

# GUIDELINES

for READERS and TEST TAKERS of  
the NEXT GENERATION GMAT<sup>®</sup>

*Recommendations to help readers and test takers work together for an accessible testing experience*

Accessibility



**Carl and Ruth Shapiro Family  
National Center for Accessible Media**



*Connecting talent and aspiration with opportunity*

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# Section 1: General Recommendations

## Recommendations for Readers

1. Be familiar with the subject matter and test format. Read GMAT practice materials including practice tests. Be sure you are comfortable with the language, terms, symbols, images, and item formats that may appear in the test.
2. We recommend that the reader and test taker meet some time prior the test. This can be in person, on the phone, or via email. Topics for discussion may include how the test taker prefers to hear mathematical equations, if the test taker will be using any tools or assistive technology during the test, how the test taker would like to confirm that the answer choice they have selected has been entered into the computer, and other considerations that will make for a smooth experience on test day.
3. Some sections of the online test include an onscreen calculator. Since the test taker may not be able to use the calculator independently, you will have to input numbers, perform calculations, and read out the results. Be careful to input exactly what the test taker says.
4. This is a complex test so there will be some level of conversation during the exam period as you describe a question type or a graph and the test taker queries you to determine the correct answer to the question. These guidelines will provide both you and the test taker with a structure for those conversations by identifying what can be asked and how to answer.
5. The test will take a long time, several hours, to complete. Readers should be sure to speak in a clear and consistent voice throughout the test. Often, the test taker will ask you to repeat words, lines or paragraphs; spell words; or take notes. When there are complex images, the test taker may request to have the same information read over and over as they work through the problem. Take care to deliver the information in the same manner each time and prevent boredom or frustration from creeping into your voice.
6. It is important to read the text on screen without adding any comment, analysis, or emotion that may affect the test taker's understanding of the material. If words are in bold face or highlighted, give them emphasis and indicate that they are in bold face and highlighted. When reading answer choices, be sure to read each one with the same inflection and tone to avoid unintentionally tipping the test taker toward one answer choice or another. If you come across an unfamiliar word or one you are not sure how to pronounce, tell the test taker and then spell it out.
7. The majority of these guidelines provide guidance on how to read or describe elements of the test that are not simply text. This includes images, tables, and mathematical expressions. Using these guidelines, you should be able to provide access to images and other non-text elements without confusion or delay, similar to the way you will be reading plain text.

## Recommendations for Test Takers

1. During the test, the reader will read to you from the computer screen and will also take notes and read them back to you. You can ask the reader to:
  - a. Make a note of any information you need to use as you work through a problem.
  - b. Make a note of which answers you can rule out from the multiple-choice answers available.
2. When giving an answer choice, say the letter of the choice as well as the choice itself to prevent errors, where applicable.
3. Some sections of the online test include an onscreen calculator. When you request it, the reader will perform calculations for you.
4. Meet beforehand with the reader and have them read math equations and describe graphics and images. Ensure that you are comfortable with their style and make personal adjustments as needed.

# Section 2: Quantitative

There are two types of quantitative questions: Problem Solving and Data Sufficiency.

## Problem Solving

Solve each problem and select the best of the five answer choices given.

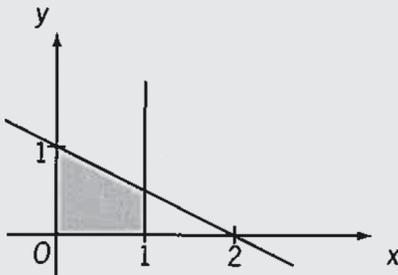
### READER GUIDELINES

- Read the question.
- Describe any figure related to the question.
  - If the question contains a description of the figure, use the same language in your description.
  - Often, the question does not provide all of the figure's relevant details needed to determine the answer. Be sure to add those details in your description. See example on page 6.
  - See Section 5, How to Describe Complex Images, for more guidelines.
- Read the answer choices.
- Repeat any part of the question, figure description, or answer choices when asked.

### TEST-TAKER GUIDELINES

- Listen to the question, answer choices, and any figure description.
- If you do not understand what is being asked, ask to hear the question and answer choices again.
- If the problem seems simple, take a few moments to see whether you can determine the answers on your own. Then check your answer against the choices provided.
- If the problem requires more work or multiple steps, ask your reader to write down any data you'll want to reference or use to answer the question.

### EXAMPLE



*"The rectangular coordinate system has a shaded region bounded by two straight lines. The first line crosses the y-axis at the ordered pair zero comma one, and crosses the x-axis at the ordered pair two comma zero. The second line is a vertical line that crosses the x-axis at the ordered pair one comma zero. The shaded region is between the origin and the intersection of the lines."*

21. In the rectangular coordinate system above, the shaded region is bounded by straight lines. Which of the following is NOT an equation of one of the boundary lines?
- (A)  $x = 0$
  - (B)  $y = 0$
  - (C)  $x = 1$
  - (D)  $x - y = 0$
  - (E)  $x + 2y = 2$

## Data Sufficiency

Each Data Sufficiency question consists of a question, often accompanied by some initial information, and two statements, labeled (1) and (2), which contain additional information. Decide whether the information in each statement is sufficient to answer the question or—if neither statement provides enough information—whether the information in the two statements together is sufficient. It is also possible that the statements in combination do not give enough information to answer the question. The same five answer choices apply to each question in this section.

### READER GUIDELINES

- At the start of this section, read the five fixed answer choices.
- Read the initial information and question.
- Read the first statement.
- Read the second statement.
- Describe any figure related to the question.
  - If the question contains a description of the figure, use the same language in your description.
  - Often, the question does not provide all of the figure's relevant details needed to determine the answer. Be sure to add those details in your description. See example on page 8.
  - See Section 5, How to Describe Complex Images, for more guidelines.
- Repeat any part of the question or figure description when asked.
- Repeat the five fixed answer choices, as a whole or individually, when asked.

### TEST-TAKER GUIDELINES

- Listen to the five fixed answer choices before starting the section.
- Listen to the information, question, and statements.
- Consider each statement separately and in tandem.
- Work through the problem, asking your reader to write down any data you'll want to reference or use to answer the question.
- Decide whether the given statements are sufficient for answering the question.
- Ask to hear the answer choices, as a whole or individually, as needed.
- Select one of the five fixed answer choices.

## EXAMPLE

| Cancellation Fees       |                          |
|-------------------------|--------------------------|
| Days Prior to Departure | Percent of Package Price |
| 46 or more              | 10%                      |
| 45–31                   | 35%                      |
| 30–16                   | 50%                      |
| 15–5                    | 65%                      |
| 4 or fewer              | 100%                     |

*"The table shows the cancellation fee schedule. It lists Days Prior to Departure in one column and Percent of Package Price in another column.  
46 or more days; 10 percent  
45 to 31 days; 35 percent  
30 to 16 days; 50 percent  
15 to 5 days; 65 percent  
4 or fewer days; 100 percent"*

93. The table above shows the cancellation fee schedule that a travel agency uses to determine the fee charged to a tourist who cancels a trip prior to departure. If a tourist canceled a trip with a package price of \$1,700 and a departure date of September 4, on what day was the trip canceled?

- (1) The cancellation fee was \$595.
- (2) If the trip had been canceled one day later, the cancellation fee would have been \$255 more.

# Section 3: Verbal

There are three types of multiple-choice questions in the Verbal section: Reading Comprehension, Critical Reasoning, and Sentence Correction. These question types are intermingled throughout the Verbal section.

When reading passages or sentences, if there is a word the reader is unfamiliar with, the reader should let the test taker know that, and spell the word. Similarly, the test taker can ask to have a word spelled if they are unsure of what word was read.

## Reading Comprehension and Critical Reasoning

For Reading Comprehension questions, a passage appears on the left side of a split screen, with one question at a time appearing on the right side. The number of questions associated with each passage may vary.

Critical Reasoning questions are similar to Reading Comprehension questions; they include a passage and a question. However, Critical Reasoning passages are only one paragraph and are followed by one or two questions.

### READER GUIDELINES

- Begin by identifying the type of question. If there is a passage of more than one paragraph, it is a Reading Comprehension question. If there is a single paragraph, it is a Critical Reasoning question.
- Ask the test taker if they would like to hear the passage first or the question and answer choices first.
- Read the entire passage.
- Say “End paragraph” at the end of a paragraph.
- If the passage includes words in quotes, say “Begin quote” and “End quote.”
- If the passage includes words in italics, pause before and after the italics. However, if the italics are setting off a title, such as the title of a book, and the sentence does not make it clear that it is a book title, say “Begin italics” and “End italics.”
- If the passage includes highlighted words, say “Begin highlight” and “End highlight.”
- If the passage includes words in boldface, say “Begin bold” and “End bold.”
- Read the first question and the answer choices.
- Repeat any part of the passage, question, or answer choices when asked.
- On request, reread specific paragraphs or sentences. See test-taker guidelines for acceptable requests.
- If the test taker asks about a specific term, read the first sentence where that term appears.
- Tell the test taker, when the next question appears, whether the same passage or a new passage is shown.

### TEST-TAKER GUIDELINES

When listening to a passage, you can ask your reader to:

- Re-read the entire passage.
- Re-read a specific paragraph or sentence such as:
  - The paragraph (or sentence) that first mentions a specific term.
  - The paragraph (or sentence) before or after one you have just heard.
- Re-read the words in quotes, italics, bold, or highlighting.
- Re-read the question or the answer choices.

## Sentence Correction

Sentence Correction questions present a statement in which words are underlined. The questions ask you to select from the answer choices the best expression of the idea or relationship described in the underlined section. The first answer choice always repeats the original phrasing, whereas the other four provide alternatives. The test taker must select the correct phrasing for the underlined section.

### READER GUIDELINES

- Begin by identifying the type of question, Sentence Correction.
- Read the entire sentence as normal text with the intonation conveyed by the punctuation but without naming the punctuation.
- Then read the entire sentence again, naming each punctuation mark, and saying “Begin underline” and “End underline.”
- Read the answer choices including punctuation.
- If the test taker prefers to hear the sentence read differently (for example, with punctuation and underlining from the start, or with underlining only) follow that direction.

### TEST-TAKER GUIDELINES

When listening to a Sentence Correction question, you can ask your reader to:

- Re-read the full sentence, with or without punctuation and underlining.
- Re-read an answer choice.
- Read the sentence with an answer choice substituted for the underlined section.
- If you prefer to hear the sentence read differently (for example, with punctuation and underlining from the start, or with underlining only) establish this with the reader.

## EXAMPLE

Like ants, termites have an elaborate social structure in which a few individuals reproduce and the rest are serving the colony by tending juveniles, gathering food, building the nest, or they battle intruders.

First read without naming punctuation or underlining:

Like ants, termites have an elaborate social structure in which a few individuals reproduce and the rest are serving the colony by tending juveniles, gathering food, building the nest, or they battle intruders.

Then read it again, naming punctuation and noting the underlining:

Like ants comma termites have an elaborate social structure in which a few individuals reproduce and the rest Begin Underline are serving the colony by tending juveniles comma gathering food comma building the nest comma or they battle End Underline intruders.

Read the answer choices with punctuation. There is no underlining in the answer choices.

# Section 4: Integrated Reasoning

There are four types of Integrated Reasoning questions. Readers should be familiar with each type of question and with the general tools provided with the test, such as the calculator.

Throughout this section, you will be referred to more detailed guidelines on **How to Describe Complex Images (Section 5)** and **How to Read Mathematics (Section 6)**.

## Multi-Source Reasoning

Multi-Source Reasoning questions begin with two or three sources of information, each labeled with a tab, that appear on the left side of a split computer screen. Typically, one or more of the sources will contain a written passage; the other sources may consist of tables or graphics. Only one source of information will be displayed at a time. To view a different source, select its tab. The guidelines below begin with general guidelines for Multi-Source Reasoning questions and are followed by specific guidelines for passages, tables, and graphics.

### GENERAL MULTI-SOURCE REASONING GUIDELINES

#### READER GUIDELINES

- Begin by identifying the question type (Multi-Source Reasoning). Describe the split screen; list the number of tabs on the left side of the page, and state that there is a question on the right side of the screen.
- Read the name of each tab and give a short description of the source, i.e. “an article with three paragraphs” or “a paragraph followed by a data table labeled X.”
- Ask the test taker if they would like to hear the question and answer choices first, or if they would like to hear the sources of information first.
- Ask the test taker which tab they would like to hear first, listing the tab titles if requested.

#### TEST-TAKER GUIDELINES

When answering a Multi-Source Reasoning question, you can ask your reader to:

- Re-read the overview of the tabs and question.
- Re-read the tab you would like to hear.
- Re-read the list of tabs as needed.
- Re-read the question or answer choices as needed.

### PASSAGES

#### READER GUIDELINES

To read passages:

- Read the title of the passage, if given, or the name of the tab.
- Read the entire passage.
- On request, re-read specific paragraphs or sentences.  
See test-taker guidelines for acceptable requests.
- If a question asks about a specific term, read the first sentence where that term appears.

#### TEST-TAKER GUIDELINES

When listening to a passage, you can ask your reader to:

- Re-read the entire passage.
- Re-read a specific paragraph or sentence such as:
  - The paragraph (or sentence) that first mentions a specific term.
  - The paragraph (or sentence) before or after one you have just heard.

## TABLES

### READER GUIDELINES

To read the tables:

- Read the text accompanying the table, if any.
- Provide an overview with the header column(s) (including any units, abbreviations, or data ranges) and any footnotes attached to the table.
- Identify the total number of rows that contain data, i.e. “the table has ten rows” for a table that has ten rows plus one header row.
- Wait for the test taker to ask for specific data.

### TEST-TAKER GUIDELINES

When analyzing a table, you can ask your reader to:

- Read the column headers.
- Read the row headers.
- Read an entire column by providing its header.
- Read an entire row by providing its header.
- Read a specific cell by providing the column header and row header.
- Read rows or columns which include specific cell data.
- Read specific column values by providing specific row values.
- Identify any blank cells and provide the header and row information.
- Identify any zero-value cells and provide the header and row information.
- Write down any data you’ll want to reference or use to answer the question.

## GRAPHICS

See the section on Graphic Interpretation questions within IR and in **How to Describe Complex Images (Section 5)**.

### EXAMPLE

The screenshot shows a GMAT Integrated Reasoning question interface. At the top, a teal banner reads "Questions 1–18: Multi-Source Reasoning". Below this, the GMAT logo and "Integrated Reasoning" are visible. A "Click for calculator" button is present. The main content area features two tabs: "Sports Association" and "News Organizations". The "News Organizations" tab is active, displaying a passage of text. A question stem asks: "Statement by news organizations spokes-". Below the text, there are two answer choices: "10B." and "10C.", each with a radio button. Three callout boxes provide instructions: 1. "View the information within each tab by clicking on its name" (with arrows pointing to the tabs). 2. "This type of question asks you to solve a problem or make a decision using information contained within the tabs". 3. "You must choose an answer for each statement by selecting one of the buttons in front of each statement". At the bottom, there are "Help", "Submit Answer", and "GO" buttons. The footer shows "HOME", "Question 10 of 50", and "Jump to: [ ] GO".

## Table Analysis

Table Analysis questions present a sortable table similar to a spreadsheet. These tables can be sorted by selecting a column title from a drop-down menu. The entire table will then be sorted based on your selection. Tables may be sorted numerically, alphabetically, or according to a logical principle such as “bad, indeterminate, good, excellent.”

### READER GUIDELINES

To read the sortable tables:

- Begin by identifying the question type (Table Analysis). Describe the screen with the paragraph and table, and the series of questions on the right side of the screen.
- Read the paragraph accompanying the table.
- Identify the table as sortable.
- Provide an overview with the header column(s) (including any units, abbreviations, or data ranges) and any footnotes attached to the table.
- Identify the total number of rows and columns.
- Wait for the test taker to ask for specific data.

### TEST-TAKER GUIDELINES

When analyzing a sortable table, you can ask your reader to:

- Read the column headers.
- Sort by a specific column name.
  - Tell you how the column has been sorted, for example high to low, alphabetically, or logically grouped. Do not assume that words are sorted alphabetically.
  - Read the top cell, bottom cell, or all cells in a column from top to bottom or bottom to top.
  - Read all rows that include specific data.
  - Read the columns for all rows that include specific data.
  - Read a specific cell by providing the column header and row data.
  - Identify any blank cells and provide the header and row information.
  - Identify any zero-value cells and provide the header and row information.
  - Write down any data you’ll want to reference or use to answer the question.

## EXAMPLE

**Questions 19–24: Table Analysis**

Click for calculator

The table displays nutrition data per 240 mL serving for selected cooked or uncooked vegetables: percent water, energy in kilocalories (kcal), protein, total fat, carbohydrate, and total fiber, in grams (g). Each serving consists of 240 mL of finely chopped, raw vegetables (uncooked) or 240 mL of thoroughly drained, steamed vegetables (cooked).

Sort By: Vegetable

| Vegetable      | Cooked (yes/no) | Percent water | Energy (kcal) | Protein (g) | Total fat (g) | Carbohydrate (g) | Total fiber (g) |
|----------------|-----------------|---------------|---------------|-------------|---------------|------------------|-----------------|
| Asparagus      |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Beets          |                 | 96            | 20            | 3           | trace         | 3                | 2.7             |
| Broccoli       |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Broccoli       |                 | 96            | 20            | 3           | trace         | 3                | 2.7             |
| Corn           |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Corn           |                 | 96            | 20            | 3           | trace         | 3                | 2.7             |
| Green beans    |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Mustard greens | yes             | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Pak choy       | yes             | 96            | 20            | 3           | trace         | 3                | 2.7             |
| Spinach        |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Spinach        |                 | 96            | 20            | 3           | trace         | 3                | 2.7             |
| Summer squash  |                 | 94            | 21            | 3           | trace         | 3                | 2.6             |
| Sweet pepper   |                 | 96            | 20            | 3           | trace         | 3                | 2.7             |

For each of the following statements, select Yes if the statement is true based on the information provided, otherwise select No.

|      | Yes                   | No                    |                                                                                                                                                                   |
|------|-----------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22A. | <input type="radio"/> | <input type="radio"/> | The median amount of protein for all uncooked vegetables listed is $\frac{1}{3}$ the median amount of protein for all cooked vegetables listed.                   |
| 22B. | <input type="radio"/> | <input type="radio"/> | The amount of carbohydrate per serving of cooked corn is exactly 3 times the median amount of carbohydrate per serving for the other 14 vegetable options listed. |
| 22C. | <input type="radio"/> | <input type="radio"/> | Each serving listed for which total fiber is less than 3.0 g also has at most 10 g of carbohydrate.                                                               |

HOME Question: 22 of 50 Jump to: 22 GO

Help < Submit Answer >

**The table can be sorted by clicking on the sort box and choosing a column by which to sort**

**This type of question will include a table of information and several statements that refer to the table**

**You must choose an answer for each statement by selecting one of the buttons in front of each statement**

## Graphics Interpretation

Graphics Interpretation questions present a graph, diagram, or other visual representation of information, followed by one or more statements containing a total of two blanks. Each blank contains a drop-down menu from which the test taker must select the option that creates the most accurate statement.

Many of the graphs included in Graphics Interpretation questions involve two variables plotted on vertical and horizontal axes. Graphs of this type include bar graphs, line graphs, scatter plots, and bubble graphs.

It is critical that the reader provide accurate data when the test taker asks for specific data points. Some questions require numeric calculations based on individual data points. Readers should be familiar with techniques for accurately determining data points for each kind of graph. The reader may need to use a ruler to trace lines from a data point to the axis to find a value, for example.

### READER GUIDELINES

- Begin by identifying the question type (Graphics Interpretation). Describe the screen; name the kind of graphic provided and say that there are one or two sentences below with a total of two blanks to be filled in.
- Provide an overview with the graphic title, and any headers, axis titles, and axis scales. If there are two different vertical axes, say so.
- Read the paragraph accompanying the graph.
- Provide a one-to-two sentence description of trends in the data that are immediately obvious to a sighted test taker. For example, a steady line or curve, one that increases or decreases sharply, or a break in a line or curve. Refer to Section 5, How to Describe Complex Images, for guidelines on the specific type of graphic (bar graph, scatter plot, flow chart, etc.).
- Wait for the test taker to ask for specific data or data points.

### TEST-TAKER GUIDELINES

While answering a Graphics Interpretation question, you can ask your reader to:

- Read the overview of the graphic or any part of it again.
- Provide specific data or data points - i.e. "What is the value for Cost for the month of January?" or "Who reports to the CEO?"
- Write down any piece of data you'll want to reference or use to answer the question.

## EXAMPLE:

The screenshot displays a GMAT Integrated Reasoning question titled "Questions 25–34: Graphics Interpretation". The interface includes a "Click for calculator" button and a "Calculator" icon. The main content area features a bar graph titled "Total Number of Hours of Exercise Reported by Respondents". The graph shows the number of respondents (y-axis, 0 to 5) for each hour of exercise (x-axis, 1 to 11). The data points are: 1 hour: 5 respondents; 2 hours: 3 respondents; 3 hours: 2 respondents; 4 hours: 4 respondents; 5 hours: 4 respondents; 6 hours: 5 respondents; 7 hours: 0 respondents; 8 hours: 1 respondent; 9 hours: 0 respondents; 10 hours: 1 respondent; 11 hours: 0 respondents.

Text on the screen reads: "This type of question will ask you to analyze a graph and fill in the blanks to complete the statements below." and "To complete a statement, click on each box and choose an answer from the list that appears".

Question 25A: "The least possible value for the mean of the numbers of hours of exercise reported for the week is .

Question 25B: "The number of respondents who exercised on average less than one-half hour per day during the week is between  and  inclusive." A dropdown menu is open for the second blank, showing options: 0 and 5, 5 and 8, 8 and 10, 10 and 14, 14 and 19.

Navigation buttons include "Help", "<", "Submit Answer", and ">". The bottom of the screen shows "HOME", "Question 25 of 50", and "Jump to:  GO".

## Two-Part Analysis

Two-Part Analysis questions present a brief written scenario or problem and ask the test taker to make two choices related to that information. These choices are connected to each other in some way; for example, they might be two steps involved in solving a problem, two components required to successfully complete a task, or a pair of true and false statements inferred from the text.

The possible answers and choices will be given in a table format. The possible answers are listed in the third column, on the right side of the table. The choices for the first part and second part of the question will be recorded in the first and second columns of the table, respectively. Remember that a choice needs to be made for each of the first two vertical columns of the table—not one for each horizontal row. Make only two selections, one in each column.

### READER GUIDELINES

- Begin by identifying the question type (Two-Part Analysis). Describe the screen; say that there is a short paragraph followed by a table of choices, and that one selection should be made in each of the two answer columns.
- Read the scenario.
- Provide an overview of the answer choices with the header column(s) (including any units, abbreviations, or data ranges) and then read all choices.
- Repeat the scenario, the headings, or the answer choices as needed.

### TEST-TAKER GUIDELINES

While answering a Two-Part Analysis question, you may ask the reader to:

- Repeat any part of the question you wish to hear again, including the instructions on how to enter answers in the table, the table headers, and the answer choices.
- Write down any data you'll want to reference or use to answer a question.

## EXAMPLE:

The screenshot shows a GMAT Integrated Reasoning question titled "Questions 35–50: Two-Part Analysis". The question text reads: "Naturalist: The decline of coral reefs has various causes. One contributing factor is predation on coral by organisms such as the crown-of-thorns sea star, whose preferred food source is coral polyps. Human fishing practices have decreased the sea star's predators, such as the harlequin shrimp. It is also possible that runoff containing nutrients for phytoplankton has resulted in larger phytoplankton blooms: the crown-of-thorns sea star gladly eats phytoplankton. Indicate in the table which cause-and-effect sequence would most likely, according to the naturalist, result in coral reef decline. Make only two selections, one in each column." Below the text is a table with three columns: "Cause", "Effect", and a blank column for selection. The table has five rows labeled A through E. Row A: Cause: An increase in phytoplankton, Effect: A decrease in phytoplankton. Row B: Cause: A decrease in phytoplankton, Effect: An increase in crown-of-thorns sea stars. Row C: Cause: An increase in crown-of-thorns sea stars, Effect: A decrease in crown-of-thorns sea stars. Row D: Cause: A decrease in crown-of-thorns sea stars, Effect: An increase in harlequin shrimp. Row E: Cause: An increase in harlequin shrimp, Effect: An increase in harlequin shrimp. Two blue arrows point to the first two columns of the table. A callout box says "To answer, click one button in each column". Another callout box says "This type of question will include a short passage and a problem or question that refers to the passage". The interface includes a "Click for calculator" button, "Help", "Submit Answer", and "GO" buttons. The bottom of the screen shows "HOME", "Question: 37 of 50", and "Jump to: [ ] GO".

|   | 37A                   | 37B                   |                                          |
|---|-----------------------|-----------------------|------------------------------------------|
|   | Cause                 | Effect                |                                          |
| A | <input type="radio"/> | <input type="radio"/> | An increase in phytoplankton             |
| B | <input type="radio"/> | <input type="radio"/> | A decrease in phytoplankton              |
| C | <input type="radio"/> | <input type="radio"/> | An increase in crown-of-thorns sea stars |
| D | <input type="radio"/> | <input type="radio"/> | A decrease in crown-of-thorns sea stars  |
| E | <input type="radio"/> | <input type="radio"/> | An increase in harlequin shrimp          |

# Section 5: How to Describe Complex Images

All image description should follow these basic guidelines for effective and efficient description.

## **BREVITY**

Test takers with visual or print disabilities will usually require more time to complete an exam. In addition, since the test taker cannot scan an image and is essentially experiencing the information in a linear way, the initial investigation of every new page and every new diagram simply takes longer. Therefore, it is important for readers to provide access to the information in as few words as possible consistent with providing accurate and adequate detail.

Brevity can be achieved when both reader and test taker are familiar with the exam and have determined how they will approach each type of graphic or image.

## **CLARITY**

If the reader needs to listen to a description several times because it is presented in a confusing manner, it adds to time spent on the test and to the test taker's cognitive load. In other words, if the reader is not describing graphical information in a clear manner, then the test taker's job is doubled. They must first decode what the reader is trying to convey before they can analyze the information and try to answer the test questions.

Sometimes, in an effort to be as brief as possible, a reader may mistakenly leave out important information, therefore making the description difficult to understand or leading the test taker to choose an incorrect answer choice.

## **DATA**

The way to achieve a balance of brevity and clarity is to focus on the graphic's data and not extraneous visual elements. Charts and diagrams, for example, often contain data that can be made accessible by presenting the data separate from the description of the overall image.

For example, the test taker who is blind, and does not have a tactile graphic, will not compare the relative size of wedges in a pie chart or the heights of bars on a bar chart. Instead, they will require the numerical data to discover the meaning of each graph. Therefore, a reader's description should focus on the construction and data of graphics and, unless essential, omit purely visual or decorative elements.

## **DRILL-DOWN ORGANIZATION**

How the reader's presentation of information is organized is an important ingredient to providing clear and brief descriptions that are focused on data.

Descriptions should follow a drill-down organization, e.g., a brief summary, including the title and construction of the image, followed by an extended description and/or specific data. Drill-down organization allows the reader to either continue listening for more information, stop when they have heard all they want, or have specific information repeated as necessary.

## Data Graphs (Line Graph, Bar Chart, Scatter Plot, and Circle Graph)

### READER GUIDELINES

- Briefly describe the chart and give a summary if one is immediately apparent, making sure not to analyze or interpret the graphic.
  - Provide the title and axis labels, if any.
  - Identify and read the legend.
- NOTE:** Establish with the test taker if they would like the lines or bars of a chart to be referred to by their visual legend, e.g., the dashed line, or if they prefer to hear the name of what the line or bar represents (as indicated in the legend), e.g., U.S. Exports. The test taker's preference may change depending on the complexity of the chart. For example, the bars of one chart may be easily differentiated with words, (a white bar and a black bar) while those with many bars may become tedious to describe that way (the solid bar, the spotted bar, the light grey bar, the bar with diagonal hashes, the herringbone bar, etc.).

The test taker may ask to have the course of each line read individually. For example, a simple imports/exports line graph could be described like this:

*The reader introduces the line graph:*

A line graph titled U.S. Automobile Industry 1980-1984.

The horizontal axis, labeled Year, begins in 1980 and ends in 1984.

The vertical axis is labeled Number of Cars in hundreds of thousands.

There are two lines on the graph. A solid line labeled Imports and a dashed line labeled Exports.

*The test taker asks to hear the Imports line by year:*

Imports.

1980, 7

1981, 8.5

1982, 12

1983, 13.5

1984, 15

*Alternately, the test taker may ask to have the year read, with the Imports number followed by the Exports number. Be sure to pause between numbers so that the test taker is clear as to which number is which.*

The year followed by Imports, then Exports.

1980, (PAUSE) 7, (PAUSE) 10.5

1981, (PAUSE) 8.5, (PAUSE) 11

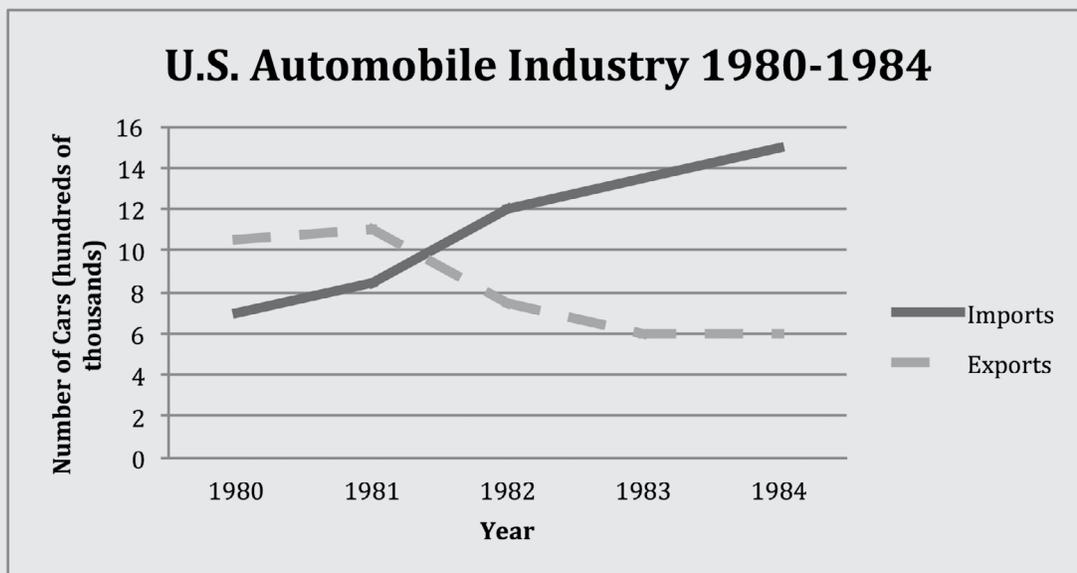
1982, (PAUSE) 12, (PAUSE) 7.5

1983, (PAUSE) 13.5, (PAUSE) 6

1984, (PAUSE) 15, (PAUSE) 6

The test taker may also ask for data from a specific year for one or more lines.

### LINE GRAPH



The approach to a bar chart is similar; begin with the title and construction of the chart.

A bar chart titled U.S. Automobile Industry 1980-1984

The horizontal axis, labeled Year, begins in 1980 and ends in 1984.

The vertical axis is labeled Number of Cars in hundreds of thousands.

A legend shows that the solid bars represent Imports and the shaded bars represent Exports.

Next, the test taker will ask to have the data read, and despite the fact that the bar chart looks different from a line graph, it will sound very similar if read along the horizontal axis (Year) with the solid bar (Imports) followed by the shaded bar (Exports.)

The year followed by Imports, then Exports.

1980, (PAUSE) 7, (PAUSE) 10.5

1981, (PAUSE) 8.5, (PAUSE) 11

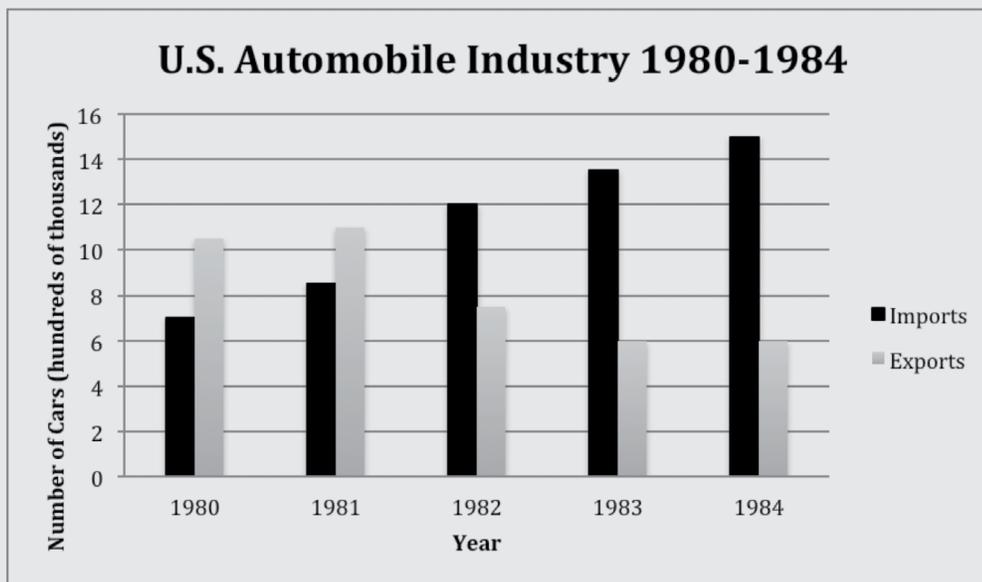
1982, (PAUSE) 12, (PAUSE) 7.5

1983, (PAUSE) 13.5, (PAUSE) 6

1984, (PAUSE) 15, (PAUSE) 6

Other types of charts that may appear on the GMAT (pie charts, for example) can be approached in the same style as line graphs and bar charts.

## BAR CHART



Scatter plots are among the more difficult graphs to describe. Since scatter plots typically contain dozens or even hundreds of data points, reading out all of the points can be a tedious and unhelpful exercise. Therefore, it is incumbent on the test taker to ask relevant questions that focus the responses of the reader on a specific area or trend of the scatter plot. To that end, it will be important for test takers to hear the questions before exploring the scatter plot.

### READER GUIDELINES

- Identify the image as a scatter plot.
- Read the paragraph accompanying the scatter plot (if there is one.)
- Read the question and answer choices.
- Provide the title and axis labels.
- Read the legend.
- Describe the scatter plot left to right, describing the relative change of concentration and density of the points.
- Identify the number, or approximate number, of points on the scatter plot. Use relative terms like dozens instead of counting each point. Be specific when asked by the test taker.
- Wait for the test taker to ask for specific data.

### TEST-TAKER GUIDELINES

- Ask about outliers from the main concentration.
- Ask what is the highest or lowest /greatest or least point of a data set.
- Ask how many points in a data set fall between two values in the chart.
- Ask for the coordinates of any point. For example, the highest point between A and B on the x-axis.

### Sample Description

The graph is a scatter plot, entitled “Paper Recycling Efforts of US Law Firms.”

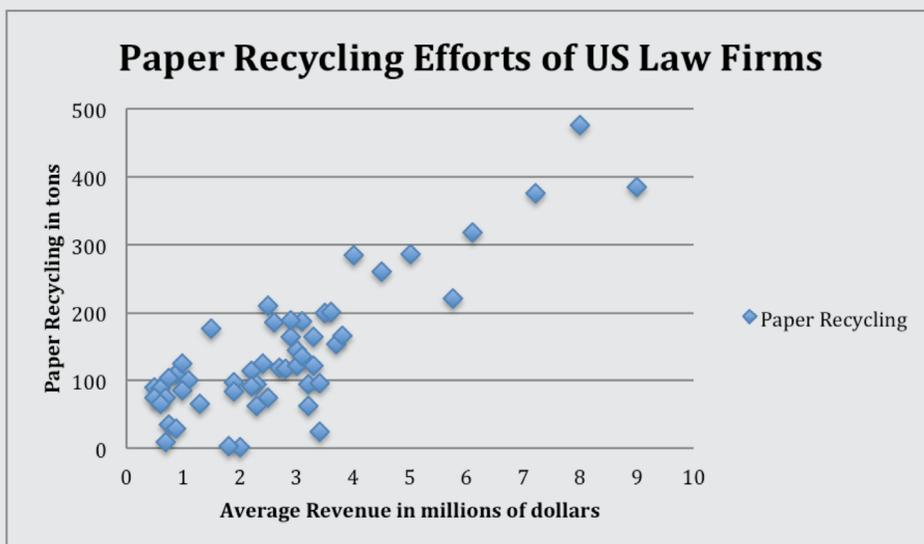
The horizontal x-axis shows Average Revenue ranging from zero to ten million dollars, in increments of one hundred thousand dollars.

The vertical y-axis shows Paper Recycling ranging from zero to five hundred tons, in increments of twenty tons.

The graph has approximately 50 points scattered in a pattern beginning in the lower-left corner. The pattern extends toward the upper-right corner.

The majority of points are concentrated in the lower-left corner and diminish in concentration as the pattern extends toward the upper-right corner.

## SCATTER PLOT



## CIRCLE GRAPH

Like line graphs and bar charts, circle graphs (or pie charts) are a visual representation of a data set. Often, the sections are shaded or colored and have varying widths to represent their relative size. These visual elements are not important for the test-taker who is blind. The reader should focus on the label and data in each section. On the rare occasion that the sections do not contain data (numbers or percentages), the reader must then describe the size of each section in relation to the others. For example, “The sections in order of largest to smallest are: car, train, bicycle, walking. Car is almost half of the circle, train and bicycle are roughly the same size and together make up the other half of the circle, and walking is a thin sliver.”

## Tables

Similar to charts and graphs, tables will require a conversation between the reader and the test taker. In general, the reader should provide an overview of the table, including the title and columns headers. Next, the test taker should ask to hear the contents of certain rows or columns. The test taker will likely ask to have several rows or columns repeated and for the reader to take notes along the way. As always, the reader should take care to provide the information as asked but not to do analysis.

### READER GUIDELINES

To read the tables,

- Read the paragraph accompanying the table.
- Provide an overview with the header column(s) (including any units, abbreviations, or data ranges) and any footnotes attached to the table.
- Identify the total number of rows that contain data, i.e. “the table has ten rows” for a table that has ten rows plus one header row.
- Wait for the test taker to ask for specific data.

### TEST-TAKER GUIDELINES

When analyzing a table, you can ask your reader to,

- Read the column headers.
- Read the row headers.
- Read an entire column by providing its header.
- Read an entire row by providing its header.
- Read a specific cell by providing the column header and row header.
- Read rows or columns which include specific cell data.
- Read specific column values by providing specific row values.
- Identify any blank cells and provide the header and row information.
- Identify any zero value cells and provide the header and row information.
- Write down any data you’ll want to reference or use to answer a question.

## Informational Graphics (Flow Chart, Organizational Chart and Venn Diagram)

Informational graphics include flow charts, organization charts, and Venn diagrams. These are a challenge to describe succinctly and, like other complex images, may require many repeated readings and questions from the test taker. Readers should be aware that it may take them a moment (or more) to understand the way an informational graphic is organized in order to provide a useful description.

## FLOW CHART

### READER GUIDELINES

- Take a quick look at the flow chart to see how many branches there are and how many possible paths exist. While it’s not essential to know exactly how the flow chart is organized before you describe it, it will help to have a general concept.
- Read each step in the flow chart followed by “leads to,” “next step,” or “yields,” whichever is appropriate.
- When there is a choice or a branch, announce that, and the options that follow. The test taker will tell you whether to move on with one branch or another and how far down that line they’d like to move.

## ORGANIZATION CHART

### READER GUIDELINES

- Announce the number of levels or tiers.
- Read the positions in each level beginning at the top.
- For each item/position at each level, announce if and how many branches follow from that item.
- Answer the test taker’s questions.

### TEST-TAKER GUIDELINES

- Ask questions to ensure you understand the levels, positions and reporting relationships.
- It may be helpful to ask how many positions are on each level, prior to hearing the position names.

### Sample Description

An organization chart with three levels. Top level: restaurant manger with three direct reports. Next level: chef, kitchen manager, and serving staff manager. Chef has no direct reports, kitchen manager has two, and serving staff manager has one. Next level: food preparation staff, cleaning staff and serving staff. Food preparation staff and cleaning staff report to kitchen manager. Serving staff report to serving staff manager.

## VENN DIAGRAM

### READER GUIDELINES

- Identify the graph as a Venn diagram and the title if there is one
- Give the number of circles and their titles
- Read the title of each circle followed by the contents, and end with the area of intersection.
- Focus on the data in the Venn diagram, not on its appearance.

### Sample Description

A Venn diagram shows two intersecting circles, one labeled Harvard and the other labeled Yale. Harvard has Cambridge, Crimson, and Barak Obama. Yale has New Haven, Bull Dogs, and Bill Clinton. The area of intersection has New England, Ivy League, and George W. Bush.

## Maps

The description of maps and floor plans should follow the same basic principles of other complex images. Begin with the title and legend, followed by a general overview, “The map shows the buildings on Main Street, between 2nd and 5th Streets,” for example. Next, describe the map in an organized manner with an orientation appropriate for the map, for example, top to bottom, left to right, or beginning with the perimeter clockwise followed by interior items.

# Section 6: How to Read Mathematics

Follow traditional best practices for reading mathematics, moving from left to right and using precise and accurate language to describe numbers, decimals, ratios, and exponents. Guidelines for describing common math concepts follow.

## Operations, Signs, and Symbols

- **Minus:** The minus sign should be read as “minus” to describe an operation when it appears in an equation or expression between quantities. But it should be read as “negative” to describe a number’s sign when it appears before a stand-alone number or an expression in parentheses.
- **Square root:** The square root symbol should be read as “the square root of.” If there is any question as to where the square root ends, say, “end square root.”
- **Inequalities:** Read the following descriptions for each inequality symbol.

| Symbol    | Description                 |
|-----------|-----------------------------|
| <         | Is less than                |
| >         | Is greater than             |
| $\leq$    | Is less than or equal to    |
| $\geq$    | Is greater than or equal to |
| $\neq$    | Is not equal to             |
| $\approx$ | Is approximately equal to   |
| =         | Equals                      |

## Fractions

- Read the fraction without identifying the numerator and denominator when it is a simple fraction. For example, “one-sixth” for  $\frac{1}{6}$
- Read the fraction as the numerator over the denominator for a similar, simple letter fraction. For example, “a over b” for  $\frac{a}{b}$
- For a complex fraction that contains other mathematical operations, read the fraction in terms of its numerator and denominator. For example, “a fraction with numerator b plus d and denominator c” for  $\frac{b+d}{c}$
- If there is any question as to where the fraction begins and/or ends, include “start fraction” and/or “end fraction” in the description.

## Parentheses

- Parentheses should be described as “open parenthesis” and “closed parenthesis” when they appear in an equation or expression.
- If the reader and/or test taker would like to use a different approach, they should discuss and agree to one prior to the test. Other options include,
  - “close” or “closing” for “closed”
  - “paren” as shorthand for “parenthesis”
  - “The quantity...close quantity”
  - “Left paren...right paren”
- For functions, do not describe the parentheses. For example, for  $f(x)$ , read, “the function of x.”

## Brackets

- Brackets should be described as “open bracket” and “closed bracket” when they appear in an equation or expression.
- The same options for describing parentheses apply to describing brackets and should be discussed prior to the test.

## Geometry

- Use common and appropriate vocabulary to describe figures.
  - Shapes (for example, triangle, rectangle, parallelogram)
  - Lines and line segments (for example, parallel, perpendicular, intersects)
  - Circles (for example, radius, diameter, chord, arc)
  - 3-dimensional shapes (for example, prism, cube, sphere)
- Describe a right angle when it is indicated in a figure.

## Units

- Read abbreviated units as the full word. For example, for the unit ft, read, “feet.”
- Ordered pairs
- Ordered pairs should be described as “The ordered pair  $x$  comma  $y$ ” whenever they appear. For example, for the ordered pair (4, 3) read, “the ordered pair 4 comma 3.”
- If the reader and/or test taker would like to use a different approach, they should discuss and agree to one prior to the test. Other options include
  - “the point four comma three”
  - “ordered pair with  $x$ -coordinate 4,  $y$ -coordinate 3”
  - “open parenthesis 4 comma 3, closed parenthesis”
- If there is a point associated with the ordered pair, indicate the point either before or after the ordered pair. For example, “At point  $S$ , the ordered pair  $a$  comma  $b$ ” or “The ordered pair  $a$  comma  $b$  at point  $S$ .”

## Letters

- Reader and test taker may agree that, unless otherwise noted, variables are lower case and do not need to be described as such.
- Indicate the case of each letter if there is a mix of upper- and lower-case letters in the same equation. For example, for the equation  $R - 2y = 6$ , read, “upper case  $R$  minus two lower case  $y$  equals six.”
- Read letters that are juxtaposed as a multiplication expression. For example, read, “ $a$   $b$ ” for  $ab$ . If the pair is part of a complex expression, or the reading could be unclear, read “ $a$  times  $b$ ” instead.



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