Getting Started

Is this the right book for you?

If you want to improve your score on the games, this is the book for you. If you are new to the LSAT, this book will help you build a solid foundation of skills and supply all the practice games you need to excel. If you have already begun studying for the LSAT, this book will fill in the gaps in your skills and move you to the next level.

This book prepares you for the logic games section of the LSAT. You will need other books to prepare for the logical reasoning and reading comprehension sections. To prepare for those sections, we suggest “The Next 10 Actual Official LSAT PrepTests” and a companion book, “LSAT Explained: Unofficial Explanations for ‘The Next 10 LSATs’”.

How this book is organized

The first part of this book assumes that you have little or no prior knowledge of the games. It shows you the types of games and the answering techniques for each type. The second part contains 14 full games sections (a total of 56 games) with detailed explanations. Practicing with these games will help you master the skills taught in the first part of the book. The third part of the book contains the games sections from the two most recent LSATs (a total of eight games), also with full explanations. After you complete the eight most recent games, you can be confident that you will dominate the games on your LSAT.

A brief overview of the LSAT

You probably have already done some research on the LSAT, but if you haven’t, then all you need to know for now is that the LSAT has 100-101 questions. Of the 100-101 questions, 22-24 are games questions. Even though the games section represents less than a quarter of the points on the test, it is the section where students can dramatically improve their score in the shortest period of time. In terms of your preparation efforts,
the games play a much bigger role than the small number of questions would seem to warrant.

**How do you find the correct answer to any games question?**

For most questions, the fastest way to find the correct answer is to use a diagram. Diagrams organize the information. After organizing the information, you make additional conclusions and add them to the diagram. These additional conclusions are what the questions are really testing. Even though diagramming is the primary technique, it is not the only way to find the correct answer. This book will show you when and how to use shortcuts that allow you to skip the diagramming step.

**How to use this book**

The authors of this book know that students learn by doing games, not by reading about games. By practicing, and yes, by making mistakes, you will learn how to use the techniques and how to avoid common pitfalls. You should plan to complete this entire book. Year after year, the highest-scoring students tell us that they completed the entire book. If you have already done a great deal of games work and simply want practice questions, you may choose to skip the introductory sections, although it never hurts to review the concepts.

**Now it is time to get started**

You will start by doing a game that provides context for the techniques and concepts that will be introduced later. You need 8 minutes and 45 seconds of uninterrupted test-taking time. As you work on this game, don’t worry if you feel completely bewildered and get few, or even no, correct answers. Even students who do poorly on the first game can go on to earn excellent scores. If this is your first game ever, you probably will not finish in the allotted time. Don’t worry; you will have a chance later to try this game again. For now, just consider this game to be an introduction. Begin when you are ready.

Note – Use a pencil when taking the tests. You are required to use a pencil when taking the LSAT, so become accustomed to doing so now.

Note – The formatting of the games in this book may appear unusual at first. For example, the following page begins with question 7. To ensure that you get the most effective preparation, the games in this book are designed to be as realistic as possible. The games have authentic formatting and instructions. The pages containing games are not numbered, nor do they have any formatting or text that does not appear on the LSAT.
Questions 7–13

Six airplanes—R, S, T, U, W, and X—must land at an airport that has one runway. The airplanes must land one at a time and all the planes must land at the airport. The order that the airplanes land must adhere to the following rules:

T lands earlier than R.
U lands earlier than R and later than X.
W lands immediately before or after T lands.

7. Which one of the following could be an accurate matching of airplanes to landing times?
   (A) First: W; second: S; sixth: R
   (B) Second: U; fourth: S; fifth: W
   (C) Third: U; fourth: S; sixth: R
   (D) Second: X; fourth: T; fifth: U
   (E) First: W; third: U; fourth: R

8. If X lands second, then which one of the following must be true?
   (A) U lands third.
   (B) S lands third.
   (C) T lands first.
   (D) U lands fifth.
   (E) R lands sixth.

9. If X lands third, then each of the following could be true EXCEPT:
   (A) S lands fifth.
   (B) U lands fourth.
   (C) R lands fourth.
   (D) T lands second.
   (E) W lands second.

10. Which one of the following CANNOT be true?
    (A) T lands fourth.
    (B) R lands fourth.
    (C) W lands fourth.
    (D) S lands sixth.
    (E) X lands fourth.

11. Which one of the following is a complete and accurate list of the times that U can land?
    (A) first, second, third
    (B) first, third, fourth, fifth
    (C) second, third, fourth, fifth
    (D) second, third, fourth, fifth, sixth
    (E) third, fourth, fifth

12. If U lands later than T, then the latest W can land is:
    (A) first
    (B) second
    (C) third
    (D) fourth
    (E) fifth

13. Suppose the rule that W lands immediately before or after T is replaced by the rule that the landings of W and T are separated by exactly one other landing. If the other rules remain unchanged, then the latest X can land is:
    (A) first
    (B) second
    (C) third
    (D) fourth
    (E) fifth

GO ON TO THE NEXT PAGE.
Answer Key:

Answer Key

7. D
8. E
9. C
10. B
11. C
12. D
13. D
Moving Forward

How did you do?

Most students answer only one or two questions correctly on their first logic game; some get no correct answers. Does that mean they cannot do well on the LSAT? No, it does not. Students don’t do well at first because games are complex and unfamiliar. You wouldn’t expect to ride a bike on your first attempt, so don’t expect to excel at something that is just as complex and requires just as much practice. But, once you learned to ride a bike, the skill became instinctual. The same is true of the games. It is difficult to get up and pedaling; but once you do, it becomes second nature.

Even someone who is a “natural” at the games must still practice to get a top score. Even after that person has practiced many games, they will occasionally miss a question because the time limits simply don’t allow one to exhaustively work every question, so errors do happen. Take comfort in the fact that scoring well on the LSAT requires excellence, but not perfection.

Overview of a game

Now that you have seen a game it is time to review some basic information. Every game has three parts: the setup, the rules, and the questions.

The setup paragraph introduces the “story”. In this game the setup begins, “Six airplanes...”. The setup provides clues to determine what kind of diagram to use. The setup always contains the names of the members. Here the names are, “R, S, T, U, W, and X.” Sometimes, like here, the names are single letters. Other times the names are full words, usually people’s names. When the names are full words, you should abbreviate them. The names are always listed in alphabetical order, and each name has a different first letter. This is helpful because it eliminates the possibility you will confuse two members when abbreviating their names.

The rules are listed below the setup paragraph. The first rule of this game is, “T lands earlier than R.” All games have three to six rules. The types of rules depend on the kind of game. In this game, a line game, the rules describe the sequential landing of the members (the airplanes). The information in the setup paragraph is different than the information in the rules. The setup provides the diagram and the members. The rules place the members on the diagram. Put another way, the setup describes the structure, and the rules place the members on this structure. Put in even simpler terms, the setup provides the blanks and the rules fill in the blanks.
Although correctly diagramming the rules is necessary before you can answer the questions, it is not sufficient to answer the questions. The important work begins after you diagram the rules. After you diagram the rules, you must make additional conclusions about what can and cannot be true. In the airplane game there were several additional conclusions that you had to make before you could answer the questions. For example, you should have concluded that R could not land first, second, third, or fourth. To recap, once you create the diagram, diagram the rules, and make the extra conclusions, then you are ready to answer the questions. Don’t worry if you can’t make any conclusions after diagramming the rules; sometimes this happens. When it is not possible to make any conclusions based on the rules, the questions will add more information that will allow you to make conclusions. Each type of game has certain types of conclusions. As you become familiar with the different games, you will learn the typical conclusions associated with each type of game.

The final part of a game is the questions. Questions take many forms. They may ask what must be true, what could be true, what must be false, what cannot be true, etc. No matter how questions are phrased, they are merely testing how well you make conclusions. Sometimes a question adds new rules; sometimes it does not. When a question adds new rules, incorporate the rules into the diagram and then make additional conclusions. When a question does not add a new rule, the answer is found in the conclusions you made after you diagrammed the initial rules.

What do diagrams look like?

There are two categories of games, ordering and grouping. Within these two categories there are many types of diagrams that could possibly be tested, but only a handful are regularly tested. The other types are tested, at most, once every few years.

Ordering games – Most games focus on the linear order the members can be placed in.

The airplane-landing-sequence game tests the linear order of the members. It is called a simple line game because it required just one set of dashes. A simple line game could also ask, for example, for the order that seven songs are played on a radio station.

Complex line games require two or three sets of dashes; these games are called multiple line games. A multiple line game could test the order that ten airplanes land on two runways. You will see examples of multiple line games later.

Although there are ordering games besides simple line games and multiple line games, they are very rare. You will see examples of these rare games later.

Grouping games – On your test there will be one game (sometimes two) that asks you to create an ending group or groups by selecting members from an initial group or groups. For example, the game may provide a list of nine people and ask you to select a group of five of them to serve on a committee. The rules restrict the selection of members. For example, members X and Y will not be permitted to be on the committee at the same time. There are two types of grouping games.
Selection grouping games ask you to create a final group by selecting members from one, two, or three starting groups. The committee selection game discussed above is a selection game.

Assignment grouping games ask you to assign all the members of a starting group to two or three ending groups. For example, you must assign six people to go to one of three movies. Some people will not be permitted to go to a particular movie, and other people will be required to attend the same movie together.

Other games – Some games are neither ordering games nor grouping games. Fear not, these are rarely tested. These rare games include matrix games, multiple rounds games, and games that are hybrids of two other game types. Don’t worry about these games yet. You will learn them later, after you build a solid foundation for ordering and grouping games.

Budgeting time

You have 35 minutes to complete the four games in the games section. This is an average of 8 minutes and 45 seconds for each game; budgeting your time is vital. Novice test-takers often spend too much time on the first two games, leaving themselves too little time to complete the third and fourth games. Since the games are not necessarily presented in order of difficulty, these students might be spending too much time on difficult games, leaving themselves too little time to earn points on easy games.

How to approach a games section if you are running out of time

After finishing this book, most students can complete all four games in less than 35 minutes. If you still struggle with timing after you complete this book, you must decide if the best strategy is to select three of the games and spend more time doing them. Use this strategy if you get more correct answers by attempting fewer games, but correctly answering a higher percentage of the questions you attempt. If you decide to do only three games, make sure to pick the best ones. First, review all four games and determine what diagram is needed for each game. Then consider the number of questions each game has. Games can have as few as five questions or as many as eight. You want the games that have the most questions and are the easiest to diagram. Most students find the line games to be easiest, but you can decide for yourself once you learn your strengths and weaknesses.

How to approach a game

The basic approach to a game is to read, to understand, to plan, to diagram, and to answer. Read the setup and the rules. Don’t read the questions yet.
Understand the setup and the rules. Don’t rush. If you misread a rule or misinterpret it, it will cost you far more time than the few seconds you gained by rushing. Reflect on how the setup and the rules interact. Sometimes a rule contains a key property that dramatically modifies the appearance of the diagram, instead of merely placing information on the diagram.

Plan the kind of diagram you will use and how it should be modified to best reflect the setup and the rules.

Diagram the information provided by the setup and the rules. Additional conclusions can be diagramed either as you diagram each rule, or after you diagram all the rules. It is a matter of personal preference. Most students make some conclusions as they diagram each rule, more conclusions after they have added all the rules to the diagram and see new connections, and even more conclusions as they answer questions and see even more new connections.

Answer the questions. Some questions can be answered after you diagram the rules and make the initial conclusions. Most questions add new information. You must diagram this new information and make new conclusions before answering these questions.

The next step

The next step is to learn the games. You will begin by learning the three most common types of games. For each of these types of games you will do one game as an introduction. The game is then explained in detail using step-by-step solutions and diagrams. This is followed by a discussion of the rules and diagrams that are used for this type of game. Because there are common rules, there are common conclusions that result from these rules. These common conclusions are also revealed to you. After the overview of the game type, short exercises will reinforce the concepts. You will do additional practice games to test your new understanding of the game type.

After you learn the common games, you will learn about the questions. You will learn how they are phrased and how you should answer them. Exercises will sharpen your skills. For example, you will learn to distinguish between a “must be true” question and a “could be true” question, and how to efficiently solve each kind.

The section covering the questions is followed by a discussion of the overall strategies and approaches that you should consider.

Next, you will be introduced to the hybrid games, the unusual games, and the unique games. There will be examples and pointers on how these games are designed and how you should answer them.

Finally, you will practice many games, 64 games to be exact. The skills required to solve these games are not quickly mastered. You must practice many games before you become comfortable using your new skills.
You will now do the “airplane landing order” game a second time. Spend as much time as you need to answer all the questions. After you finish, compare your work with the “tutor page”, which demonstrates how to organize your work and where to draw the diagrams.

Using the landing-order game as a starting point, you will learn the different ways a simple line can be tested and how to complete a simple line game quickly and effectively. This is followed by a series of practice exercises. You will finish by doing two simple line games under timed conditions and reviewing your work.
Questions 7–13

Six airplanes—R, S, T, U, W, and X—must land at an airport that has one runway. The airplanes must land one at a time and all the planes must land at the airport. The order that the airplanes land must adhere to the following rules:

T lands earlier than R.
U lands earlier than R and later than X.
W lands immediately before or after T lands.

7. Which one of the following could be an accurate matching of airplanes to landing times?

(A) First: W; second: S; sixth: R  
(B) Second: U; fourth: S; fifth: W  
(C) Third: U; fourth: S; sixth: R  
(D) Second: X; fourth: T; fifth: U  
(E) First: W; third: U; fourth: R

8. If X lands second, then which one of the following must be true?

(A) U lands third.  
(B) S lands third.  
(C) T lands first.  
(D) U lands fifth.  
(E) R lands sixth.

9. If X lands third, then each of the following could be true EXCEPT:

(A) S lands fifth.  
(B) U lands fourth.  
(C) R lands fourth.  
(D) T lands second.  
(E) W lands second.

10. Which one of the following CANNOT be true?

(A) T lands fourth.  
(B) R lands fourth.  
(C) W lands fourth.  
(D) S lands sixth.  
(E) X lands fourth.

11. Which one of the following is a complete and accurate list of the times that U can land?

(A) first, second, third  
(B) first, third, fourth, fifth  
(C) second, third, fourth, fifth  
(D) second, third, fourth, fifth, sixth  
(E) third, fourth, fifth

12. If U lands later than T, then the latest W can land is:

(A) first  
(B) second  
(C) third  
(D) fourth  
(E) fifth

13. Suppose the rule that W lands immediately before or after T is replaced by the rule that the landings of W and T are separated by exactly one other landing. If the other rules remain unchanged, then the latest X can land is:

(A) first  
(B) second  
(C) third  
(D) fourth  
(E) fifth
Six airplanes—R, S, T, U, W, and X—must land at an airport that has one runway. The airplanes must land one at a time and all the planes must land at the airport. The order that the airplanes land must adhere to the following rules:

- T lands earlier than R.
- U lands earlier than R and later than X.
- W lands immediately before or after T lands.

7. Which one of the following could be an accurate matching of airplanes to landing times?

(A) First: W; second: S; sixth: R
(B) Second: U; fourth: S; fifth: W
(C) Third: U; fourth: S; sixth: R
(D) Second: X; fourth: T; fifth: U
(E) First: W; third: U; fourth: R

8. If X lands second, then which one of the following must be true?

(A) U lands third.
(B) S lands third.
(C) T lands first.
(D) U lands fifth.
(E) R lands sixth.

9. If X lands third, then each of the following could be true EXCEPT:

(A) S lands fifth.
(B) U lands fourth.
(C) R lands fourth.
(D) T lands second.
(E) W lands second.

10. Which one of the following CANNOT be true? (initial analysis)

(A) T lands fourth.
(B) R lands fourth.
(C) W lands fourth.
(D) S lands sixth.
(E) X lands fourth.

11. Which one of the following is a complete and accurate list of the times that U can land?

(A) first, second, third (fifth)
(B) first, third, fourth, fifth
(C) second, third, fourth, fifth
(D) second, third, fourth, fifth
(E) third, fourth, fifth

12. If U lands later than T, then the latest W can land is:

(A) first
(B) second
(C) third
(D) fourth
(E) fifth

13. Suppose the rule that W lands immediately before or after T is replaced by the rule that the landings of W and T are separated by exactly one other landing. If the other rules remain unchanged, then the latest X can land is:

(A) W __ T or T __ W
(B) first
(C) second
(D) fourth
(E) fifth

GO ON TO THE NEXT PAGE.
How to use the tutor page

The facing page is a “tutor page.” When a Get Prepped student works with a tutor, the tutor demonstrates how to efficiently and effectively diagram a game. The tutor page recreates the tutoring experience by showing you how and where to draw the diagrams.

A tutor page has two components. The first component is the initial diagram. Here, the initial diagram is at the bottom of the page and includes two features: the order of the members (W/T < R, etc.) and the six-dash line with the negative letters underneath. The second component of the tutor page is the diagram next to each question. These diagrams incorporate the information provided by the question.

Each game in the first half of this book has a tutor page. To get the most from the tutor pages, you should complete the game and then compare your work with the tutor page. You want to determine why you did not find the correct answer, or how you could have found the correct answer more quickly. Do not expect your work to look exactly like the tutor page. Instead, use the tutor page as a reality check to ensure you are not creating too many diagrams, overly complex diagrams, or doing other unnecessary work.
The setups for simple lines

The setup paragraph for a simple line game will present a situation where there are six, seven, or eight different elements that must be organized in either a time sequence or a location sequence. You will use a horizontal set of dashes to serve as the six, seven, or eight places. Make the left-most dash the lowest number, the earliest time slot, etc. The right-most dash will be the highest number, latest time slot, etc. Here are some examples:

“Six customers pay at the cash register of the grocery store.”

\[\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 & 6 \\
\end{array}\]

This setup requires a series of dashes to keep track of the time sequence in which the customers will reach the cash register. Numbering the dashes is useful when first learning the games; once you become skilled you can save time by omitting them.

“A bank has six teller windows along one wall.”

\[\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 & 6 \\
\end{array}\]

This setup is similar to the first setup. The only difference is that the ordering is now spatial (physical location order) instead of temporal (time sequence order).

“Seven cars are parked on one side of the street.”

\[\begin{array}{cccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}\]

This setup specifies that the cars are on one side of the street. The setups are always very precise when detailing the scenario. For example, here it says that all cars are on one side of the street. If this were a multiple line diagram, the setup would specify that there are cars on both sides of the street. The setup will never be ambiguous, leaving it unclear whether the cars are on one side or two sides of the street.

“An office worker performs eight tasks during the work day.”

\[\begin{array}{cccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\
\end{array}\]

Six is the most common number of spaces, seven is also common, and eight spaces or five spaces are occasionally used. This is because six or seven spaces allow the test-maker sufficient flexibility to create an assortment of questions, while not creating so much flexibility that test-takers are bogged down with too many permutations. If there are eight spaces, the rules will be more restrictive. Restrictive rules reduce the possible
permutations to a more manageable number. If there are only five spaces, then a second
dimension will be added to the diagram to increase the complexity and number of
permutations, usually by making the diagram a multiple line instead of a simple line.

Horizontal (side to side) dashes are the best way to diagram a simple line game.
Although it is possible to use a set of vertical (up and down) dashes to accomplish the
same task, this is more difficult. Also, the language of a setup often specifically calls for
a horizontal order, but rarely for a vertical order.

The rules for the simple lines

Pay close attention to the following discussion. Most of what you are about to learn
applies to every type of game, not just simple line games.

The following are common rules in simple line games. The language of the rule is
provided, along with an example of how the rule should be diagrammed.

1. “A is first or last.”

   \[
   \begin{array}{cccccc}
   \text{(A)} & - & - & - & - & \text{(A)}
   \end{array}
   \]

   Often a rule requires that a specific member be either first or last; the test-makers
   like to use this rule. By putting the (A) below the line, you show that it is only a
   fifty-fifty possibility for each of these two spaces. The parentheses clarify that A
   is only a fifty-fifty possibility for a particular space. When you want to show that
   A must be in a space, put the A above the line, without parentheses.

   This may also be phrased as, “A must attend the earliest or latest meeting.”

   Negative variation: “A cannot be first or last.” Depict as: A, and place the A
   under the appropriate spaces. Because A is not in these spaces, you do not
   enclose it in parentheses.

2. “A is earlier than B.”

   A\text{<}B

   This rule is a mainstay of simple line games and multiple line games. The “<”
symbol is used to show that the member is earlier (in time or place) than another
member. One mistake test-takers often make is assuming that A is immediately
before B, instead of merely somewhere earlier than B. As you will see later, this
rule can be combined with other rules to make very useful conclusions.

   This may also be phrased as, “A is on a lower-numbered shelf than B.”

   Negative variation: Never used.
3. “A is immediately before B.”
\[ \begin{array}{cc}
A & B \\
\end{array} \]
Place the two members next to each other with dashes underneath them. This helps you visualize that A is before B, and that A is immediately before B. This rule should be treated carefully because it is often confused with rule 4.

This may also be phrased as, “B is placed immediately to the right of A.”

Negative variation: “A is not immediately before B.” Depict as: \[ \begin{array}{cc}
A & B \\
\end{array} \]

4. “A is next to B.”
\[ \begin{array}{cc}
A & B \\
\end{array} \] \quad \text{or} \quad \begin{array}{cc}
A & B \\
\end{array} \quad \begin{array}{cc}
A & B \\
\end{array} \]

Use the one you find easier to understand.
This rule does not specify which member comes first. Many test-takers incorrectly graph this rule, making it appear that A must be before B, instead of before or after B.

This may also be phrased as, “A is immediately before or immediately after B.”

Negative variation: “A is not next to B.” Depict as: \[ \begin{array}{cc}
A & B \\
\end{array} \] \quad \begin{array}{cc}
A & B \\
\end{array} \] or \[ \begin{array}{cc}
A & B \\
\end{array} \] \quad \begin{array}{cc}
B & A \\
\end{array} \]

5. “A is earlier than B and C.”
\[ \begin{array}{cc}
A & B \\
\end{array} \quad \text{or} \quad \begin{array}{cc}
A & B \\
\end{array} \quad \text{or} \quad \begin{array}{cc}
A & B \\
\end{array} \]

Use the one you find easier to understand.
This is a variation on the common rule, “A is earlier than B.” The mistake test-takers often make is to depict this rule as \[ A < B < C \], which yields a very different, and very wrong, result.

This may also be phrased as, “Both B and C are heavier than A.”

Negative variation: Never used.

6. “If A is second, B is fifth.”
\[ \begin{array}{c}
\text{(A)} \quad \text{(B)} \\
\end{array} \]
This is a conditional rule, so it applies only in the situation where A is second. As such, even if your diagram shows that B is fifth, this does not necessarily mean that A is second. Many test-takers make exactly this mistake. Also, when B is not fifth, then A cannot be second. You will see this situation come up regularly, so get used to working with it.

Negative variation: Never used.

7. “Either A or B is fourth.”
\[ \begin{array}{c}
\text{(A)} \quad \text{(B)} \\
\end{array} \]
The slash between A and B shows that one of them must be in this space.
Negative variation: “Neither A nor B is fourth.” Depict this as: A, B, and place them under the fourth space.

8. “A and B are separated by one space.”
   \[ \text{A/B _ _ B/A or A _ B/ _ B _ A} \]
   This rule causes test-takers to make one of two mistakes. The first mistake is that they think there are either no spaces separating the two members, or that there are two spaces separating the two members. The second mistake is that they think that A must come before B. Occasionally, the rule may dictate two full spaces between A and B, instead of just one space. Never has a rule dictated three full spaces between two members.

This may also be phrased as, “Exactly one customer is after A but before B.”

Negative variation: Never used.

You will see these rules in every simple line game. You will also see these rules in multiple line games and possibly in other games. If you are skilled at using these rules it is easy to modify the diagram when the rule is phrased somewhat differently, as sometimes happens.

Once you diagram the setup and the rules, the next step is to make the additional conclusions that add more information to your diagram.

**Additional conclusions for simple line games**

Just as there are common setups and common rules, there are common additional conclusions you must make. There are two points in the diagramming process when you can make conclusions. First, you can sometimes make a conclusion based on a single rule. You make and diagram these conclusions as soon as you diagram the rule. Second, you can sometimes make a conclusion based on the effect and overlap of two or three rules. You make and diagram these conclusions after you diagram all the rules and consider how they interact.

1. “A is earlier than B.”

   \[ \text{__ __ __ __ __ _ _ A} \]
   When A is earlier than B, B cannot be first and A cannot be last. When you can combine this rule with another rule, to learn, for example, A < B < C, then you can eliminate several more possibilities for A, B, and C, as shown below. Notice how the two ends of the line are mirror images; be aware of this symmetry.

   \[ \text{__ __ __ __ __ B \_ \_ \_ \_ \_ \_ \_ A} \]

   \[ \text{B \_ \_ \_ \_ \_ \_ \_ A \_ \_ \_ \_ \_ \_ \_ \_ \_ B} \]

   \[ \text{C \_ \_ \_ \_ \_ \_ \_ C \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ B} \]

**Simple Line Games** 17
2. “A is immediately before B.”

__ __ __ __ __ __ A

When A is before B, there is no way that B can be first, and no way that
A can be last. This rule becomes even more useful when one space is already
filled by a different member, because this dictates two more spaces where A and
B cannot be. In the example below, C fills the third space. This prevents A from
being second and B from being fourth.

B __ A C __ B __ A

3. “A and B are separated by one other appointment.”

By itself, you cannot use this rule to make a conclusion, but if you have other
information, for example, that C is fourth, then you know that neither A nor B can
be second or sixth.

__ __ C __ __ A

B __ A __ B
Now it is time to practice what you have learned. The following exercises are designed to reinforce the basic concepts for simple line games. There are exercises for diagramming the setup, followed by exercises for diagramming the rules, and finally, exercises that have you do both.
Exercises – setups

Compare your diagrams with the examples that follow this exercise.

1. A television series must be scheduled to broadcast once a week for an eight-week period. Each of the eight episodes—A, B, C, D, E, F, G, and H—must be scheduled exactly once.

2. James paints a mural using six cans of paint—amber, black, cayenne, ecru, green, and lime. Each can of paint is used exactly once and only one can of paint can be used at a time.

3. A college professor gives a series of seven lectures—D, F, G, H, I, K, and L—during the summer term. Exactly one lecture is given during each class.

4. A football coach is scheduling the upcoming season of eight games against seven opposing teams—J, K, L, M, N, O, and P. The coach schedules exactly one opposing team for each game.

5. A convention planner must schedule seven consecutive speeches to be given during the convention. The six speakers who give speeches are Arundel, Boyle, Canabra, Dalton, French, and Rial.

6. Customers at a spa schedule appointments for one of four treatments—kiwi, lime, mud, and nutrient—to be administered during each of six consecutive sessions, numbered one through six.
Answers – setups
Appropriate diagrams for the setups are as follows:

1. **A television series.**
   There are eight episodes and eight spaces to fill. Each episode is used once. An eight-dash line will suffice. Numbering the dashes is optional. As you improve and your confidence increases, you will find that numbering the spaces is unnecessary.

   __ __ __ __ __ __ __ __
   1 2 3 4 5 6 7 8

2. **James paints a mural.**
   There are six cans of paint. The setup specifies that only one can is used at a time, and that once a can is used, it will not be used again.

   __ __ __ __ __ __
   1 2 3 4 5 6

3. **A college professor gives a series of seven lectures.**
   There are seven lectures. One lecture is given during each class. A set of seven dashes will suffice.

   __ __ __ __ __ __ __
   1 2 3 4 5 6 7

4. **A football coach schedules games.**
   This is a tricky one. There are eight games, but only seven opposing teams. This means that coach will schedule one of the opposing teams twice. Although important to know, this does not change the diagram. Eight dashes are needed, one for each game.

   __ __ __ __ __ __ __ __
   1 2 3 4 5 6 7 8

5. **A convention planner schedules speeches.**
   Once again, there are more spaces to fill than members to fill them, so one member will repeat.

   __ __ __ __ __ __ __
   1 2 3 4 5 6 7

6. **Spa customers schedule appointments.**
   The important thing to focus on is that there are six consecutive sessions. There are only four members to fill the six spaces, so at least one of the members repeats.

   __ __ __ __ __ __
   1 2 3 4 5 6
Exercises – rules
Practice diagramming the common rules for simple line games. Draw a six-space line for each rule. If you can make additional conclusions, diagram them as well. Compare your diagrams with the examples that follow this exercise.

1. “A is the third play.”

2. “B is not the second book.”

3. “A is first or sixth.”

4. “A is served immediately before B.”

5. “A is younger than B.”

6. “A is earlier than B and C.”

7. “A and B have meetings on consecutive days.”

8. “Either A or B is printed fourth.”
**Answers – rules**

Appropriate diagrams for the rules are as follows:

1. “A is the third play.”
When a rule provides a definite location for a member, place it above the line.

```
   _ _ _ A _ _ _
```

2. “B is not the second book.”
When a member cannot be in a space, note it below the line.

```
   _ _ _ _ _ _ _
     B
```

3. “A is first or sixth.”
This is a common rule. Use parentheses to indicate the conditional nature of A.

```
   _ _ _ _ _ _ _
   (A)     (A)
```

4. “A is served immediately before B.”
You can conclude that A cannot be in the last space and B cannot be in the first space.

```
   A B: _ _ _ _ _ _ _
      B
```

5. “A is younger than B.”
A is before B. A cannot be last and B cannot be first.

```
   A<B: _ _ _ _ _ _ _
      B
```

6. “A is earlier than B and C.”
Diagram this as: A < B/C or as A < B & A < C. Many test-takers diagram this rule incorrectly. Both B and C must come later than A, so A cannot be last, or second to last. Neither B nor C can be first, but one of them could be second.

```
   A<B: _ _ _ _ _ _ _
      B
   A<C: _ _ _ _ _ _ _
      C
```

7. “A and B have meetings on consecutive days.”
Diagram this as: A B A or A B / B A. Remember, either A or B could be the earlier member.

```
   A B / B A
```

8. “Either A or B is printed fourth.”
Put them above the line, with the slash.

```
   _ _ _ _ A/B _ _ _
```
Exercises – setups and rules
Diagram the setups and rules. Diagram any additional conclusions you can make.

1. Exactly six songs—N, O, P, Q, R, and S—will each be played once during a radio program. The order they will be played is determined by the following requirements:
   N is played before R is played.
   Q is not played first or third.
   P is played after R is played.
   At least one other song is played after N and before S.

2. An office worker begins a seven-hour workday at 8:00am and must perform six tasks during the work day—answering calls, boxing products, copying documents, delivering mail, e-mailing proposals, and eating lunch. The worker performs one task at a time for exactly one hour and, except for answering calls, performs each task exactly once. The order the worker accomplishes the tasks is subject to the following requirements:
   The worker cannot begin eating lunch before 11:00am or later than 1:00pm
   At least one other task must be performed between delivering mail and eating lunch.
   E-mailing proposals must be done immediately after boxing products.
   The worker performs exactly two other tasks between answering calls.
   Copying documents must be started at 12:00 noon.
3. During the course of a five-day workweek a supervisor has exactly seven meetings with employees. Each meeting is with exactly one of the following five employees—Chowdry, Dunn, Eflin, Ghoshn, and Hepplewhite—and each employee has at least one meeting. The following restrictions control the scheduling of meetings with employees:
   The supervisor meets with Ghoshn exactly two times.
   No employee meets with the supervisor twice in row.
   All of Eflin’s meetings take place earlier in the week than all of Hepplewhite’s meetings.
   At least two other employees must meet with the supervisor before Dunn meets with the supervisor.

4. A file cabinet has space for exactly six file folders from the front to the back of the cabinet. There are three categories of folders—research, marketing, and warranty—and there is one closed and one active folder for each category. The six folders must be filed in accordance with the following procedures:
   The warranty folders are separated by exactly two other folders.
   Three closed folders cannot be filed immediately next to each other.
   The closed research folder is filed immediately before or after the active marketing folder.
   The closed marketing folder is filed third from the front.

5. Exactly seven commercials—A, B, C, D, E, F, and G—will be broadcast during a radio show. Each commercial will be broadcast exactly once, in accordance with the following requirements:
   If D or G is broadcast third, the other is broadcast seventh.
   B is broadcast earlier than D and C.
   E is broadcast later than C.
   Either A or C must be broadcast second.
Answers – setups and rules

The appropriate diagrams are as follows:

1. Exactly six songs—N, O, P, Q, R, and S—will each be played once during a radio program. The order they will be played is determined by the following requirements:
   - N is played before R is played.
   - Q is not played first or third.
   - P is played after R is played.
   - At least one other song is played after N and before S.

<table>
<thead>
<tr>
<th>Q:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N&lt;R&lt;P:</td>
<td>R</td>
<td>N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>P</td>
<td></td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>N (_ ) S:</td>
<td>S</td>
<td>S</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

   Six songs are played once, so draw six dashes. Rules 1 and 3 should be combined to make a chain that allows us to eliminate several possibilities for N, P, and R. Due to Rule 4—“At least one other song is played after N and before S”—the earliest S can be played is third, and then only if N is first. N cannot be fourth. Why? If N were fourth, there would not be enough spaces left to fit R, P, and S after N. To diagram Rule 4, place a (_) between N and S to show that there may be more than one space between N and S, or there may not. There could be three or four spaces between N and S, but it would be too confusing to graph these possibilities. The current diagram should be sufficient to remind you of the effect of the Rule 4.

2. An office worker begins a seven-hour workday at 8:00am and must perform six tasks during the workday—answering calls, boxing products, copying documents, delivering mail, e-mailing proposals, and eating lunch. The worker performs one task at a time for exactly one hour and, except for answering calls, performs each task exactly once. The order the worker accomplishes the tasks is subject to the following requirements:
   - The worker cannot begin eating lunch before 11:00am or later than 1:00pm.
   - At least one other task must be performed between delivering mail and eating lunch.
   - E-mailing proposals must be done immediately after boxing products.
   - The worker performs exactly two other tasks between answering calls.

<table>
<thead>
<tr>
<th>L:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>E</td>
<td>B</td>
<td>E</td>
<td>B</td>
</tr>
<tr>
<td>A (_ ) A:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D (_ ) L:</td>
<td>or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L (_ ) D:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are seven time slots and six tasks to fill them. Answering calls, A, will be used twice. Because C is at 12, the number of places B and E can occupy is reduced, but C has no effect on D or L, since they are very flexible. A cannot be at 9 because C is at 12, which prevents the second A from being at 12.

3. During the course of a five-day workweek, a supervisor has exactly seven meetings with employees. Each meeting is with exactly one of the following five employees: Chowdry, Dunn, Eflin, Ghoshn, and Hepplewhite. The following restrictions control the scheduling of meetings with employees.

- The supervisor meets with Ghoshn exactly two times.
- No employee meets with the supervisor twice in row.
- All of Eflin’s meetings take place earlier in the week than all of Hepplewhite’s meetings.
- At least two other employees must meet with the supervisor before Dunn meets with the supervisor.

\[
\begin{align*}
E < H & : & H & & & & & & E \\
? < ? < D & : & D & & D \\
G = 2, & & & & & & \\
\end{align*}
\]

Careful, the fact that it is a five-day workweek is not relevant. There are seven meetings to schedule, and five employees to fill those seven meetings. Thus, either one employee has three meetings, or two employees each have two meetings. The key is in Rule 1. Since G meets exactly twice, that means that one of the other employees also meets exactly twice, and the other three employees each meet once. Rule 2 is difficult to diagram effectively, just remember not to put the same employee twice in a row. Rule 3 is more complex than it initially appears. E is earlier than H, but if E is used twice then both Es must be earlier than H. If there are two Hs, they must be later than E. The basic information is listed on the diagram, but you will have to remember this contingency, when there are two Es or two Hs. Finally, Rule 4 says that D cannot be first or second.

4. A file cabinet has space for exactly six file folders from the front to the back of the cabinet. There are three categories of folders—research, marketing, and warranty—and there is one closed and one active folder for each category. The six folders must be filed in accordance with the following procedures:

- The warranty folders are separated by exactly two other folders.
- Three closed folders cannot be filed immediately next to each other.
- The closed research folder is filed immediately before or after the active marketing folder.
- The closed marketing folder is filed third from the front.

\[
\begin{align*}
\text{CR AM CR:} & & \text{no} & & \text{no} & & \text{no} & & \text{no} & & \text{CR/AM}
\end{align*}
\]
Although this game is a little more difficult to visualize, there are six spaces, to be filled by six different folders. It’s best to start with is Rule 4—CM is third. Using this as a starting point, you can deduce that the two Ws must be first and fourth. (If they were second and fifth, this would not allow two contiguous spaces for CR and AM.) After the Ws have been fixed on first and fourth, AR is the only one that is available for the second space. CR and AM must be fifth and sixth, but you don’t know their exact order.

5. Exactly seven commercials—A, B, C, D, E, F, and G—will be broadcast during a radio show. Each commercial will be broadcast exactly once, in accordance with the following requirements:

- If D or G is broadcast third, the other is broadcast seventh.
- B is broadcast earlier than D and C.
- E is broadcast later than C.
- Either A or C must be broadcast second.

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>A</th>
<th></th>
<th></th>
<th>(D/G)</th>
<th></th>
<th>(G/D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B &lt; D:</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>B &lt; C &lt; E:</td>
<td>C</td>
<td></td>
<td>E</td>
<td></td>
<td>B</td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>
```

This setup is typical; there are seven members to fill seven spaces. The anchor rule is often the final rule. Here, Rule 4 states that either A or C is second. Usually you create one line, but sometimes, like here, where either A or C will occupy the second space, it can make sense to create two lines. The first line shows what happens when A is the second broadcast. The second line shows what happens when C is the second broadcast. Next, diagram Rule 1. Since either D or G can be third, but might not be third, place a (D/G) below the third space. An arrow pointing from the third space to the seventh space clarifies that only when D or G is in the third space must the other one be in the seventh space. Since B is broadcast earlier than C, C can never be first. Since C is broadcast before E, E can never be first, nor can C be seventh. There are several more conclusions (shown above) that you can make when you combine the rules that B is earlier than both D and C, and that C is earlier than E.

**Practice games**

Spend 8 minutes and 45 seconds doing each of the following games, answering as many questions as you can. Then review the explanations that follow the games.
SECTION I
Time—35 minutes
23 Questions

Directions: Each group of questions in this section is based on a set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. Choose the response that most accurately and completely answers each question and blacken the corresponding space on your answer sheet.

Questions 1–6

Anna, Childress, Doyle, Elbert, Xavier, and York are students in a philosophy class. They must each reserve one of six individual tutoring sessions with the instructor. Each session begins when the prior sessions ends. Exactly one student attends each session, and no student attends more than one session.

Anna’s session is later than Childress’ session.
Elbert’s session is either first or last.
York’s session begins immediately after Xavier’s session ends.
Either Childress or Anna must be scheduled for the third session.

1. Which of the following is an acceptable schedule of students to tutoring sessions from first to sixth?
   (A) Elbert, Doyle, Childress, York, Xavier, Anna
   (B) Doyle, Childress, Anna, Xavier, York, Elbert
   (C) Elbert, Anna, Childress, Doyle, Xavier, York
   (D) Xavier, York, Doyle, Childress, Anna, Elbert
   (E) Doyle, Childress, Anna, Elbert, Xavier, York

2. Which of the following could be true?
   (A) Anna has the second session.
   (B) Childress has the sixth session.
   (C) Xavier has the second session.
   (D) York has the fourth session.
   (E) Childress has the second session.

3. If York has the second session, which of the following must be true?
   (A) Anna has the fourth session.
   (B) Doyle has the fifth session.
   (C) Anna has the third session.
   (D) Elbert has the first session.
   (E) Childress has the third session.

GO ON TO THE NEXT PAGE.
SECTION I
Time—35 minutes
23 Questions

Directions: Each group of questions in this section is based on a set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. Choose the response that most accurately and completely answers each question and blacken the corresponding space on your answer sheet.

Questions 1–6

Anna, Childress, Doyle, Elbert, Xavier, and York are students in a philosophy class. They must each reserve one of six individual tutoring sessions with the instructor. Each session begins when the prior sessions end. Exactly one student attends each session, and no student attends more than one session.

Anna’s session is later than Childress’ session.
Elbert’s session is either first or last.
York’s session begins immediately after Xavier’s session ends.
Either Childress or Anna must be scheduled for the third session.

1. Which of the following is an acceptable schedule of students to tutoring sessions from first to sixth?
   (A) Elbert, Doyle, Childress, York, Xavier, Anna
   (B) Doyle, Childress, Anna, Xavier, York, Elbert
   (C) Elbert, Anna, Childress, Doyle, Xavier, York
   (D) Xavier, York, Doyle, Childress, Anna, Elbert
   (E) Doyle, Childress, Anna, Elbert, Xavier, York

2. Which of the following could be true?
   (A) Anna has the second session.
   (B) Childress has the sixth session.
   (C) Xavier has the second session.
   (D) York has the fourth session.
   (E) Childress has the second session.

3. If York has the second session, which of the following must be true?
   (A) Anna has the fourth session.
   (B) Doyle has the fifth session.
   (C) Anna has the third session.
   (D) Elbert has the first session.
   (E) Childress has the third session.

4. If Doyle has the first session, which of the following must be true?
   (A) Anna has the fourth session.
   (B) Xavier has the fifth session.
   (C) Childress has the second session.
   (D) York has the second session.
   (E) York has the fourth session.

5. If Doyle does not have a session earlier than fifth, which of the following could be true?
   (A) Anna has the fifth session.
   (B) Childress has the first session.
   (C) York has the second session.
   (D) York has the fourth session.
   (E) Xavier has the fifth session.

6. Which of the following students CANNOT be scheduled for the fifth session?
   (A) Anna
   (B) Childress
   (C) Doyle
   (D) Xavier
   (E) York

GO ON TO THE NEXT PAGE.
Tutoring order

This game is a straightforward simple line with a typical setup and common rules. The setup makes it clear that one tutoring session must end before another starts, and that each student attends one tutoring session and does so alone. This requires six dashes to keep track of the order. (Figure 1a) Now, review the rules. When you are more experienced, you will review all the rules before diagramming any of them; but for now, to keep things simple, we shall deal with the rules in the order they appear.

Rule 1 says that A is later than C. (Figure 1b) This allows you to make a conclusion: Since C must be before A, A cannot be first, nor can C be sixth. Note this conclusion under the first and sixth dashes in figure 1b. Rule 2 is easy to diagram; E can only be first or sixth. Instead of putting a negative E under dashes two through five, it is more efficient to put an (E) under dashes one and six. The parentheses tell us that E is conditional, that it may be in one space or the other. (Figure 1c) Next, Rule 3 creates a block where X must be immediately before Y. This is diagrammed as X Y. Whenever the rules provide this kind of block, eliminate all the places where X can’t be, and all those where Y can’t be. Since X must be before Y, Y cannot be first and X cannot be sixth. (Figure 1d) Finally, Rule 4 is a little more complex. It states that either C or A must be third. To diagram this, place a C/A on the third space. (Figure 1e) The slash indicates that either C or A must be on this space. When we combine Rule 1 and Rule 3, we can make an important conclusion. Since C is before A and either C or A is third, C must be first, second, or third, and it cannot be fourth, fifth, or sixth. Also, A must be third, fourth, fifth, or sixth. (Figure 1e) It is also possible to use two lines, one with A third, and the other with C third. (Figure 1f)

Although we now know a lot about the diagram, there is even more we can conclude. Since either C or A is third, neither X nor Y can be third. This means that X cannot be second (because Y cannot be third) and that Y cannot be fourth (because X cannot be third). After graphing these conclusions in figure 1e, you now have ample information to attack the questions.

---

Fig. 1a

C<A: A — — — — — C

Fig. 1b

E: (E) — — — — — (E)
C<A: A — C

Fig. 1c
1. (B) – For the first question in the set, you can normally use each rule to eliminate one answer choice. Start with the first rule and determine which answer choice violates the rule. Then do the same for each subsequent rule.
   (A) Rule 3 states that X must be immediately before Y, while this choice shows Y before X.
   (B) * This choice is correct because it does not violate any rules.
   (C) This choice violates Rule 1 because it has A before C.
   (D) This choice violates Rule 4 because it has D in the third space.
   (E) This choice violates Rule 2 because E is not first or sixth.

2. (E) – This question does not add any new information. As such, you can answer it using the initial diagram. There is no need to do additional work.
   (A) A cannot be second.
   (B) C cannot be sixth.
(C) X cannot be second.
(D) Y cannot be fourth.
(E) * C can be second, as long as A is third.

3. (E) – Since this question adds new information, create a simple diagram next to the question and graph the new information. (Figure 2) Since Y is second, X must be first. Since X is first, E must be sixth. Since either C or A must be third and C must be before A, C must be third. A and D are in the fourth and fifth spaces, in either order.
(A) Either A or D can have the fourth session.
(B) Either A or D can have the fourth session.
(C) C must have the third session.
(D) E must have the sixth session.
(E) * Yes. C is forced to be third because X and Y are first and second, respectively.

X  Y  C  _  _  E

Fig. 2

4. (C) – Again, create a simple diagram with this new information about D being first. (Figure 3) Since D is first, E must be sixth. The only remaining spaces that can accommodate the block of X and Y are the fourth and fifth spaces. This means that A must be third and C must be second.
(A) A must be third.
(B) X must be fourth.
(C) * C must be second.
(D) Y must be fifth.
(E) Y must be fifth.

D  C  A  X  Y  E

Fig. 3

5. (C) – This question uses a slightly different approach. You must figure out what is possible when D is fifth, and what is possible when D is sixth. When D is sixth, E must be first. (Figure 4a) This leaves the fourth and fifth spaces open for the block of X and Y. A must then be third and C second. If D is fifth, then the only way to accommodate X and Y is to place them first and second. (Figure 4b) This forces E to be sixth. C will be third and A will be fourth.
(A) A is either third or fourth when D is limited to the last two spaces.
(B) C is either second or third.
(C) * Yes, Y can be second.
(D) Y cannot be fourth.
(E) X can be first or fourth, but not fifth.

\[ \begin{array}{cccccc}
E & C & A & X & Y & D \\
\end{array} \]

Fig. 4a

\[ \begin{array}{cccccc}
X & Y & C & A & D & E \\
\end{array} \]

Fig. 4b

6. (B) – This question does not add new information, so consult the initial diagram.
   (A) A can be third, fourth, fifth, or sixth.
   (B) * C cannot be fifth. (Figure 1e)
   (C) D can be fifth, as we learned in question 5.
   (D) X can be fifth.
   (E) Y can be fifth.
Questions 7–12

A package delivery service must deliver seven boxes—A, B, C, D, E, F, G. The boxes must be delivered one at a time, and all seven boxes must be delivered. The order the boxes are delivered in must satisfy the following conditions:
Box A must be delivered earlier than box D.
Box B cannot be delivered immediately before or immediately after box C.
Exactly two boxes must be delivered after the delivery of box E and before the delivery of box D.
Box B is delivered first, third, or fifth.
Box F is delivered fourth.

7. Which of the following could be an accurate list of the boxes in order of delivery, from first to seventh?

(A) A, E, B, F, D, C, G
(B) B, E, G, F, D, C, A
(C) B, A, D, F, G, E, C
(D) C, B, E, F, A, D, G
(E) A, B, E, F, G, D, C

8. Each of the following boxes could be delivered fifth EXCEPT:

(A) A
(B) B
(C) D
(D) E
(E) G

9. If exactly two boxes are delivered between the delivery of boxes B and C, which of the following must be true?

(A) Box E is delivered second.
(B) Box B is delivered third.
(C) Box D is delivered sixth.
(D) Box G is delivered seventh.
(E) Box C is delivered second.

10. Which of the following is a complete and accurate list of the boxes that could be delivered second?

(A) A, D, G
(B) A, E, G
(C) A, C, E, G
(D) A, B, C, E, G
(E) A, B, C, D, E, G

11. Which of the following is a complete and accurate list of the times that box C can be delivered?

(A) First, fourth, fifth, seventh
(B) First, third, fifth, sixth
(C) Second, third, sixth, seventh
(D) First, second, sixth, seventh
(E) First, second, fifth, sixth, seventh

12. If box C is delivered before box B, which of the following must be true?

(A) Box C arrives first.
(B) Box E arrives third.
(C) Box A arrives second.
(D) Box B arrives third.
(E) Box C arrives second.

GO ON TO THE NEXT PAGE.
Questions 7–12

A package delivery service must deliver seven boxes—A, B, C, D, E, F, G. The boxes must be delivered one at a time, and all seven boxes must be delivered. The order the boxes are delivered in must satisfy the following conditions:
Box A must be delivered earlier than box D.
Box B cannot be delivered immediately before or immediately after box C.
Exactly two boxes must be delivered after the delivery of box E and before the delivery of box D.
Box B is delivered first, third, or fifth.
Box F is delivered fourth.

7. Which of the following could be an accurate list of the boxes in order of delivery, from first to seventh?

(A) A, B, E, F, D, C, G
(B) B, E, G, F, D, C, A - 1
(C) B, A, D, F, G, E, C - 3
(D) C, B, E, F, A, D, G - 2
(E) A, B, E, F, G, D, C - 4

8. Each of the following boxes could be delivered fifth EXCEPT:

(A) A
(B) B
(C) D
(D) E
(E) G

9. If exactly two boxes are delivered between the delivery of boxes B and C, which of the following must be true?

(A) Box E is delivered second.
(B) Box B is delivered third.
(C) Box D is delivered sixth.
(D) Box G is delivered seventh.
(E) Box C is delivered second.

10. Which of the following is a complete and accurate list of the boxes that could be delivered second? 7A + analysis + work

(A) A, E, G
(B) A, E, G
(C) A, E, G
(D) A, E, G
(E) A, E, G

11. Which of the following is a complete and accurate list of the times that box C can be delivered?

(A) First, fourth, fifth, seventh
(B) First, third, fifth, sixth
(C) Second, third, sixth, seventh
(D) First, second, sixth, seventh
(E) First, second, fifth, sixth, seventh

12. If box C is delivered before box B, which of the following must be true?

(A) Box C arrives first.
(B) Box E arrives third.
(C) Box A arrives second.
(D) Box B arrives third.
(E) Box C arrives second.

(no clues from diagram)

GO ON TO THE NEXT PAGE.
Delivery order
This game is a typical simple line with some common rules and some uncommon rules. There are seven boxes. Each must be delivered separately, and delivered exactly once. You should use a seven-dash simple line. Now, review the rules. The two easiest rules to diagram are Rule 4 and Rule 5. Rule 5 puts F in the fourth space. Rule 4 says that B is first, third, or fifth. This is difficult to graph, so instead, consider where B cannot be. B cannot be second, sixth, or seventh, so diagram this. (Figure 1a) Once those rules are diagrammed, consider Rule 1, A is before D. This means that A is not seventh and D is not first. (Figure 1b) Now, Rule 4 says that E is before D, and that two boxes are delivered between them. This allows us to conclude that E cannot be fifth or later, and that D cannot be earlier than fifth. Additionally, because F is fourth, this prevents E from being first, because D cannot be fourth. It also prevents D from being seventh, because E cannot be fourth. (Figure 1c) There are no conclusions we can make yet using Rule 2, B and C are not next to each other, so just note it on the left side of the diagram.

---

7. (A) – For the first question in the set, you can normally use each rule to eliminate one answer choice. Start with the first rule and determine if any answer choices violate the rule. Then do the same for each subsequent rule. (A) * This does not violate any rules. (B) This violates Rule 1 because it shows D before A. (C) This violates Rule 3 because it shows D before E. (D) This violates Rule 2 because it shows C and B next to each other.
(E) This violates Rule 4 because it shows B on the second space.

8.  (D) – The work done in the initial analysis shows that E is the only member that cannot be fifth.
(A) See the initial diagram.
(B) See the initial diagram.
(C) See the initial diagram.
(D) * See the initial diagram, E cannot be fifth.
(E) See the initial diagram.

9.  (D) – This question is more complex than the previous two. You may want to skip it until you finish the easier questions, then come back to it and use the correct answers from the easier questions to answer it. If you do this, you could use the correct answers from Question 7 and Question 10 to eliminate four of the answer choices, thus saving yourself a great deal of work. If you went the route of doing all the work, you would have to attempt to disprove each answer choice.
(A) The work done for Question 10 shows that when B and C are separated by two spaces, it is not necessary that E be delivered second, or that B be delivered third. If you instead did all the work for this answer choice, you would have placed E on the third space. D would then have to be sixth. C would be second and B would be fifth. A would be first and G would be seventh.
(B) See (A). The work we did in (A) proved that B can be fifth.
(C) In Question 7(A), we saw that when B and C are separated by two deliveries, it is not necessary that D be sixth.
(D) * Correct, G must be seventh when B and C are separated by two deliveries.
(E) In Question 7(A), we saw that when B and C are separated by two deliveries, it is not necessary that C be second.

10. (C) – The most effective way to answer this question is to use a combination of techniques. First, use the correct answer from Question 7. Question 7(A) lists E as being second, so clearly, E can be second. This eliminates answer choice (A). Next, look at the initial diagram. Neither B nor D can be second. This eliminates three answer choices, (A), (D), and (E). Only answer choices (B) and (C) remain. The only difference between these two answer choices is the presence of box C. Create a quick diagram to determine if box C can be delivered second. (Figure 2) The diagram shows that it can, so we have the correct answer.
(A) In Question 7 we saw that box E can be second, so we can eliminate this answer choice because it does not contain E.
(B) See the analysis.
(C) * C can be delivered second.
(D) B cannot be delivered second.
(E) Neither B nor D can be delivered second.

A C E F B D G
\[A \lessdot D: \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D}\]
\[E \_ \_ D: \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E}\]

Fig. 2

11. (E) – There are two initial steps to take before you jump into this question. First, you should review the initial diagram and see if it shows any places where C cannot be. Unfortunately, it does not. Second, you should use correct answers from other questions to eliminate answer choices. Question 7(A) shows that C can be sixth. Question 10(C) shows that C can be second. This information allows us to eliminate answer choices (A) and (B). Now consider the three remaining answer choices. The only difference between them is whether box C can be first and/or fifth. A quick diagram shows that C can be fifth. (Figure 3) Now it is no longer necessary to confirm that C can be first, since both of the remaining answer choices contain it.

(A) C can be second or sixth.
(B) C can be second or sixth.
(C) C can be fifth.
(D) C can be fifth.
(E) * C can be in any of these five spaces.

B A E F C D G
\[A \lessdot D: \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D} \quad \mathcal{D}\]
\[E \_ \_ D: \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E} \quad \mathcal{E}\]

Fig. 3
12. (B) – Once again, you can use a combination of previous correct answers and a simple diagram to solve this question. If C is before B, then B can only be third or fifth. Diagram both of these possibilities. (Figure 4) It does not work to have B third, because there is no way to diagram this without violating the rule that A must be earlier than D. It is possible to have B fifth. This determines the order of all the other packages except A and C.

(A) A or C can be first.
(B) * E must be third.
(C) See (A).
(D) B must be fifth.
(E) See (A).

C   E   B   F   D   __   __
A/C  C/A   E   F   B   D   G

Fig. 4
Conclusion of simple lines

Points to remember:

The first or second game of the four games is always a simple line game.

There is always one simple line game in a section, and often there are two.

There are usually six or seven spaces to be filled.

There are usually as many members as there are spaces to fill.

There are sometimes fewer members than spaces to fill. If so, one or two members will be used more than once.

There may be more members than spaces to fill, though this is very unusual. If so, one or more members will not be used.

There are only a few simple line rules. Memorize these rules and the conclusions that result from them.

Some conclusions can only be made after considering the overlap and interactions of two or more rules.

You have now finished a comprehensive introduction to the simple line games. You have learned what the setups look like, what the rules look like, and what the questions look like. You have learned how to draw the diagrams, how to depict the rules, and how to make additional conclusions.

Much of what you have learned will be useful for the other types of games. Some of what you have learned will not sink in until you do practice tests, so plan to review this section as you practice the simple lines in the tests found later in this book.