Why Care About Formal Logic?

When students start studying for the LSAT they are often surprised that there isn’t a lot to “learn” to be successful on the exam, the way that GRE students often have to re-learn high-school geometry or MCAT students have to re-study organic chemistry. However, there are a few critical skills that most students have not been exposed to; the largest and most important by far is formal logic. Unless they have taken a logic course (often offered through philosophy or mathematics departments), students have probably not learned the formal skills necessary to do well on the exam.

The good news is that the formal logic skills necessary for the LSAT are themselves pretty basic and can be taught quickly. The bad news is that you’ll need to make constant use of those basic skills in challenging questions under the LSAT’s strict time limits.

Conditional logic appears most explicitly in the Logic Games (Analytical Reasoning) section, where many questions simply assume that you have correctly understood the contrapositive of rules and many, many wrong answer choices revolve around the two big fallacies you’ll learn here. However, conditional reasoning is also all over the Logical Reasoning section, particularly the 5-8 most challenging questions in the exam. That being the case, understanding how to work through conditional reasoning is often the difference between students getting an average score and vaulting into the 160’s and 170’s.

How to Use This Guide

This brief, free resource isn’t designed to replace longer LSAT books and certainly does not replace LSAC sample exams. Here’s how we suggest using it:

**If you are just starting on the LSAT** this guide will give you a very effective overview of conditional reasoning and a ton of practice to check your comprehension. Many commercial choices and prepbooks (in our opinion) don’t go into enough depth or provide enough practice on conditional logic; spending a few hours with this guide will give you a great baseline for the rest of your prep.

**If you have done some substantial LSAT studying** this will be a great resource for you to practice your formal logic skills on over 100 short sample problems, before jumping back into LSAC practice exams. In particular, if you find yourself missing lots of questions revolving around conditional statements, plan to go through this guide a few times before you’ve really mastered the content. (As with everything LSAT, it only gets harder when you add in the 35 minute limit).

We hope this resource benefits you in your studies. Good luck!

John Rood

President, Next Step Test Preparation
The goal of this guide is to provide a brief yet complete review of the formal logic that is regularly found on the LSAT. It is broken into four short sections:

① The Logic of Conditionals and the Contrapositive  
② Necessary/Sufficient  
③ Unless/If and Only If  
④ Misc. Formal Logic concepts.

THE LOGIC OF CONDITIONALS AND THE CONTRAPOSITIVE

By far, the most commonly tested type of formal logic on the LSAT is the conditional statement. It is found in abundance in both Logic Games – particularly in grouping games – and in Logical Reasoning. Conditional statements can essentially be boiled down to “if/then” statements, or what must follow from a given condition. We use the following structure when we diagram such statements:

\[ \text{if} \rightarrow \text{then} \]

If you live in Brooklyn, then you live in New York City.
If you live in Brooklyn \( \rightarrow \) then you live in New York City

When actually diagramming these for the test, we’re going to remove the words “if” and “then.” Instead, we’ll remember that the left of the arrow means if, and the right of the arrow means then, yielding:

Live in Brooklyn \( \rightarrow \) Live in New York City

When we formalize a statement in this way, it means that if the left condition is met, then always always always the right condition occurs. The LSAT provides a wealth of these statements, but statements with “maybe” and “probably” that may occur are not ideally diagrammed this way.

We will use this same method that involve negative conditions. We use a \( \sim \) symbol to indicate a negative condition. For example:

“If we move to Queens, then we won’t live in Manhattan” would be diagrammed as:

Queens \( \rightarrow \) \( \sim \) Manhattan

Or

“If I’m not in New England, then I can’t be in Boston”

\( \sim \) New England \( \rightarrow \) \( \sim \) Boston

Key words that indicate a conditional statement: if, all, any, every, none, will, must, requires, only.
The Contrapositive

It’s a neat word. It’s also the only valid inference you can make from a conditional statement. The contrapositive is a logical fact. It is true of every single conditional you face, on the LSAT and in real life, and every single LSAT relentlessly tests whether or not you understand what it is.

So what is it?

The simple explanation is that you “flip and negate” the terms of the conditional.

Brooklyn → New York City

becomes

∼New York City → ∼Brooklyn.

If I live in Brooklyn, I must live in New York City. If I don’t live in New York City, there’s no earthly way that I can live in Brooklyn.

Let us contrapose the other examples that we used. We said “if we move to Queens, then we will not live in Manhattan.” To contrapose that, we would need to flip the terms, and then negate them. Now, before we do, notice that the second term, “then we will not live in Manhattan,” is already negated. In this case – and always, as far as the LSAT is concerned – two negatives = a positive. Negating that term is the same as unnegating it, so in the contrapositive it will become

“If we live in Manhattan, then we did not move to Queens”

Manhattan → ∼Queens.

The final example was “if you’re not in New England, then you’re not in Boston.” Once, again we will flip and negate. Since both of our terms are already negative terms (“not”), then we will effectively unnegate them to

“If you are in Boston, then you are in New England.”

Boston → New England.

Common Fallacies

The contrapositive is a two step process – flip the terms and then (un)negate them. Every single conditional has a valid contrapositive. It’s worth repeating: the contrapositive is the only valid inference you can make from a conditional. The LSAT will attempt to trick you with a few common and invalid inferences. We’ll look at them in more detail, but they can be summarized very quickly: as the contrapositive requires both flipping and (un)negating, incorrect inferences will do only one of these things.

Let’s look at the final example in more detail. “If I’m not in New England, then I’m not in Boston,” which we correctly contraposited to “If I’m in Boston, then I must be in New England.” That contrapositive was both flipped and negated.

The LSAT will frequently present this option as an answer/inference:

“If I’m not in Boston, then I’m not in New England.”

We call this an Incorrect Reversal, as the terms are merely switched and not negated.
Now, it is totally possible that you are not in Boston and also not in New England, but it is only maybe true and not definitely true. Notice that if you are not in New England, there is no earthly way to be in Boston. If you are not Boston, there is are very many ways you could nonetheless be in New England – by being in Burlington, Vermont, for example. A conditional presented in an argument is always always true. Thus, this is an invalid inference.

There’s one other frequently tested fallacy, which is to negate the terms but not to switch them.

“If I’m in New England, then I’m in Boston.”

We call this an **Incorrect Negation**, as the terms are merely negated and not flipped.

Just as in the above case, it is totally possible that you are in New England and also in Boston. It’s also completely possible that you are in New England and NOT in Boston – you could be in Concord, New Hampshire, for example. The conditional needs to be always true, and note that there is no earthly way to be in Boston and not be in New England. Boston → New England.

**And/Or**

So far, we have only covered what might be called “simple conditionals;” that is, conditionals with one if statement and one then statement. Let’s look at what are called “compound conditionals.”

If I am in Washington, DC, then I am not in Virginia and Maryland

\[ \sim \text{Virginia} \]
\[ \text{Washington} \rightarrow \text{AND} \]
\[ \sim \text{Maryland} \]

“If I am in Brazil or Argentina, then I am not in the Northern Hemisphere”

\[ \text{Brazil} \]
\[ \text{OR} \rightarrow \sim \text{Northern Hemisphere}. \]
\[ \text{Argentina} \]

The contrapositive with these conditionals still works in fundamentally the same way – we will still flip and negate every single term. The only new information you need to successfully contrapositive these terms is:

Any AND becomes OR in the contrapositive

Any OR becomes AND in the contrapositive.

“If I am in Washington DC, then I am not in Virginia and I am not in Maryland” becomes: “If I am in Virginia or Maryland, I am not in Washington DC”

\[ \text{Virginia} \]
\[ \text{OR} \rightarrow \sim \text{Washington DC} \]
\[ \text{Maryland} \]

“If I’m in Argentina or Brazil, then I’m not in the Northern Hemisphere” becomes: “If I am in the Northern Hemisphere, then I am not in Brazil and I am not in Argentina.”
Important Note on “Or”: In English, the word “or” has two subtly distinguished meanings. If I am driving and you are giving me directions, you might say “make a left or right up here, it doesn’t matter.” I could make a left or a right, but I could not make both a left and a right. This is called the “exclusive” use of or: one or the other, but not both. If you come over to my house, I might say “would you like anything to eat or drink?” Obviously, you may have something to eat or something to drink OR BOTH, this is what’s called “inclusive” or. On the LSAT, the word “or” always means “inclusive” or, unless it says otherwise. You will occasionally see games with a condition “but not both.” This is the only time the “or” does not mean “one or the other or both.”

Continue On Next Page For Practice Problems
IF/THEN, CONTRAPOSITIVE

Formal Logic Samples
Diagram the following statements. Then diagram their contrapositives.

1. You have won a Grand Slam if you have won at least one of the Wimbledon, the French Open, the US Open, or the Australian Open.

2. If you drive recklessly, you will get into a car accident or trouble with law enforcement.

3. You’re definitely in Australia when you’re in Melbourne.

4. If the play is banned, then the government is not honoring its commitment to free expression.

5. If the temperature continues to rise, humans will need to adapt to a new environment.

6. Kara says that as long as you serve cranberry sauce, it will be a traditional Thanksgiving.

7. If the pandas do not breed, the zoo will soon need to acquire more or close the panda exhibit.

8. I will become the mayor if I receive enough votes and do not become embroiled in a scandal.

9. If the companies merger is successful, they will eclipse their rivals and become the largest entity in the industry.

10. If Jane gets a cat, she will need to buy a litter box as well.

11. David will be promoted if he finishes the project and gets positive feedback from his clients.

12. If the team wins tomorrow, then they’ll be in the finals.
13. If we go anywhere tonight, it will be to the cinema.

14. We’ll take the highway if we can afford the tolls.

15. I’m definitely coming to your party if my parents let me and I finish my homework.

16. Parking isn’t frustrating if you have a lot of patience.

17. The goal will be allowed to stand if the player was not offside.

18. If anyone vetoes the resolution, then it will not reach the general assembly.

19. You would only say he won the debate if you already agreed with him.

20. If you can hear this whistle, then you are a dog.

21. The ports around the gulf will flourish if we can coordinate the shipping of these luxury goods.

22. Harry has deleted all of the phone numbers of his exes.

23. If you have a US passport, then you have a blue passport.

24. Every car of the new model will be recalled.

25. Every photograph in this collection is in black and white.
SOLUTIONS

1. W or AmO or FO or AuO → Grand Slam || ~Grand Slam → ~W and ~AmO and ~FO and ~AuO

2. Drive Recklessly → Car Accident or Law Enforcement || ~Car Accident and ~Law Enforcement → ~Drive Recklessly

3. Melbourne → Australia || ~Australia → ~Melbourne

4. Banned → ~Not Honoring || Honoring → ~Not Banned

5. Rise → Adapt || ~Adapt → ~Rise

6. Cranberry Sauce → Proper Thanksgiving || ~Proper Thanksgiving → ~Cranberry Sauce

7. ~Breed → Acquire More or Close Exhibit || ~Acquire More and ~Close Exhibit → Breed

8. Enough Votes and ~Scandal → Mayor || ~Mayor → ~Enough Votes or Scandal

9. Successful → Eclipse Rival and Become Largest || ~Eclipse Rivals or ~Become Largest → ~Successful

10. Cat → Litter Box || ~Litter Box → ~Cat

11. Finish Project and Positive Feedback → Promoted || Promoted → ~Finish Project or ~Positive Feedback

12. Win → Finals || Finals → ~Win

13. Go → Cinema || ~Cinema → ~Go

14. Afford Tolls → Take Highway || ~Take Highway → ~Afford Tolls

15. Parents Let Me and Finish Homework → Party || ~Party → ~Parents Let Me or ~Finish Homework

16. Patience → ~Frustrating || Frustrating → ~Patience

17. ~Offside → Goal Stands || ~Goal Stands → Offside

18. Veto → ~General Assembly || General Assembly → ~Veto

19. Agree → Won Debate || ~Won Debate → ~Agree

20. Hear → Dog || ~Dog → ~Hear

21. Coordinate Shipping → Ports Flourish || ~Ports Flourish → ~Coordinate Shipping

22. Ex → Number Deleted || ~Number Deleted → ~Ex

23. US Passport → Blue Passport || ~Blue Passport → ~US Passport

24. New Model → Recalled || ~Recalled → ~New Model

25. Photograph in Collection → Black and White || ~Black and White → In Collection
NECESSARY/SUFFICIENT

We’ve talked already about basic “if/then” conditionals, which we diagrammed as

If → Then

And if we think the conditionals we talked about in the last section, we might called them all SUFFICIENT conditions. In the example:

Brooklyn → New York City

being in Brooklyn is SUFFICIENT for being in New York City. Do you need to be in Brooklyn in order to be in New York City? Of course not! New York City is very large and Brooklyn is only one part of it. However, it is necessary to be in New York City in order to be in Brooklyn. So another way of looking at a normal if/then conditional is

Sufficient → Necessary

In this way, you can explain a conditional as “if the sufficient condition is met, the necessary term follows,” and the contrapositive as “If you lack the necessary component, then you lack the sufficient condition.”

∼New York City → ∼Brooklyn.

Consider the following two examples

**Student M:** If I get an A on tomorrow’s midterm, then I am sure to get a B in the class. I can literally not do a single homework assignment for the rest of the semester and skip the final, and I’ll still get a B.

**Student N:** The only way I can possibly pass the class is if I get an A on the midterm tomorrow.

What’s the difference here? For Student M, an A on the midterm is sufficient for a B. No matter what, if student M gets an A on the midterm, she will get a B in the class. For Student N, on the other hand, an A on the midterm is necessary. Student N could still fail the class even if she gets an A – it is necessary for her, and, as such, if she does not receive an A, she will fail.

**Sufficient Conditions are not necessary:** For Student M, an A is enough alone to get a B in the class. We may write:

A on midterm → B.

But an A on the midterm is probably not necessary. Student M could still receive a B in the class in another way – by acing the final for example. The only inference we can make here is that if student M does not achieve a B or higher in the class, then she must have not gotten an A on the midterm.

**Necessary Conditions are not sufficient:** Even if Student N gets an A on the midterm, her success in the course is not guaranteed – she could still fail the final, for example. Because the absence of this condition is sufficient for failure, success implies the presence of the condition.

∼Doesn’t Fail the Course → A on Midterm

∼A on Midterm → Fails the Course.

The LSAT invariably tests the relationship between necessary and sufficient, and you will frequently see it in the answer choices of flaw and method of argument questions. Further, you’re implicitly tested on necessary/sufficient conditions throughout the LR section.
If v. Only If: We talked about “if/then” statements in the previous section, but there’s a giant exception to the rule

If $\rightarrow$ Then

That exception is an “only if” statement. Typically, any “if” statement suggests a sufficient condition (“if it rains, the picnic is canceled” means rain is sufficient to cancel the picnic. Many things could cancel the picnic – nuclear fallout for example – but we know one of them, for sure, is rain.) “Only if” suggests a necessary condition. (“The picnic is canceled only if it rains” means that even in the event of nuclear fallout, we’re still having a picnic, unless it also rains). You can think about Only If statements, as regards diagrams, as follows:

[Rest of Statement] $\rightarrow$ Only If

Any “Only If” statement is effectively a sign that says “put this to the right of the arrow.”

Any “if” statement without the word “only” is a sign that says “put this to the left of the arrow.”

Key Words Indicating Sufficient Conditions: “If,” Enough, Any, All, Every, None, When

Key Words Indicating Necessary Conditions: “only if,” only, must, requires, prerequisite, “cannot without”

Continue On Next Page For Practice Problems
Diagram each statement below, then diagram each statement's Contrapositive.

1. Your trash will be collected only if you bring it to the curb.  
2. A proper cake requires that you include eggs and sugar among your ingredients.  
3. If you pay off your loans, your credit score will improve.  
4. If it fits, you must acquit.  
5. In order to be hired for this job you need at least 2 years of experience.  
6. Svetta would sleep better if she had a comfortable mattress....  
7. But you would sleep better only if you had a comfortable mattress.  
8. You can remove wrinkles from your clothes if you iron or steam them.  
9. History would be greatly changed if it were discovered that Alexander was poisoned.  
10. You must have a necessary condition if you have a sufficient condition.  
11. You need to bring a valid government ID with you when you take the LSAT.  
12. In order for me to agree that creature is a parrot, I must also agree that creature is a bird.
13. With very few exceptions, you must wear clothes when you appear in public.

14. If the cat keeps meowing, then either its hungry or it wants to play.

15. Brenda can practice law as a profession only if she passes the bar.

16. If Michel drinks this coffee, he’ll be up all night.

17. Brett will lose weight only if he stops eating so much sugar.

18. You shouldn’t come to Leslie’s party if you’re allergic to dogs or afraid of heights.

19. Melissa will be home before 9pm only if she has quit her job or been fired.

20. If you heard it from Paul, then you’ll have to find a second source.
Solutions

Necessary/Sufficient Solutions || Contrapositives

1. Collected → At Curb || ~At Curb → ~Collected

2. Proper Cake → Eggs and Sugar || ~Eggs or ~Sugar → ~Proper Cake

3. Pay Loans → Score Improves || ~Score Improves → ~Pay Loans

4. Fits → Acquit || ~Acquit → ~Fit

5. Hired → 2 years of experience || ~2 years experience → ~Hired


7. You Sleep Better → Comfortable Mattress || ~Comfortable Mattress → ~You Sleep Better

8. Iron or Steam → Remove Wrinkles || ~Remove Wrinkles → ~Iron and ~Steam

9. Poisoned → Greatly Changed || ~Greatly Changed → ~Poisoned

10. Sufficient → Necessary || ~Necessary → ~Sufficient

11. LSAT → Valid ID || ~Valid ID → ~LSAT

12. Parrot → Bird || ~Bird → ~Parrot

13. Public → Wear Clothes || ~Wear Clothes → ~Public

14. Meowing → Hungry or Wants to Play || ~Hungry and ~Wants to Play → ~Meowing

15. Practice Law → Passed Bar || ~Pass Bar → ~Practice Law

16. Coffee → Up All Night || ~Up All Night → ~Coffee

17. Lose Weight → ~Eat Sugar || Eats Sugar → ~Lose Weight

18. Allergic To Dogs or Afraid of Heights → ~Come || Come → ~Allergic and ~Afraid

19. Home before 9pm → Quit or Fired || ~Quit and ~Fired → ~Home before 9pm

UNLESS/IF AND ONLY IF

We'll now move into two concepts that are less frequently tested on the LSAT, though can be among the trickiest.

If and Only If: this may implicitly make sense to you if you’ve been following along from the previous chapter. Remember “if” statements and “only if” statements are crucially different on the LSAT: an “if” statement means it is sufficient and goes to the left of the arrow; an “only if” statement means it is necessary and goes to the right of the arrow. A statement that reads “if and only if” indicates both a necessary and a sufficient condition.

Let’s say you are the member of a really low-quality sportsteam and you’re about to face professionals. There is literally no hope that you will win this game unless the other team forfeits. Of course, the opponent forfeiting is a sufficient condition for victory, but in this case, it’s also necessary that they forfeit – otherwise, you have no chance at all. One way of diagramming this would be

\[ \text{Forfeit} \rightarrow \text{Victory} \]
\[ \text{Victory} \rightarrow \text{Forfeit}. \]

But this is two statements, and we can do the same job with one. Since either condition (Victory and Forfeit) is sufficient for the other, we can instead write:

\[ \text{Victory} \leftrightarrow \text{Forfeit}. \]

The contrapositive is hopefully intuitive at this stage.

\[ \sim \text{Victory} \leftrightarrow \sim \text{Forfeit} \]

If we don’t win, then they didn’t forfeit. If they didn’t forfeit, we don’t win.

You will occasionally see “if and only if” written on the LSAT, but it’s somewhat rare. More commonly, you’ll see a pair of rules in a logic game that read something like:

\[ \text{If John is on the team, then Rich is not.} \quad (J \rightarrow \sim R) \]
\[ \text{If Rich is not on the team, then John is on the team} \quad (R \rightarrow \sim J) \]

We would then write these conditions and find their contrapositives. Altogether we would have

\[ J \rightarrow \sim R \quad | \quad R \rightarrow \sim J \]
\[ \sim R \rightarrow \sim J \quad | \quad \sim J \rightarrow R \]

You can see that the necessary conditions in the left set switch places, allowing us to rewrite this conditional as:

\[ J \leftrightarrow \sim R \]
\[ R \leftrightarrow \sim J \]

No matter what, one of Rich and John is on the team and one of them is off of it.
Unless:

Some of the trickiest conditionals on the test involve the word “unless;” yet somehow, most English-speakers can operate conditionals in every day life using this word flawlessly. Here are step-by-step instructions on how to diagram “unless”

1. Take whatever term follows the “unless” and put it to the right of the arrow
2. Take the rest of the conditional and put it to the left of the arrow
3. Negate (or Un-negate) the term on the left.

Let’s do two together:

Unless I’m mistaken, that painting was not here last time.

1. [other term] → I’m Mistaken
2. That Painting Was Not Here → I’m Mistaken
3. That Painting Was Here → I’m mistaken

In step 3, you can see the sensible conclusion – if that painting were here, then I would be mistaken. We can then infer the contrapositive: if I’m not mistaken, then the painting was not here. Let’s look at one more.

We’ll all die in this boat unless a miracle occurs

1. [other term] → Miracle Occurs
2. We’ll Die in This Boat → Miracle Occurs
3. ~We die in this boat → Miracle

From that, we can infer the contrapositive: if there’s no miracle, we’ll die in this boat.

Continue On Next Page For Practice Problems
UNLESS/IF AND ONLY IF

Diagram the following conditionals using the methods outlined above. Be sure to diagram contrapositives.

1. Any tautology is and must be a tautology.
2. Unless this traffic relents, I’m never getting home.
3. Andy will go on to great things unless he gives up on himself.
4. We’ll lose everything unless we work together.
5. The market can sustain the hit if and only if drastic action is taken.
6. Unless an unless statement is free-standing, you can diagram it using the standard formula.
7. I’m going to borrow your headphones unless I can find mine.
8. I’m going to borrow your headphones if and only if I can’t find mine.
9. Yushu’s going to the library unless her mom gives her more chores.
10. Unless she aced this test, Kaya will get a B in the class.
11. Phil will win Employee of the Month if he settles this case, and that’s the only way he can win it.
12. Unless he quits his job or gets promoted, Eli will never be happy.
13. Their business model is unsustainable unless they can find a way to reduce expenses.
14. We’re going to choose Emily to sublet the apartment if and only if she is nice and responsible.
15. I won’t eat any of Mike’s boiled peanuts unless he offers them to me.

Continue On Next Page For Solutions
Solutions
Unless/If and Only If Solutions

1. Tautology ↔ Tautology | | ~Tautology ↔ ~Tautology

2. Get Home → Traffic Relented | | ~Traffic Relented → ~Get Home

3. ~Do Great Things → Gave Up | | ~Give Up → Do Great Things

4. ~Lose Everything → Work Together | | ~Work Together → Lose Everything

5. Sustains Hit ↔ Drastic Action | | ~Sustain Hit ↔ ~Drastic Action


7. ~Borrow Yours → Found Mine | | ~Found Mine → Borrow Yours

8. Borrow Yours ↔ ~Found Mine | | ~Borrow Yours ↔ Found Mine

9. ~Go to Library → More Chores | | ~More Chores → Go to Library

10. Gets a B → ~Ace the Test | | Ace the Test → ~Get a B

11. Win Employee of the Month ↔ Settle Case | | ~Win ↔ ~Doesn’t Settle

12. Happy → Quit Job or Got Promoted | | ~Quit Job and ~Get Promoted → ~Happy

13. ~Unsustainable → Reduce Expenses | | ~Reduce Expenses → Unsustainable

14. Nice and Responsible ↔ Sublet | | ~Nice or ~Responsible ↔ ~Sublet

15. Eat Peanuts → Offered | | ~Offered → ~Eat Peanuts
FORMAL LOGIC.

In LR, formal logic questions are questions which involve a long series of claims about the relationships among various groups. Writing out complex formal arguments takes time, so for most students it makes sense to save questions involving complex arguments for the end of the section and work on easier problems first.

Example: All chickens are birds, and most birds are diurnal. Some diurnal creatures hibernate during the winter, but not all hibernating creatures are diurnal.

Many students find these questions quite challenging; they involve a complex set of relationships which are almost impossible to keep track of mentally. However, with the diagramming techniques we’ll cover below, you’ll be able to simplify these arguments and answer questions on them correctly.

Understanding these relationships starts with understanding the basic terminology and how the LSAT uses these words.

All: Every single one. No exceptions. All dogs are mammals. All people in Brooklyn are in New York City.

Note that for the purposes of diagramming conditional statements, the word “all” is synonymous with “if.” All dogs are mammals = Dog → Mammal.

Most: More than half, so anywhere from 50.1%- to 100%. Most people in the US live in urban areas. Most dogs have four legs. Most dogs are mammals.

That last example is a little weird and merits a comment. In normal conversational English, when we say “most,” we mean 50.1%-99%, not 100%. For example, if you said, “well, I like most of my family members,” you would be strongly implying that you don’t like a few jerks in the group. But the LSAT doesn’t do that. On the LSAT, “most” means more than half and as many as all. So it’s weird but technically correct to say, “It is true that all dogs are mammals. It is also true that most dogs are mammals.

Some: At least one, so anywhere from 0.1%-100%. Some LSAT tutors work for NextStep, Some US presidents were named Abraham Lincoln. Some dogs are mammals.

Again, note that the comment above about “most” also applies to “some.” The LSAT is very technical! The word “some” means “at least one and as many as all.” So as long as there is one dog in the world that is also a mammal, it is a true sentence to say “Some dogs are not mammals.”

None: Not a single one. No dogs are reptiles. No women have (as of 2015) been a US president. No reptiles are dogs. No chimpanzee has walked on the moon.

Again, note that “none” statements can also be turned into conditional statements. “None of the people in this room are my friends.” Friend → ~In Room

Negations

The LSAT will expect us to be comfortable with the opposite of each of these terms. Again, how the LSAT uses language here isn’t how conversational English works. We’ve got to be sure to read and think in the hyper-picky, technical way the LSAT is written.

Not All: Not every single one, so there’s at least one exception. Not 100%. So anywhere from 0% to 99.9% Not all states in the contiguous 48 states. Not all US presidents served more than a month. Not all humans are female. Not all dogs are reptiles.
Just a quick comment about those examples: you can correctly use “not all” to indicate “none.” 0% of dogs are reptiles. So it sounds weird but is correct to assert “Not all dogs are reptiles.” You can use “not all” to indicate 49% or 51% of the group (human females and human males, respectively). Finally you can use “not all” to indicate that there was only one exception ever: William Henry Harrison was only president for one month.

**Not Most:** Not more than half, so 0-50%. It’s not true that most dogs are reptiles. It’s not true that most cars are made by Toyota. It’s not true that most humans are female.

**Not Some:** None. None at all. Not even one. 0%. Just as we described “none” above.

The counter-intuitive thing here is this: “all” and “none” are NOT OPPOSITES. On the LSAT, “some” and “none” are opposites, because they mean “there is at least one” and “there is not even one,” respectively.

“All” and “Not All” are opposites because they mean “Every single one, no exceptions” and “There is at least one exception,” respectively.

**DIAGRAMMING “SOME” AND “MOST”**

Statement: Some US presidents were named George.
Notation: Some P are G
Alternate Notation: P some G.

Statement: Most Dogs have four legs
Notation: Most D are 4
Alternate Notation: D most 4

Statement: Among the members of this club, some are women.
Notation: Some CM are W
Alternate Notation: CM some W

Statement: Of the cars on this lot most are foreign imports
Notation: Most CL are FI
Alternate: CL most FI

Note that we do not use the arrow → for these statements. We reserve the arrow solely for the if-then relationship in which we definitely know that the “if” always leads to the “then.” Our notation here is just a very short abbreviation of the original sentence. Look at the last example. We know most cars on the lot are foreign, but since this leaves open the possibility that some of the cars are not foreign, it would be inappropriate to write CL → FI

**Deductions and Reversability**

It’s critically important that we avoid making incorrect deductions on the basis of these statements. Under the time pressure of Test Day, it is too easy to slip up. Be sure to memorize these rules.

First the words “all” and “none” function just like the if-then statements we’ve already seen. So you can form the contrapositive as a valid deduction.
The words “some” and “most” are a bit trickier.

“Most of my friends play basketball”

F most B

Valid deduction:

F some B
B some F

NOT VALID: B most F.

Here, you can see that if most of my friends play basketball (F most B), it’s totally valid to also say “Some of my friends play basketball.” It’s also fair to say that some people (at least one) who play basketball are my friends. While it’s technically possible that most people who play basketball are my friends, it’s an unknown, a “maybe,” – thus it is considered “invalid.”

Some LSAT tutors work for NextStep

LT some NSTP

VALID Deduction:
NSTP Tutors some LT

Some LSAT tutors work for NextStep has only one valid deduction: some NextStep employees tutor LSAT. There are no other valid deductions from a some statement.

Continue On Next Page For Practice Problems
Many of these contain flaws in reasoning. Spotting them is optional, diagramming them is not.

1. If you want to buy coffee in town, you have a lot of options. Some of the coffeehouses are spacious, but all of them are expensive. Any expensive coffee house serves high quality coffee, and most have fireplaces.

2. Most of the male horses on this farm are geldings. If a male horse is not a gelding, then we use it for breeding. Any male horse used for breeding is given more pasture space due to its temperamental nature. All the horses are given some pasture space.

3. None of the candidates are discussing the issues that are important to Hoch, but some of them at least say sensible things, and Hoch will only vote for a candidate whom he thinks says sensible things. Hoch will certainly vote, so therefore he will vote for Lisa.

4. All of my roommates have been nice, but some of them I didn’t get along with. Not most of my roommates had facial hair, but any room mate that did was considerate. All my best roommates have been considerate, though not all of my bearded roommates were among the best roommates I’ve had.

5. Every player on this team tries her hardest, and no player on this team is a coward. Some of the players who try their hardest are carpooling, and any player who is carpooling lives on the north side of town. None of the players live on the south side of town, so no one who lives on the south side of town tries their hardest.

6. Most catfoods are made primarily of cornmeal, and no cat wants to eat corn. If a cat food is not made primarily out of cornmeal, it is more expensive than most catfoods that are made out of cornmeal. For whatever reason, some catfoods made out of cornmeal are equally priced or more expensive than many that are made out of meat.
7. Not all of our silverware is high quality, and any silverware of less than high quality we use for regular and unspecial meals. Any silverware used, regardless of quality, will be washed after a meal, but only high-quality silverware will be hand-washed, while any silverware of less than high quality will be put in the dishwasher.

9. Not all members of the panel are equally qualified, but some of the members of the panel are equally qualified. Some of the members of the panel are from Toronto. Danielle is the most qualified member of the panel and is not from Toronto. It follows that any person on the panel who is from Toronto is less qualified than Danielle.

8. Anyone who has succeeded in public school knows how to follow instructions, and following instructions is an important part of being a member of a team. Most of the people on my team went to public school; therefore, most of the people on my team know how to follow instructions.

10. In order to win a beauty pageant, a contestant needs to be far more than beautiful; they also need to have abilities in performance, particularly in rhetoric and posture. Mark is beautiful and excels in rhetoric and posture. Therefore, Mark will win the beauty pageant.

Continue On Next Page For Solutions
Solutions

1. Coffee → Options, Coffeeshouses some Spacious, Coffee House → Expensive, Coffeehouse and Expensive → High Quality Coffee, Coffeeshouses most Fireplaces

2. Male Horses most Geldings, Male Horse and ∼Gelding → Breeding, Male Horse and Breeding → More Pasture Space and Temperamental Nature, Horse → Some Pasture Space

3. Candidate → ∼Discussing Hoch’s issues, Candidates some Sensible Things, Hoch Votes → Sensible Things, Hoch → Vote; therefore Hoch will vote for Lisa. (Extra Credit Assumption: Lisa is the only candidate who says sensible things)

4. Roommate → Nice, Roommates some ∼Get Along With. Roommates not most Facial Hair, Roommate and Facial Hair → Considerate, Best Roommate → Considerate, Bearded not all Best

5. On Team → Tries Hardest, On Team → ∼Coward, Tries Hardest some Carpooling, Player and Carpooling → Live on North Side, Player → ∼South Side, therefore South Side → ∼Try their hardest (Extra Credit assumption: The only people who try their hardest are on the team)

6. Catfoods most Cornmeal, Cat → ∼Want Corn, Catfood and ∼Cornmeal most More Expensive, Catfood and Cornmeal some As or More Expensive

7. Silverware not all High Quality, ∼High Quality → Regular, Unspecial Meals, Silverware and Used → Washed, Handwashed → HQ Silverware, Silverware and ∼High Quality → Dishwasher.

8. Succeed in Public School → Follow Instructions, On Team most Public School, therefore On Team most Follow instructions (extra credit assumption: the people on my team who went to public school succeeded there)

9. Members of Panel not all Equally Qualified, Members of Panel some Equally Qualified, Members of Panel some Toronto, Danielle → Most Qualified and ∼Toronto, therefore Member of Panel and Toronto → Less qualified than Danielle.

10. Win Beauty Pageant → Ability in Rhetoric and Posture, Mark → Beautiful and Ability in Rhetoric in Posture, therefore Mark → Win BP (Extra Credit Flaw: Mistakes necessary for sufficient).