → A	A → C	C → A	A → C	A → C	~~A~~ → C
DATING & FUNNY GUYS	D → F	F → D	F → ~~D~~	D → ~~F~~	D → F	D → F	D → F	~~D~~ → F	F → D	F → ~~D~~
WHALES & MUSIC	W → M	M → W	W → ~~M~~	M → W	W → M	M → W	W → M	W → ~~M~~	~~W~~ → M	M → W

Conditional-Heavy Stimuli

Just like certain games can be dominated by conditional rules, certain Logical Reasoning stimuli can be over-run by conditional logic statements. In most cases, just as in those types of games, the statements in these types of stimuli will link together.

This is only likely to happen in a few types of questions (Sufficient Assumption, Inference, Match the Flaw, and Match the Reasoning, most commonly) and will not happen more than once or twice per exam. However, these can often be some of the more intimidating questions in any Logical Reasoning section.

When you see a conditional-heavy stimulus for a Sufficient Assumption question ("What exactly is a Sufficient Assumption question?" you say! We'll get to that on the next page), what you can expect is that the supporting premises link together in some way to form the conclusion. Well actually, they almost link together. They are missing one link, and the correct answer will fill that link in.

Keep in mind that just because these stimuli have statements that link up does not mean you *have to* link them up. Oftentimes, hopefully most of the time, you will see the missing link without putting all the different pieces together. Other times you'll just simply see the missing link as a flaw in the argument, and not have to think about it in a conditional sense at all.

However, once in a while, there will be a question that will really require some strong linking skills. You want to be able to whip them out when you need them. You already have the ability to recognize and use links from the Logic Games conditional logic lesson. The extra challenge for Logical Reasoning problems, of course, is that you also need to translate these statements and strip them down before you link them.

Below are examples of a more obvious missing link, and a better hidden one. You want to avoid doing the heavy work when you can, but you also want to make sure you feel you can do it when you need to.

Obvious missing link

If you don't sleep, you will be tired. If you are tired, you will be prone to making mistakes. Therefore, if you don't sleep, you will get fired.

Support*: Don't sleep → tired → prone to mistakes*
Conclusion: *Don't sleep → fired*
Whoa, where did we get fired? We can see the gap here without doing too much linking work.
We need: prone to mistakes → fired

Hidden missing link

All the socks have polyester, and Ted is allergic to anything that has polyester. If something makes Ted feel itchy, he won't buy it. Since Ted never pays attention to things he doesn't buy, he won't pay attention to the sock ad.

Support: *sock → poly → allergic ; itchy → won't buy → won't pay attention to ad*
Conclusion: *sock → won't pay attention to ad*
You don't need to think of the conclusion conditionally, though we did here. We know we need all the support to link up to give us the conclusion. The piece we are missing is that if he's allergic, Ted will be itchy. Notice that if we fit that piece in, all the support can be linked to reach the conclusion.
We need: allergic → itchy

Sufficient Assumption

"The conclusion follows logically if which of the following is assumed?"
"Which of the following, if assumed, allows the conclusion to be properly drawn?"

Fill the hole.

When a conclusion to an LSAT argument "follows logically" or can be defined as "properly drawn," it's a big deal, considering the fact that figuring out why conclusions do not follow logically, or are *not* properly drawn, is our primary task for the Logical Reasoning section.

The biggest key to Sufficient Assumption questions is to have a very clear sense of the flaw. These arguments will have specific, clearly defined gaps in reasoning—you wouldn't be able to make the arguments valid with just one statement in one answer choice otherwise. The second biggest key is to stay on task. Attractive wrong answers might strengthen the argument, or provide the argument with something it needs, without filling the hole to the point that the argument becomes valid. The right answer must leave the reasoning in the argument air-tight.

SUPER-SIMPLE EXAMPLE

Sandy has gotten straight As all through high school. Therefore, she will be a valedictorian.

The conclusion follows logically if which one of the following is assumed?

(A) Sandy has been accepted to every college she applied to.
(B) Sandy did not get any grades lower than an A.
(C) It is exceedingly rare for individuals to get all As through high school.
(D) Some valedictorians do not get all As.
(E) If a student gets all As through high school, that person will be named valedictorian.

The correct answer is (E). Certain answers have no direct relation to the stimulus: (A), (C); some have no connection to the point: (B); and some play a different, or unclear, role relative to the reasoning issue: (D). Note that the right answer leaves NO holes in the argument.

step one

understand your job

The question stems for Sufficient Assumption questions are defined by three main characteristics: they have the word "assumption," they almost always phrase that assumption in terms of a condition—"if assumed" (other types of assumption questions almost never have the word "if")—and most importantly, they include some sense that the argument would, with the assumption, be made logical or valid.

It's very important to keep the different Assumption questions clear (which is one of the reasons we are talking about them in different lessons). Basic Assumption, Sufficient Assumption, and Necessary Assumption are asking for different things, and it'll definitely cause you problems if you mix them up in your head.

Once you recognize that it's a Sufficient Assumption question, you should expect two things from the argument: it is more likely than not to have formal reasoning issues (most commonly conditional reasoning), and the argument is going to have one, clearly definable gap in reasoning.

two

find the point

As you go through the argument for the first time, try to get a sense of the overall flow of the reasoning. In particular, pay attention to whether you have a more typical support-to-conclusion relationship (which may be clouded in background and fluff), or a series of supporting premises that are meant to link together. If it's the latter, you know that the gap, or flaw in reasoning, has to do with some sort of missing link in the chain.

All of the above should be done in a fairly cursory way. As always, your primary task during your first read-through is to identify the conclusion. If you notice that it's a complicated argument, you may want to write out the conclusion (perhaps with the → shorthand we've been using in this lesson) in order to have it handy as you break down the support.

three

find the support

As just stated, the support will either be of a more traditional variety (one supporting piece of evidence), or it will come as a series of linking conditions. If it's the former, and it's a difficult question, chances are that there will be a lot of fluff in the argument. It's not unusual to have an argument that takes up seven or eight lines, only to have the last two lines be the only ones that are relevant to the point being made. If it's a series of linking conditions, expect that pretty much everything other than the conclusion will be support. If it's a linking situation, and it's tough to see exactly where the missing link is, you may want to write out the supporting statements.

four
figure out what's wrong

As always, this is *the* step. It's important to remember that the arguments for Sufficient Assumption questions will have one clearly definable hole or flaw. If they didn't—if an argument had multiple holes or a vaguely defined gap in reasoning—they could not create an answer that would be sufficient, or enough, to make the argument logically valid.

Finally, try to keep separate your understanding of what is wrong with the argument—that is, what the hole is in the argument, and how you might go about filling it. For more difficult questions, they may not fill the gap in the way that you might expect—having a sense of the issue, rather than a particular way of fixing it, will help you better adapt in the moment.

five
get rid of answers

The wrong choices are most commonly what determine whether a Sufficient Assumption question is more challenging or less so. Many Sufficient Assumption questions will have four wrong choices that have nothing to do with the argument. If you are diligent about finding the flaw and focusing on why answers are wrong, you can get through some of these questions very quickly. As always, don't try to identify the right answer; carefully evaluate attractive wrong answers. Get rid of answers that are obviously wrong first, then think carefully about the answer choices you are forced to think carefully about.

The hardest Sufficient Assumption questions can have several wrong answer choices that at first glance can seem like they fill the gap. Commonly, these attractive wrong choices match the argument in terms of subject matter, but don't give us the connection that we need in order to validate the conclusion. To illustrate, consider these two sample arguments, and these two sample answers. The first answer validates the first argument because it allows us to use the support to justify the conclusion. The second answer does not validate the second argument because it does not ensure that the conclusion will result (other people could have gotten bonuses too). The most attractive wrong choices for Sufficient Assumption questions commonly tend to work in this way.

Argument 1	Argument 2
Erica earned over $35,000. Therefore, she got a bonus.	**Erica got a bonus. Therefore, she earned over $35,000.**
Sufficient Assumption	*Insufficient* Assumption
Everyone who earned over $35,000 got a bonus.	**Everyone who earned over $35,000 got a bonus.**

Also keep in mind that other attractive wrong answers can help strengthen the argument—sometimes help strengthen it a lot—but that's very different from making the argument valid. The wrong answers can also provide something that needs to be true to reach the conclusion, but doesn't get us all the way to the conclusion (more on this in the next lesson).

six
confirm the right answer

You should be able to see that if you place the answer in between the support and the conclusion, it makes the conclusion one hundred percent justifiable. If it makes the conclusion seem really, really good but somehow not one hundred percent justifiable, there may be something wrong. Keep in mind that the right answer can go above and beyond filling a gap. If, say, we need to know that Manny "makes over $35,000" to get a certain bonus, finding out he makes $50,000 would be more specific than, and above and beyond, what we need to fill the gap, but it would absolutely be the correct answer, because it would be enough (more than enough) to make the conclusion one hundred percent valid.

SAME MEANING/DIFFERENT WORDS

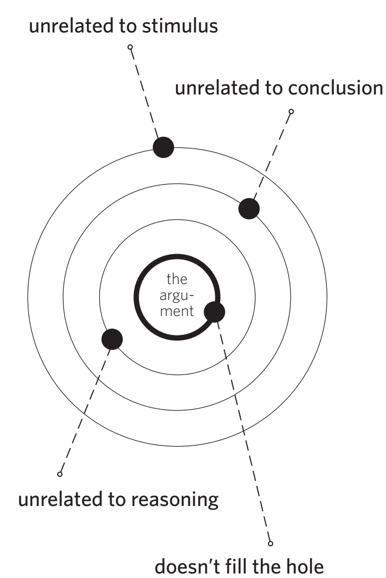
There are many ways of stating the same information, and LSAT writers take advantage of that when they form answer choices. You need to be comfortable understanding statements, particularly conditional statements, in all of their various forms. Consider the following argument, all the ways to fill the gap, and all the ways they could create attractive wrong choices that give us the reverse or negation of what we need.

Argument
Kermit is a frog. Therefore, he loves green.

What will fill the gap?
All frogs love green.
Every frog loves green.
One is a frog only if one loves green.
If you don't love green, you are not a frog.

What won't?
Anything that loves green is a frog.
Everything that loves green is a frog.
One loves green only if one is a frog.
If you are not a frog, you do not love green.

CONSTELLATION OF WRONG ANSWERS



the process in action

Let's model the problem-solving process with two questions you solved at the end of Lesson 16.

2.23. Philosopher: An action is morally right if it would be reasonably expected to increase the aggregate well-being of the people affected by it. An action is morally wrong if and only if it would be reasonably expected to reduce the aggregate well-being of the people affected by it. Thus, actions that would be reasonably expected to leave unchanged the aggregate well-being of the people affected by them are also right.

The philosopher's conclusion follows logically if which one of the following is assumed?

(A) Only wrong actions would be reasonably expected to reduce the aggregate well-being of the people affected by them.
(B) No action is both right and wrong.
(C) Any action that is not morally wrong is morally right.
(D) There are actions that would be reasonably expected to leave unchanged the aggregate well-being of the people affected by them.
(E) Only right actions have good consequences.

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1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need to find an answer that plugs that gap.

2. find the point: The point is that actions expected to leave peoples' well-being unchanged are morally right.

3. find the support: There is actually no support for this! If an action increases well-being, it's morally right. If it decreases it, it's morally wrong. Also, if an action is morally wrong, it decreases well-being.

4. figure out what's wrong: We have no information about actions that leave unchanged people's well-being. We need an answer that connects these types of actions to them being morally right.

5. get rid of answers: (A) is a tempting opposite, but if we are thinking about sufficiency, this doesn't help us prove that the actions mentioned in the conclusion are *morally right.* (B) is strange! Let's leave it. (C) looks good. Our action is not yet morally wrong. If we put (C) in there, our action becomes morally right. Let's leave it. (D) simply shows us our conclusion is a possible situation—that's a long way away from proving it must be so. (E) might be tempting if we over-think it, but in no way does it validate the conclusion.

6. confirm the right answer: On the same note, tough to see how (B) impacts our conclusion—it leaves our conclusion neither right or wrong. (C) does impact our conclusion though, and it's the only answer remaining. Let's walk through it carefully. "Any action that is not morally wrong"—we're told only those actions that make people worse off are morally wrong, so we know for sure that an action that has no +/- is not morally wrong. If we add (C) to the conclusion and support, we get that any action that leaves unchanged the aggregate well-being is not morally wrong, and any action that is not morally wrong is morally right. This is enough to justify the conclusion, and (C) is correct.

3.5. Atrens: An early entomologist observed ants carrying particles to neighboring ant colonies and inferred that the ants were bringing food to their neighbors. Further research, however, revealed that the ants were emptying their own colony's dumping site. Thus, the early entomologist was wrong.

Atrens's conclusion follows logically if which one of the following is assumed?

(A) Ant societies do not interact in all the same ways that human societies interact.
(B) There is only weak evidence for the view that ants have the capacity to make use of objects as gifts.
(C) Ant dumping sites do not contain particles that could be used as food.
(D) The ants to whom the particles were brought never carried the particles into their own colonies.
(E) The entomologist cited retracted his conclusion when it was determined that the particles the ants carried came from their dumping site.

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1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need an answer that plugs that gap.

2. find the point: Ants do not bring food to their neighbors.

3. find the support: Ants dumping their trash.

4. figure out what's wrong: The issue is tough to see at first, but when you separate out the point and the support, it limits what could be wrong in the argument—the author is taking for granted that the trash does not have food. We need to find an answer that proves this is the case.

5. get rid of answers: (A) is the type of answer a strong sense of task can help you eliminate quickly. (B) too. Neither proves anything about food. (C) is exactly what we need. Let's keep it. (D) is unrelated to the point. (E) does not validate the conclusion, for the entomologist could have been wrong in retracting, and whether he retracted his opinion or not has no bearing on what ants actually do.

6. confirm the right answer: (C) is the only answer standing, and seems like a great hole filler. Let's read through it one more time. If (C) is true, then we know for sure that what the ants are taking to their neighbors has no food in it. (C) is correct.

Supporting Principle Questions

Just as Basic Assumption questions are very close siblings of Flaw questions, Supporting Principle questions are very close siblings of Sufficient Assumption questions. Just like sufficient assumptions, supporting principles serve to bridge the gap between the reasoning given and the conclusion reached.

There are a few secondary differences between Supporting Principle questions and Sufficient Assumption questions. The flaws in the arguments for Supporting Principle questions tend to be less absolute and abstract than those in Sufficient Assumption questions, and by the same token the right answers may not always have the same sense of closure. Furthermore, expect that the right answer will generalize beyond what we need to fill the gap—after all, a principle is just a rule that is generalized.

These are differences that ultimately have very little to do with getting to the right answer. The way you want to think about and solve Supporting Principle questions is no different from how you handle Sufficient Assumption questions—find the problem, and look for the one answer that would plug it up.

A question type that is even less common but still very closely related is the **Conform to a Principle question**. You saw an example of this in Lesson 16, and it's written below. The main difference with these questions is that the gaps will be written less as flaws and more as opinions. Your job is still the same—find the hole and plug it.

supporting principle question stems

Here is how a Supporting Principle question is typically phrased:

Which one of the following principles, if valid, most helps to justify the economist's reasoning?

conform to a principle question stems

Here are some ways in which Conform to a Principle questions can be phrased:

The reasoning above most closely conforms to which of the following principles?

Which one of the following propositions is most precisely exemplified by the situation presented above?

Step 1. Understand Your Job
We have to find an argument and figure out the gap between the support and the point. The right answer will plug that gap.

Step 2. Find the Point
Universities should only use open-source software.

Step 3. Find the Support
Open-source software better matches values embodied in academic scholarship, and academic scholarship is central to the mission of schools.

Step 4. Figure Out What's Wrong
Who says the software you use has to match, in some particular way, your value system? What if proprietary software is far more useful and cheaper? In any case, the author is taking for granted they should do something because it matches the values of the university.

Step 5. Get Rid of Answers
(A) matches our "what's wrong" hypothetical, but doesn't match the author's point. Neither does (B). (C) seems like exactly what we need. (D) is close right to the end, but the author's point is not about efficiency. (E) is not directly related to the stimulus.

Step 6. Confirm the Right Answer
That leaves (C) as the only legitimate contender. Notice how nicely (C) fits in between the support and the conclusion. This is the principle that underlies the author's thinking.

3.14. Commentator: In academic scholarship, sources are always cited, and methodology and theoretical assumptions are set out, so as to allow critical study, replication, and expansion of scholarship. In open-source software, the code in which the program is written can be viewed and modified by individual users for their purposes without getting permission from the producer or paying a fee. In contrast, the code of proprietary software is kept secret, and modifications can be made only by the producer, for a fee. This shows that open-source software better matches the values embodied in academic scholarship, and since scholarship is central to the mission of universities, universities should use only open-source software.

The commentator's reasoning most closely conforms to which one of the following principles?

(A) Whatever software tools are most advanced and can achieve the goals of academic scholarship are the ones that should alone be used in universities.
(B) Universities should use the type of software technology that is least expensive, as long as that type of software technology is adequate for the purposes of academic scholarship.
(C) Universities should choose the type of software technology that best matches the values embodied in the activities that are central to the mission of universities.
(D) The form of software technology that best matches the values embodied in the activities that are central to the mission of universities is the form of software technology that is most efficient for universities to use.
(E) A university should not pursue any activity that would block the achievement of the goals of academic scholarship at that university.

26.3.21. The companies that are the prime purchasers of computer software will not buy a software package if the costs of training staff to use it are high, and we know that it is expensive to teach people a software package that demands the memorization of unfamiliar commands. As a result, to be successful, commercial computer software cannot require users to memorize unfamiliar commands.

The conclusion above follows logically if which one of the following is assumed?

(A) If most prime purchasers of computer software buy a software product, that product will be successful.
(B) Commercial computer software that does not require users to memorize unfamiliar commands is no more expensive than software that does.
(C) Commercial computer software will not be successful unless prime purchasers buy it.
(D) If the initial cost of computer software is high, but the cost of training users is low, prime purchasers will still buy that software.
(E) The more difficult it is to learn how to use a piece of software, the more expensive it is to teach a person to use that software.

29.1.19. Arbitrator: The shipping manager admits that he decided to close the old facility on October 14 and to schedule the new facility's opening for October 17, the following Monday. But he also claims that he is not responsible for the business that was lost due to the new facility's failing to open as scheduled. He blames the contractor for not finishing on time, but he too, is to blame, for he was aware of the contractor's typical delays and should have planned for this contingency.

Which one of the following principles underlies the arbitrator's argument?

(A) A manager should take foreseeable problems into account when making decisions.
(B) A manager should be able to depend on contractors to do their jobs promptly.
(C) A manager should see to it that contractors do their jobs promptly.
(D) A manager should be held responsible for mistakes made by those whom the manager directly supervises.
(E) A manager, and only a manager, should be held responsible for a project's failure.

29.1.20. The price of a full-fare coach ticket from Toronto to Dallas on Breezeway Airlines is the same today as it was a year ago, if inflation is taken into account by calculating prices in constant dollars. However, today 90 percent of the Toronto-to-Dallas coach tickets that Breezeway sells are discount tickets and only 10 percent are full-fare tickets, whereas a year ago half were discount tickets and half were full-fare tickets. Therefore, on average, people pay less today in constant dollars for a Breezeway Toronto-to-Dallas coach ticket than they did a year ago.

Which one of the following, if assumed, would allow the conclusion above to be properly drawn?

(A) A Toronto-to-Dallas full-fare coach ticket on Breezeway Airlines provides ticket-holders with a lower level of service today than such a ticket provided a year ago.
(B) A Toronto-to-Dallas discount coach ticket on Breezeway Airlines costs about the same amount in constant dollars today as it did a year ago.
(C) All full-fare coach tickets on Breezeway Airlines cost the same in constant dollars as they did a year ago.
(D) The average number of coach passengers per flight that Breezeway Airlines carries from Toronto to Dallas today is higher than the average number per flight a year ago.
(E) The criteria that Breezeway Airlines uses for permitting passengers to buy discount coach tickets on the Toronto-to-Dallas route are different today than they were a year ago.

31.2.10. If something would have been justifiably regretted if it had occurred, then it is something that one should not have desired in the first place. It follows that many forgone pleasures should not have been desired in the first place.

The conclusion above follows logically if which one of the following is assumed?

(A) One should never regret one's pleasures.
(B) Forgone pleasures that were not desired would not have been justifiably regretted.
(C) Everything that one desires and then regrets not having is a forgone pleasure.
(D) Many forgone pleasures would have been justifiably regretted.
(E) Nothing that one should not have desired in the first place fails to be a pleasure.

Stick to the steps!
1. understand your job
2. find the point
3. find the support
4. figure out what's wrong
5. get rid of answers
6. confirm the right answer

Sufficient Assumption & Supporting Principle Solutions

26.3.21. The companies that are the prime purchasers of computer software will not buy a software package if the costs of training staff to use it are high, and we know that it is expensive to teach people a software package that demands the memorization of unfamiliar commands. As a result, to be successful, commercial computer software cannot require users to memorize unfamiliar commands.

The conclusion above follows logically if which one of the following is assumed?

(A) If most prime purchasers of computer software buy a software product, that product will be successful.
(B) Commercial computer software that does not require users to memorize unfamiliar commands is no more expensive than software that does.
(C) Commercial computer software will not be successful unless prime purchasers buy it.
(D) If the initial cost of computer software is high, but the cost of training users is low, prime purchasers will still buy that software.
(E) The more difficult it is to learn how to use a piece of software, the more expensive it is to teach a person to use that software.

1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need to find an answer that bridges support and conclusion.

2. find the point: The shipping manager is also to blame.

3. find the support: He was aware of the contractor's typical delays and should have planned for this contingency.

4. figure out what's wrong: This argument has a much simpler argument (everything before "he too" is secondary), and a more clearly definable gap (support about being aware and planning, and conclusion is about blame) than the above argument. Note that this isn't as much a flaw (though we can think of it that way) as it is just space between an opinion and reasoning. We need an answer that fills the space—something that connects being aware and needing to plan to being as much to blame.

5. get rid of answers: (A) looks like the type of answer we are looking for—the manager should have "planned for the contingency." Let's leave it. (B) is not the point, and (C) is not a good match for "planned for contingency." (D) gives us "held responsible," which is a great match for blame. Let's leave it. "Only a manager" in (E) makes it clear that this is a not a good match for the arbitrator's point.

6. confirm the right answer: We had two attractive answers—(A) and (D). Let's evaluate them more carefully. (A) talks about what a manager should do, which is a good but not great match for being partly to blame. Looking carefully at (D), it has an even bigger issue—we have no idea if the manager directly supervises the contractor. (D) is definitely wrong, so (A) is close enough and it is correct.

1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need to find an answer that completely fixes the issue.

2. find the point: To be successful, commercial computer software cannot require users to memorize unfamiliar commands.

3. find the support: Expensive to teach people unfamiliar commands, and companies that are prime purchasers won't buy package if costs of training staff to use it are high.

4. figure out what's wrong: This is a very tough issue to spot, and on the real exam this is a situation where you may need to go into the answers without the clear sense of the flaw we normally hope to have. The issue has to do with the modifier "prime"—perhaps the company can be successful even if it doesn't sell to the main purchasers (think Apple computers before they became more mainstream).

5. get rid of answers: (A) is helpful, but doesn't fill any gap in reasoning. (B) is unrelated to the types of expenses being discussed here and so doesn't fill the gap. If you didn't initially recognize the significance of "prime purchasers," maybe you paid more attention to it after you read (C). Let's leave it. (D) hurts the argument. "Difficult to learn" in (E) is irrelevant to our argument.

6. confirm the right answer: (C) is the only attractive answer, and if we fit it into the argument, we can see that it links the support to the conclusion, and connects the two concepts (prime purchases and success) that we needed to connect. The support gave us: need to memorize unfamiliar commands → training expensive → prime purchases won't buy. If we add (C) at the end of that link, it guarantees our conclusion.

29.1.19. Arbitrator: The shipping manager admits that he decided to close the old facility on October 14 and to schedule the new facility's opening for October 17, the following Monday. But he also claims that he is not responsible for the business that was lost due to the new facility's failing to open as scheduled. He blames the contractor for not finishing on time, but he too, is to blame, for he was aware of the contractor's typical delays and should have planned for this contingency.

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29.1.20. The price of a full-fare coach ticket from Toronto to Dallas on Breezeway Airlines is the same today as it was a year ago, if inflation is taken into account by calculating prices in constant dollars. However, today 90 percent of the Toronto-to-Dallas coach tickets that Breezeway sells are discount tickets and only 10 percent are full-fare tickets, whereas a year ago half were discount tickets and half were full-fare tickets. Therefore, on average, people pay less today in constant dollars for a Breezeway Toronto-to-Dallas coach ticket than they did a year ago.

Which one of the following, if assumed, would allow the conclusion above to be properly drawn?

(A) A Toronto-to-Dallas full-fare coach ticket on Breezeway Airlines provides ticket-holders with a lower level of service today than such a ticket provided a year ago.
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(E) The criteria that Breezeway Airlines uses for permitting passengers to buy discount coach tickets on the Toronto-to-Dallas route are different today than they were a year ago.

1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need to find an answer that completely fixes the issue.

2. find the point: On average, people pay less for this ticket than they did a year ago.

3. find the support: Full price same + greater percentage sold at a discount.

4. figure out what's wrong: This is a cleverly written problem and a tough flaw to spot—can you see it? It's unclear how much the discounts are for. If most of the discounts this year are for 5 percent, and most last year were for 50 percent, this reasoning won't support the conclusion.

5. get rid of answers: (A) is irrelevant to the argument. (B) fills the gap we saw—let's leave it. (C) gives more detail about a premise we got, but not in a way that fixes any holes or guarantees an outcome. (D) is irrelevant to the argument. (E) explains why a premise may be true, but does not fix a hole.

6. confirm the right answer: (B) is the only attractive answer. If we know that the discounts are the same, the full prices are the same, and a greater percentage of people are getting the discount, that is enough to guarantee that people are on average paying less.

31.2.10. If something would have been justifiably regretted if it had occurred, then it is something that one should not have desired in the first place. It follows that many forgone pleasures should not have been desired in the first place.

The conclusion above follows logically if which one of the following is assumed?

(A) One should never regret one's pleasures.
(B) Forgone pleasures that were not desired would not have been justifiably regretted.
(C) Everything that one desires and then regrets not having is a forgone pleasure.
(D) Many forgone pleasures would have been justifiably regretted.
(E) Nothing that one should not have desired in the first place fails to be a pleasure.

1. understand your job: We have to find an argument and figure out what's wrong with it. Then we need to find an answer that completely fixes the issue.

2. find the point: Many foregone pleasures should not have been desired in the first place.

3. find the support: If something would have been justifiably regretted if it had occurred, then it is something that one should not have desired in the first place.

4. figure out what's wrong: This argument has a very clearly defined gap—we need an answer that tells us that many foregone pleasures would have been justifiably regretted had they occurred.

5. get rid of answers: (A) is about pleasures had, not forgone pleasures. (A) is irrelevant. (B) gives us the reverse of what we need. (C) helps define the premise but not in a way that bridges the gap to the conclusion. (D) seems like what we need—let's leave it. (E) seems tempting at first, but does not match up with "foregone" pleasures.

6. confirm the right answer: Perhaps you were tempted by either (B) or (E) above—if so, this would be the step in which you try to fit them into the space between support and conclusion. Neither does the work that (D) clearly does. (D) is correct.