



## NEGATION TEST: ARTICLE #1



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## INTRODUCTION

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A lot of students are scared of **Assumption questions in the Critical Reasoning Section of the GMAT**, simply because they are never really sure of the answer they are marking. The reason they face this problem is that they do not know how to **exploit a key feature of any assumption**. Needless to say that this lack in their understanding can cost them gravely since Assumption, together with related questions categories (such as Evaluate, Strengthen, Weaken etc.), accounts for more than **70% of the CR questions served in the exam**.

Before we go any further, why don't you try an Official Assumption argument to have a firsthand experience of this question category:

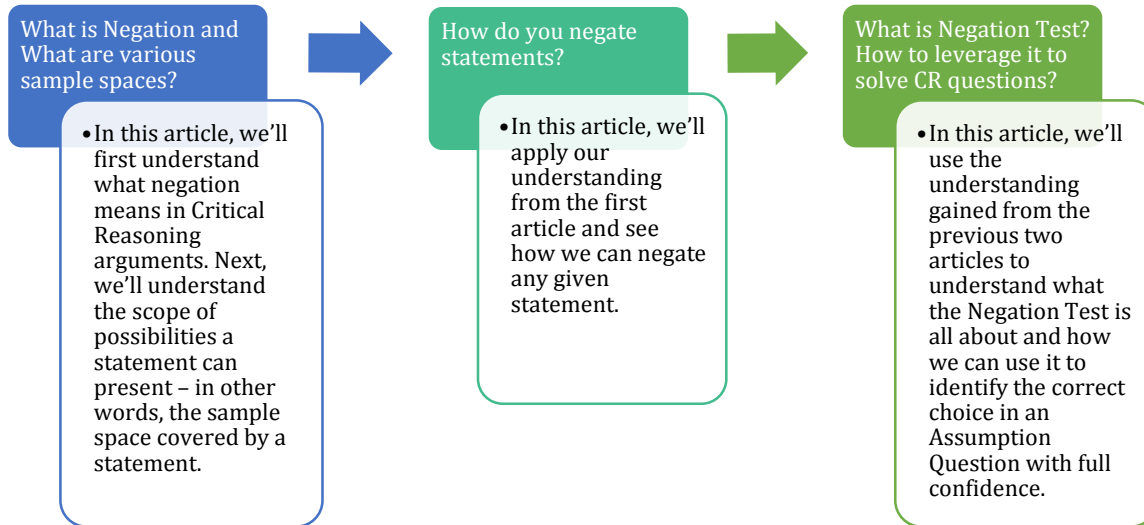
***Argument:** Although parapsychology is often considered a pseudoscience, it is in fact a genuine scientific enterprise, for it uses scientific methods such as controlled experiments and statistical tests of clearly stated hypotheses to examine the questions it raises.*

*The conclusion above is properly drawn if which of the following is assumed?*

- (A) If a field of study can conclusively answer the questions it raises, then it is a genuine science.*
- (B) Since parapsychology uses scientific methods, it will produce credible results.*
- (C) Any enterprise that does not use controlled experiments and statistical tests is not genuine science.*
- (D) Any field of study that employs scientific methods is a genuine scientific enterprise.*
- (E) Since parapsychology raises clearly statable questions, they can be tested in controlled experiments.*

What was your experience of the above question? Were you too unsure while marking the answer since you were confused between two answer choices? Did you have to re-read the passage while evaluating the answer choices, even though you did spend appropriate amount of time understanding the argument? If yes, then that means that you too are missing out on leveraging the **Negation Test** that exploits a **central feature of an assumption - that it has to be true for the argument to hold true!**

To make you understand and master the concept of Negation test, we have designed this e-book. Through a step-by-step approach, we shall demonstrate how the Negation test can help you mark the correct answer to an assumption within less than 2 minutes and that too with a 100% surety. Accordingly, this e-book is divided into the following parts:



Alright, so let's get started!

## WHAT IS NEGATION AND WHAT ARE VARIOUS SAMPLE SPACES?

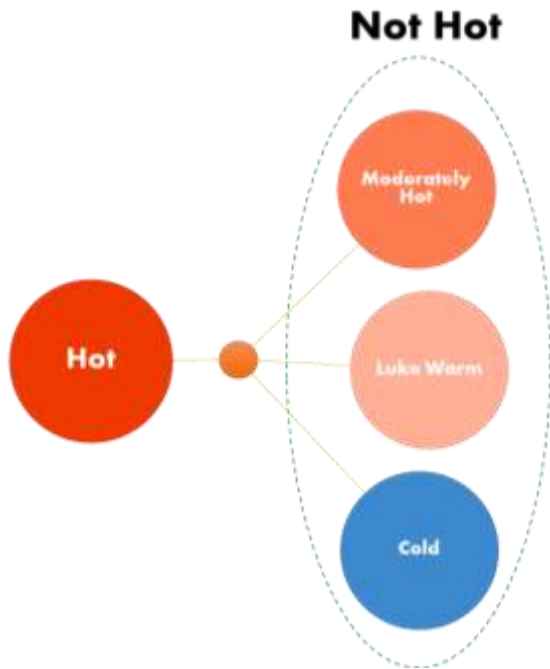
### INTRODUCTION

The first step in understanding the Negation Test is to understand what negation means in the GMAT world. This is what we'll cover first in this article. We'll then understand how certain words play an important role in determining the scope of the sample space covered by the statement.

### POLAR OPPOSITE VS LOGICAL OPPOSITE

**Negation in the GMAT world is based on the concept of Logical Opposites.** To understand what it means, let's contrast it with Polar Opposite.

**Polar Opposite:** The polar opposite of a given word/phrase/statement is the extreme opposite of it; for instance *cold* is the polar opposite of *hot*.



**Logical Opposite:** The logical opposite range of a word/phrase/statement covers the spectrum of the possibilities that lie outside the arena of the negated word; for instance the logical opposite range that we get by negating the word "hot" would include possibilities such as *moderately warm, lukewarm, cold* etc.

In all, this range includes anything and everything that is NOT hot. Hence, the logical opposite of "hot" is "not hot".

Below is a table that gives a few more examples to illustrate the difference between polar and logical opposites of a word.

Word	Logical Opposites	Polar Opposite
Bitter	Not bitter: <i>sour, sweet</i> etc.	<i>sweet</i>
Summer	Not summer: <i>spring, winter, autumn</i> etc.	<i>winter</i>



## WHAT IS NEGATION IN CR?

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Now that you have understood the concept of Logical Opposite, let's see how we use the same to negate statements in CR. Let us take a couple of examples:

**Statement:** The soup is hot.

**Negation:** The soup is NOT hot.

**Meaning of the negated statement:** We don't know whether the soup is cold, moderately warm or lukewarm. **All that we know is that it is definitely not hot.**

**Statement:** Michael plays basketball

**Negation:** Michael does NOT play basketball.

**Meaning of the negated statement:** We don't know whether Michael plays any other game. **All that we know is that he definitely doesn't play basketball.**

Easy, isn't it? Let's now look at another example.

**Statement:** Isabelle's hair is black.

What will be the negation of the above statement?

- a. Isabelle's hair is white.
- b. Isabelle's hair is not black.

Observe that (a) is the polar opposite of the given statement. With (a), you miss out on a lot of other possibilities; for instance, her hair could be neither black nor white - it could be red or brown. These possibilities are accounted for in the Logical Opposite of the statement, which in this case is: Isabelle's hair is not black. (It is not necessary to specify the actual color.☺)

**Meaning of the negated statement:** We don't know whether Isabelle's hair is white or red or brown or some other color. **All that we know for sure is that Isabelle's hair is NOT black.**

In each of the given examples, we're talking about only one person. So it is very easy for us to write down the negated statement. Let's now increase the difficulty level a bit.

Consider the following statement.

**Statement:** All tall boys have black hair.

Which of the following statements is/are the correct negation(s) for the above statement?



- a. Some tall boys have black hair.
- b. Not all tall boys have black hair.
- c. None of the tall boys have black hair.
- d. No boy has black hair.
- e. Most of the tall boys have black hair.

Only choice (b) is the correct negation of the given statement. To understand why that is the case, we need to understand the concept of **Sample Spaces**. Let's move to the same. ☺

## UNDERSTANDING SAMPLE SPACES

The next step in understanding the concept of negation in Critical Reasoning is to understand exactly who/what the statement is talking about, i.e. the segment the statement talks about, and how this segment is affected by the sample space covered by the statement. This sample space is usually defined by various group markers such as: all, most, some, none etc.

Let's take a deeper look at these two aspects:

### Understanding the Segment:

In the above example, the statement talks about a particular **segment** of population – All tall boys have black hair. So we need to consider the possibilities pertinent only to tall boys. We are not concerned with all boys, a group that includes short boys as well, or girls. **ONLY tall boys are within the scope of the statement**. This is the segment the statement talks about. Other segments are outside the scope of the argument and hence statements related to them are most likely not the correct assumptions.

### Understanding the Sample Space:

Once you understand the segment being talked about, understand the sample space covered by the statement. Group-markers such as *all, none, some, most*, etc. define this sample space for the statement.

Let's say there are 100 tall boys (100 being a placeholder for "All" the elements in the segment). With this supposition, here is the sample space each group-marker covers:

<b>Possibilities for 100 tall boys</b>		
<u>S No.</u>	<u>Term</u>	<u>Possibilities it covers</u>
a	No/None	0 tall boys out of 100 have black hair. (Only one possibility)
b	Less than 50%	0 to 49 tall boys have black hair.
c	Up to 50%	0 to 50 tall boys have black hair.
d	Half (50%)	50 tall boys out of 100 have black hair. (Only one possibility)
e	Most	51 to 100 tall boys have black hair.



f	Some	1 to 100 tall boys has black hair. (including both 1 and 100). Note that “some” does <b>NOT</b> include 0
g	Not All	0 to 99 tall boys have black hair. (Notice how <i>Not All</i> is different from <i>Some</i> )
h	All	All the 100 tall boys have black hair. (Only one possibility)

It is helpful to think of these sample spaces in terms of the possibilities they represent. These possibilities can be represented on a straight line that denotes all the possibilities in the identified segment - we call this line the **Possibility Line**.

Now, in the current example, we are concerned with the segment of tall boys. This segment consists of 100 tall boys. Since the Possibility Line will denote each and every possibility in this segment, we can diagrammatically represent the above group markers on it in the following ways:

Diagram#1 shows the possibilities related to group markers *none*, *some*, *not all*, *half*, and *all*.

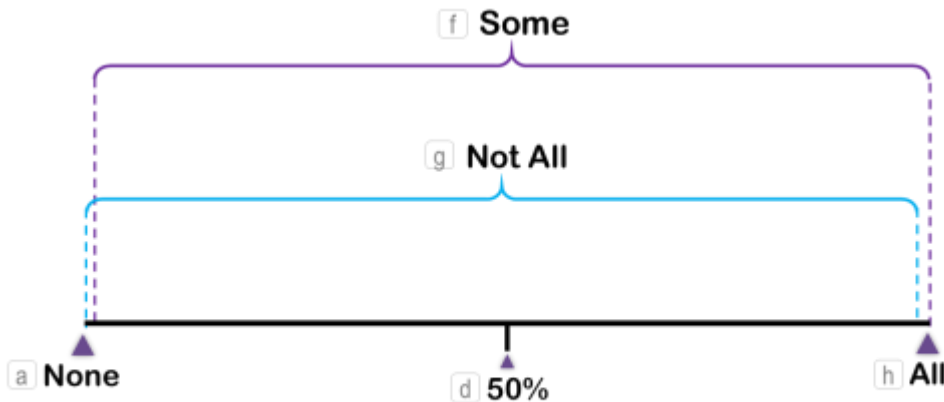


Diagram #1

Diagram#2 shows the possibilities related to group markers *none*, *less than half*, *up to half*, *half*, *most*, and *all*.

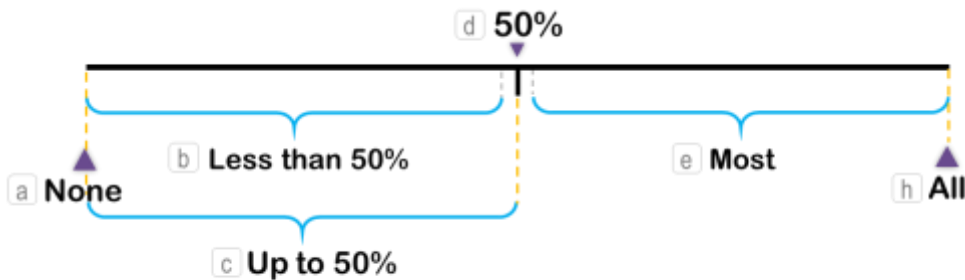


Diagram #2



**Note:** For the sake of clear understanding, the above group markers have been represented on two different Possibility Lines - you can represent them on a single Possibility Line as well.

As you can see in the above diagrams, the statement *All tall boys have black hair* covers only one possibility point - not 99, not 98, not 14, but a point denoting the possibility that all 100 of them have black hair. Therefore, its logical negation should account for anything and everything that is NOT 100/ALL (0-99 tall boys).

We will explore the concept of negating a statement in more detail in the next article, but before we move on to that, try your hand at solving the exercise questions given in this article.

Good Luck! ☺



## EXERCISE QUESTIONS

I. Assume that you're dealing with a segment of 100 people. Following are the number of people from this set who do a particular job, job X. For each statement below, determine which all groups can it fall under; for instance, the statement 0 people do X falls under Group A. None = 0, Group C. Not more than half = 0-50, and Group E. Not all = 0-99.

- i. Only 1 person does X.
- ii. Only 50 people do X.
- iii. Only 70 people do X.
- iv. 100 people do X.

- A. None
- B. Some
- C. Not more than half
- D. Most
- E. Not all
- F. All

II. In the following table, map the elements of the first column to their exact matches in the second column

Group marker	Complete possibility range
Some	0 - 99
Up to half	0- 49
Most	50 - 100
Not all	1- 99

III. For each of the given statements, choose the correct negation form(s) from the option statements.

1. Given statement: The room is dark.
  - a. The room is bright.
  - b. The room is not bright.
  - c. The room is anything but bright.
  - d. The room is anything but dark.
  - e. The room is not dark.



2. Given statement: The per-minute charge of a call made from a landline is higher than the per-minute call charge made from a cell phone.
  - a. The per-minute charge of a call made from a landline is lower than the per-minute call charge made from a cell phone.
  - b. The per-minute charge of a call made from a landline is low.
  - c. The per-minute charge of a call made from a landline is higher than the per-minute call charge made from a cell phone.
  - d. The per-minute charge of a call not made from a landline is higher than the per-minute call charge made from a cell phone.
  - e. The per-minute charge of a call made from a cell phone is high.
  - f. The per-minute charge of a call made from a landline is not higher than the per-minute call charge made from a cell phone.
  
3. Given statement: The buildings in Oakville are stronger than the buildings in Cottonville.
  - a. The buildings in Oakville are as weak as the buildings in Cottonville.
  - b. The buildings not in Oakville are not stronger than the buildings in Cottonville.
  - c. The buildings in Oakville are weaker than the buildings in Cottonville.
  - d. The buildings in Oakville are not as strong as the buildings in Cottonville.
  - e. The buildings in Oakville are not stronger than the buildings in Cottonville.
  - f. The buildings not in Oakville are not as strong as the buildings in Cottonville.
  - g. The buildings in Oakville are as strong as or weaker than the buildings in Cottonville.

## ANSWER KEY

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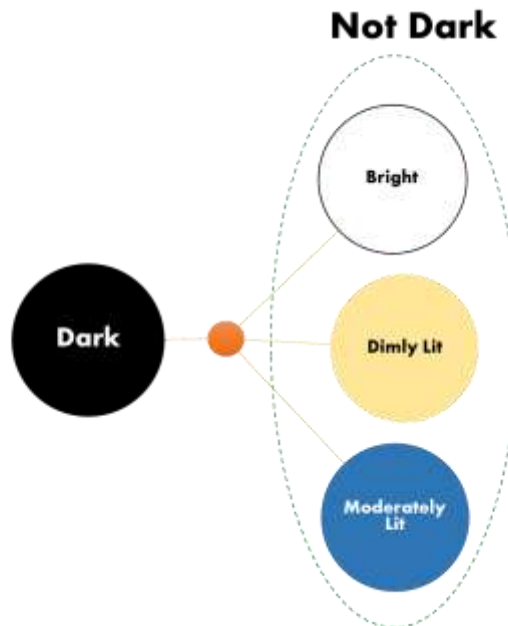
### Question I.

- i. *Only 1 person does X* falls under the Groups B, C, E
- ii. *Only 50 people do X* falls under the Groups B, C, E
- iii. *Only 70 people do X* falls under the Groups B, D, E
- iv. *100 people do X* falls under the Groups B, D, F

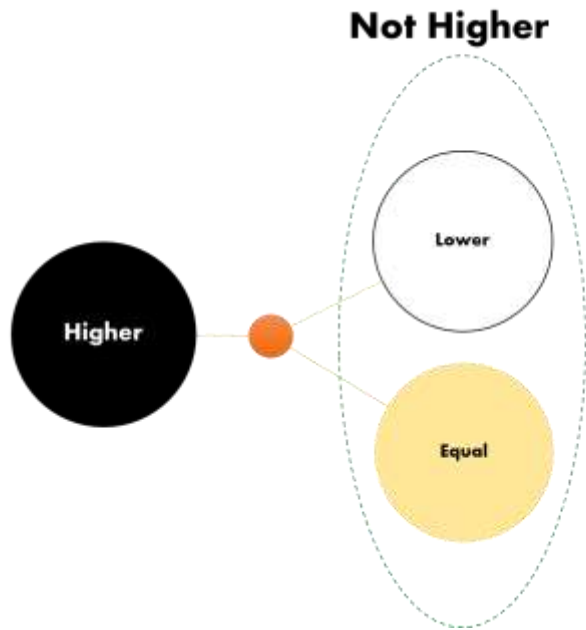
### Question II – Not All: 0 to 99

### Question III:

- 1. d, e



2. f



3. e, g

