

Here's a practice reasoning question:

What was it about Oscar Wilde's only novel, *The Picture of Dorian Gray*, that caused it to create such an uproar when it was published in 1891? While critics attacked the quality of Wilde's work, lambasting its plot as "incurably silly" and chiding the writer for using prose that was "clumsy" and "boring," these overt denunciations of the formal elements of Wilde's work merely masked the true concerns of many nineteenth-century critics. What these critics were actually railing against was the thematic content of Wilde's work, specifically his illustration of a lifestyle devoted to useless beauty. For many a nineteenth-century moralist, *The Picture of Dorian Gray* was nothing more than a primer for spiritual depravity. Wilde's ultimate sin was not his clunky plot or his sometimes cloying prose; it wasn't even his disregard for the time-honored tradition of English propriety. It was instead his leniency toward his protagonist. Wilde propagated the disdain of critics not simply because Dorian Gray was an unabashed hedonist, but because Wilde failed to punish his subject appropriately for his hedonism. To the critics, allowing an evil character to escape his just desserts was an unforgivable sin, and it was this transgression that resulted in such opprobrium for Wilde's work. In their mind, Wilde's work was corrupting the genteel reading public by failing to show the proper consequences of immoral behavior.

17 of 20

The author of the passage would probably consider which one of the following situations most analogous to the response of the critics in the highlighted sentence?

- A college professor lowers a student's grade from an A to a B because the student is chronically late to class.
- An accountant refuses to help his clients cheat on their income tax returns.
- A politician attacks the character of his opponent even though it is his opponent's positions that the politician disagrees with.
- A district attorney indicts a person on a misdemeanor charge because he lacks the evidence to convict the person on a felony charge.
- A reporter files a story despite not having been able to verify all her sources.

What sort of information do we need from the passage in order to answer this question?

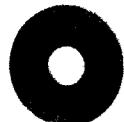
Here's How to Crack It

This question wants us to figure out what the response of the critics is and then find a situation that is similar to it. First, return to the passage and read the highlighted sentence. Next, state in your own words what that part of the passage says. Based on the sentence, it appears that the situation is that "the people attacked this thing for one reason, but there was really another reason they didn't like it."

Now you're ready to return to the answer choices and look for the best match. The situation in the first answer choice is not the same as what we've written; here the professor is penalizing the student for a transgression. Eliminate it. Choice (B) doesn't match—the accountant is refusing to do something illegal. The third choice seems like a good match; the politician attacks his opponent for one reason (his character), but there was another reason (his policies) for his dislike of the candidate.

Let's check the remaining choices to make sure our answer is the best answer. In choice (D), the district attorney indicts on a lesser charge because of a lack of evidence for a more serious charge. This is somewhat similar, in that there is an overt element (the misdemeanor charge) and also a second factor which is not overt (the felony charge). However, the part of the answer choice that mentions the lack of evidence makes this choice worse than (C). It goes beyond the information presented in the passage because the original situation in the passage doesn't mention a lack of evidence on behalf of the critics. Finally, choice (E) is not a match at all. This situation involves a reporter who puts forth something that has not been verified, which isn't the same as criticizing something for one reason when there is another, deeper reason. Thus, choice (C) is our answer.

Ready for another reasoning question? It's based on the passage we just used.



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Consider each of the choices separately and select all that apply.

The author of the passage would probably agree with which of the following statements?

- Most critics of Oscar Wilde's novel objected primarily to the lifestyle of its author.
- If *The Picture of Dorian Gray* were written in the twentieth century, the critical reaction would be less severe.
- Some critics of Wilde's *The Picture of Dorian Gray* believed that an author of a book had a moral responsibility to the book's audience.

On multiple choice, multiple answer questions, don't feel compelled to choose more than one answer—sometimes only one choice will be correct!

Here's How to Crack It

In order to answer this question we have to figure out which answer choice the author might agree with. How the heck are we supposed to know what the author might think? Well, all we know about what the author thinks is what's found in the passage. In many ways, "author-agree" questions are very similar to inference questions. In both types of questions, the best answer may not be explicitly stated in the passage, but there will be sufficient evidence in the passage to support the correct answer. The key here is to take each answer choice one by one and return to the passage to look for proof for it.

The first choice states that most critics objected to Wilde's lifestyle. Can you find any evidence of this in the passage? No. Nowhere does the passage mention his lifestyle. It says that the critics disagreed with the "thematic content," but we can't assume that Wilde based his work on his own lifestyle (and of course, you can't use any outside knowledge you may have of Wilde's licentious life). Remember, you have to stay inside the scope of the passage—don't go beyond the information given. Thus, choice (A) is no good.

Now look at the second choice. Is there any evidence about how the author would feel if the book were released today? Nope. Of course, you may assume that the author would agree with this choice, but again, on the GRE that isn't good enough. We need direct evidence from the passage and there is none for this choice. So, goodbye to choice (B). Let's go to the third and final answer. Return to the passage and look for the part about the book's audience. The last two lines make it clear that some critics saw Wilde's book as corrupting the public and for this they attacked it. This would support choice (C), so that's our best answer. Notice that in these multiple choice, multiple answer questions, there need not be two answers—sometimes there will just be one!

Select-in-Passage Questions

Think of these as regular fetch questions, but the answer choices are in the passage rather than part of the question. Most of the time you will find these questions on short passages, but should they occur on a long passage, ETS will limit the scope of the question to a single paragraph. Follow the same steps as you would on a fetch question. Put the question into your own words. Anticipate the answer; then select it from the five or six sentences in the paragraph or passage.

Here's a practice select-in-passage question:



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The constitutional concept of freedom of the press traces its origins to 1735 and the libel trial of John Peter Zenger. Zenger, born in Germany, emigrated to America in 1710 and established the *Weekly Journal* in 1733. The *Journal* starkly opposed the policies of New York governor William Cosby and while Zenger did not write the majority of the critical pieces, he was arrested on libel charges in 1734. In the ensuing trial, widely followed by the populace, Zenger was defended by Andrew Hamilton, a Pennsylvania lawyer who was brought in after Cosby disbarred all the New York lawyers who offered to defend Zenger. Hamilton's brilliant defense of Zenger was predicated on the argument that since Zenger's criticisms involved verifiable facts, they could not possibly be considered libel. The judge agreed and acquitted the publisher, establishing the basic concept of freedom of the press that was to be enshrined in the United States Constitution some 45 years later.

Select the sentence in which the author offers an opinion.

Here's How to Crack It.

Select the sentence in which the author offers an opinion.

First, read the question and summarize it in your own words. The question is looking for an opinion, as opposed to a fact, and specifically, the author's opinion. Note that there are actually only six sentences in this passage, so you really have only six answer choices, just like a regular question. One of them must contain an opinion. The other four, therefore, must be factual. This is a great case for POE. Write A, B, C, D, and E on your scratch paper so you have something to eliminate.

Sentence 1—All dates and facts. Cross off (A)

Sentence 2—More facts. Cross off (B)

Sentence 3—More facts. Cross off (C)

Sentence 4—More facts. Cross off (D)

Sentence 5—The author describes Hamilton's defense as "brilliant." This is an opinion, not a fact. This is a possible answer. Give it a check.

Sentence 6—More facts. Cross off (F). The correct answer is sentence 5.

Certain words make choices extreme and, therefore, easy to dispute. Here are a few of these words.

- must
- the best
- the first
- only
- each
- totally
- every
- always
- all
- no

Extreme answers
are bad!

You shouldn't automatically eliminate a choice that contains one of these words, but you should turn your attention to it immediately and attack it vigorously. If you can find even one exception, you can eliminate that choice.

Other words make choices moderate, more mushy, and therefore hard to dispute. Here are a few of these words.

- may
- many
- can
- sometimes
- some
- often

Moderate answers
are good!

POE, REVISITED

As you've surely noticed by now, the answer to a reading-comprehension question is the one that is supported by evidence from the passage. Regardless of the question type or format, that rule is immutable. Here is a recap of other guidelines to use when using POE:

ETS constructs correct answer choices that cannot be disputed. The more extreme a choice is, the less likely it is to be the answer.

1. **Avoid Extreme Statements.** ETS prefers wishy-washy statements to extreme ones. When in doubt, pick the answer that has a weaker tone.
2. **Half Right = All Wrong.** ETS likes to write answer choices that are half right; which also means that they're half—and thus all—wrong. The first part of the answer choice will usually look good, but the second part will be incorrect. Make sure to read the entire choice carefully.
3. **Garbled Information.** Some wrong answer choices just take parts of the passage and garble them. These answers usually contain information that's taken directly from the passage rather than paraphrasing it. Eliminate them!
4. **Beyond the Information Given.** These answers go too far beyond what is written in the passage. If you can't point to a part of the passage that matches information in the answer choice, that choice is probably wrong.

Let's explore these guidelines in a little more detail.

Avoid Extreme Statements

Extreme statements are answer choices that make absolute claims. There are very few absolutes in the world, so you shouldn't expect ETS reading passages (which are all excerpted or based on actual academic papers) to contain extreme statements.

For example, consider the following two answer choices:

- There is assuredly life on other planets or moons in the solar system.
- Scientists believe that there may be life on other planets or moons in the solar system.

Without even looking at a passage, you should pick the second answer choice because it's more wishy-washy; the first choice is too strong for ETS's liking.

Half Right = All Wrong

Careful reading of the answer choices is essential on reading comprehension. Remember that your job is to find flaws in answer choices and eliminate them. Many people focus on what they like about an answer, rather than what's wrong with it. ETS loves to write answer choices that start out fine, but then say something wrong. Don't be taken in by the part of the answer you like. Use a critical eye when applying POE; don't look for reasons to keep disputed answer choices, look for reasons to eliminate them. One word can make an answer choice wrong if that word isn't supported by the passage.

If an answer choice is half wrong, it's all wrong.
Focus on flaws and on Process of Elimination.

Look at the following example for the next three example questions:

Within the atmosphere are small amounts of a number of important gases, popularly called “greenhouse gases,” because they alter the flow of life- and heat-energy through the atmosphere, much as does the glass shell of a greenhouse. Their effect on incoming solar energy is minimal, but collectively they act as an insulating blanket around the planet. By absorbing and returning to the earth’s surface much of its outgoing heat, these gases trap it within the lower atmosphere. A greenhouse effect is natural and essential to a livable climate on Earth.

The Art of Paraphrasing

Because the right answer to every reading-comprehension question is literally right in front of you, ETS goes to great lengths to disguise the correct answer and to make the wrong answers more appealing. ETS does this by making the best answer a clever paraphrase of the words in the text, one that basically states the same idea but usually avoids repeating words verbatim from the text. By paraphrasing, ETS is able to create right answers that “fly under the radar”; they don’t stand out and they’re easy to dismiss in favor of the trap answers.

When tackling reading comprehension, your ability to paraphrase information is key. Try to take the dense and complicated ETS text and distill it to its simplest parts. For example, if the ETS text states “normative models of political behavior, despite being rife with questionable cultural assumptions that threaten to invalidate their claims of objectivity, still provide social scientists with useful ways of evaluating cultural practices,” you might paraphrase this sentence as “this thing has problems but can still be useful.” Sure, this paraphrase strips out all the important details, but on a multiple choice test, you don’t always need the details. You just have to pick the best answer from among the available choices.

Successful paraphrases give you the essence of the idea without the complication of details. Practice paraphrasing to see your reading comprehension score rise.

The passage states which of the following about the effect of greenhouse gases on the environment?

- Although their effect on incoming solar energy is minimal, the presence of artificial greenhouse gases is a danger to the planet.
- The composite effect of the gases is necessary for maintaining a climate favorable to life on Earth.

In this case, the first answer starts out great—the passage does indeed state that the gases have a minimal effect on solar energy. But look at the rest of the passage. Does the passage ever talk about “artificial” greenhouse gases? Nope, so the first answer is half right, but all wrong. The second choice, however, is entirely supported by the passage. The second sentence states that “collectively they act...,” while the final sentence says the greenhouse effect is “essential to a livable climate on Earth.”

Garbled Information

One of ETS’s favorite tricks is to write answer choices that contain information from different parts of the passage than the one to which the question refers. If you aren’t being careful you’ll think, “I remember something like that from the passage” and pick the wrong answer choice. This is one reason it’s so important to use lead words and line references to guide you to the right part of the passage. Never answer a question from memory.

ETS also likes to conflate different parts of a passage to create an answer that uses a lot of words from the passage, but doesn’t say a whole lot. For example, use the passage from the previous section to answer the following question:

The passage suggests which of the following about “greenhouse gases”?

- They are a natural source of heat energy within the atmosphere.
- They contribute to creating a habitable environment on Earth.

The first answer choice uses a lot of words from the passage, but says a whole lot of nothing. It garbles the information in the passage, which states that greenhouse gases “alter” heat energy. They are not a source of it. The second choice, which is the correct choice, is a nice paraphrase of the last sentence. It may not sound as “correct” the other choice, but close examination shows it to be the better answer.

Beyond the Information Given

ETS takes its reading passages from textbooks, collections of essays, works of scholarship, and other sources of serious reading matter. However, be careful not to answer questions based on the fact that you did your undergraduate thesis on the topic, or that you once read a newspaper article about the topic at hand. The answers are in the passage; don’t use outside knowledge.

Often, these answers will make common sense, but unfortunately you can’t use that as a criterion on the GRE. Which of the following answer choices is beyond the information in the passage from before?

The author of the passage would probably agree with which of the following statements?

- Without the presence of greenhouse gases, it is unlikely that the earth would be able to support life.
- Air pollution may contribute to an increase in greenhouse gases, which will in turn lead to eventual warming of the earth.

Remember: All of the answers you need are on the screen.

Clearly, here the second choice is beyond the information given in the passage. It may be true and it makes common sense, but the passage never addresses it. Thus, it cannot be the correct answer on a GRE reading comprehension question.

CRACKING THE QUESTION

When it's time to attack a question, remember the following steps:

1. Read the question and determine the lead words; then make sure you understand what it's asking.
2. Go back to the passage, find the lead words, and read more in depth where you need to.
3. Paraphrase the answer in your own words.
4. Use POE on the answer choices.

Reading Comprehension Drill

Answers can be found in Part V.

Questions 1 through 4 are based on the following reading passage.

The term “revolution” has been reserved by most historians for social upheaval characterized by bloodshed, the use of force, and great technological change. Historian Robert Cornwall cogently argues that the term can be extended to apply to the massive agricultural transformation that took place in the mid- to late-eighteenth century.

Farming practices in the 1700s were largely unchanged from those in the preceding centuries: Hordes of peasants labored on the land for long hours with only meager crop yields to show for their hard work. The eighteenth century brought improved transportation, progress in animal breeding, new crops, and better farming techniques, all of which served to increase the overall crop yield. However, the greatest impact on English agricultural yields may well have come from the significant expansion of enclosure. Prior to the mid-eighteenth century, farming was a communal activity in which the entire village decided what, where, and when to plant. To combat soil exhaustion, farmers were required to leave a field fallow every third year, a practice which led to massive inefficiencies. The practice of enclosure allowed farmers to maintain a better balance between arable land and pasture. Land that was worn out could be converted to grazing land for cattle, thus enriching and restoring it.

To move beyond subsistence-level farming, new ways to transport excess crops to market had to be found. The development of canal systems as well as an expanded and improved roadway system facilitated transportation.

1 of 10

The passage suggests that which of the following needed to take place in order for the agricultural revolution to take hold?

- large-scale social upheaval and bloodshed
- an increase in the number of peasants free to work the fields
- the infrastructure by which excess crops could be transported
- a widespread understanding of the necessity of crop rotation
- the lifting of legal restrictions preventing enclosure

2 of 10

The passage suggests that the author would be most likely to agree with which of the following?

- In the past, historians have not generally considered large-scale changes in agriculture to be revolutionary.
- Agricultural expansion in England would have occurred at a faster pace had it not been for the restriction of enclosure placed on farmers.
- Communal farming had a disastrous effect on English agriculture.
- Eighteenth century farming was hampered by insufficient numbers of peasants available to work the land.
- Technological innovation did not play a role in the agricultural revolution.

Click on the sentence in the second paragraph that best illustrates the problems incurred by communal farmers.

The word **cogently** as it is used in this passage is closest in meaning to

- persuasively
- enigmatically
- inadvertently
- inconclusively
- questioningly

Questions 5 through 6 are based on the following reading passage.

Echinosorex gymnura, known colloquially as the moon rat or gymnure, is one of the many fascinating creatures that inhabit the jungles of Southeast Asia. A close relative of the hedgehog, the moon rat likewise belongs to the order *Insectivora* and the family *Erinaceidae*. However, the family then splits into the sub-family *Hylomyinae*, which contains three separate genera and eight distinct species. The appearance and habitat of the moon rat are actually far more similar to those of various members of the order *Rodentia*, though its eating habits are more in line with its fellow insectivores. Ultimately, the taxonomic classification of this animal is useful only when considered along with other information regarding the animal's ecological niche.

Consider each of the choices separately and select all that apply.

Which of the following scenarios demonstrates the idea put forth by the author of this passage regarding animal classification?

- While studying a population of bears, scientists rely solely on the traditional taxonomic designations to identify likely hunting grounds.
- A team of medical researchers closely monitors the actions of the animals involved in a study and compares its findings with prevailing beliefs about those animals.
- A zookeeper designs a habitat for a new acquisition disregards taxonomic classifications and instead focuses on observational data.

The author's tone could best be described as

- exasperated
- didactic
- ambivalent
- morose
- laudatory

Click on the sentence that most directly exemplifies the rationale behind the author's conclusion.

Questions 8 through 10 are based on the following reading passage.

Chinua Achebe's masterpiece *Things Fall Apart* was borne out of Achebe's frustration at the manner in which African nations had, up until then, been portrayed in European novels. The book tells of Christian missionaries to Nigeria who disrupt traditional Igbo life, thereby driving the protagonist Oknokwo, a village elder, to suicide.

Achebe's book gained him instant recognition. Critics rightly praised the book's vivid accounts of tribal beliefs and culture, and commended Achebe's inclusion of Igbo proverbs. He was recognized not only as a historian, but also as a novelist whose work could be likened to that of a Greek tragedy.

However, not all critical views of Achebe's work were **laudatory**. Some critics felt that Achebe's novel placed undue blame on the colonialists. These critics argued that Achebe's portrayal did not show adequate gratitude for the introduction of Western culture and technology.

The word **laudatory**, as used in the passage, could most effectively be replaced with which of the following?

- approbative
- analytical
- dispassionate
- paradigmatic
- unequivocal

Click on the sentence in the passage that best illustrates the author's opinion of Achebe's *Things Fall Apart*.

The primary purpose of the passage is to

- explain the source of Achebe's desire to write his novel
- present an overview of the critical context in which Achebe's work has been viewed
- prove that Achebe's work is worthy of critical acclaim
- analyze the historical background in which Achebe writes
- explain how Achebe's novel fits within the context of Igbo literature

CRITICAL REASONING

Critical-reasoning questions are composed of short reading passages, typically just one paragraph long, followed by a series of questions about the author's argument. You should expect to see anywhere from 3 to 5 critical-reasoning questions within your two GRE Verbal sections.

Here's a sample critical-reasoning passage and question:

10 of 20

For over fifty years, many evolutionary biologists posited that early fish such as *Eusthenopteron* developed limbs as a result of the need to drag themselves across short distances when their watery habitats dried up during periods of drought. However, new fossil evidence suggests that this hypothesis is incorrect. Fossilized remains of *Acanthostega*, a primitive fish, reveal that even though the animal had rudimentary limbs, it could not walk on land. *Acanthostega* lacked ankles, which means that its limbs couldn't support its weight; furthermore, its ribs were too short to prevent the organism's chest cavity from collapsing once the animal left water.

Which of the following would most strengthen the author's argument?

- The fossilized remains of the *Acanthostega* are the earliest known evidence of early fish.
- The modern descendants of *Acanthostega* are not able to drag themselves across short distances on land.
- Biologists have found that some aquatic species can successfully drag themselves across land even though these species do not possess ankles.
- Any animal with a collapsed chest cavity is not able to survive long enough to travel even a short distance across land.
- Some evolutionary biologists believe that the new fossils are not from *Acanthostega*.

The answer to this question, by the way, is
(D). Not sure why?
Keep reading.

What Exactly Is Critical Reasoning?

Critical reasoning is our term for a specific type of reading passage you'll encounter on the GRE. At first glance, critical-reasoning passages resemble the short reading-comprehension passages. However, what distinguishes critical reasoning from a regular reading passage is twofold:

1. The structure of the passage
2. The types of questions ETS will ask about it

We'll show you how to identify critical-reasoning passages and the most effective way of tackling these questions as well.

BREAKING AN ARGUMENT DOWN

The key to doing well on critical-reasoning questions is understanding how ETS authors construct an argument. All arguments contain two major parts—the conclusion, or the main point of the argument, and the premise—the facts that the author gives in support of his or her conclusion. Identifying these two parts is crucial to your success on these questions. Let's start our analysis of an author's argument in a critical-reasoning passage by learning how to identify the conclusion.

Identifying the Conclusion

The conclusion is the most important part of the argument; quite simply, it is the reason the argument exists. The conclusion of an argument is generally a statement of opinion—it's the author's belief or prediction about a situation. Let's look at the critical-reasoning passage we just saw, above:

For over fifty years, many evolutionary biologists posited that early fish such as *Eusthenopteron* developed limbs as a result of the need to drag themselves across short distances when their watery habitats dried up during periods of drought. However, new fossil evidence suggests that this hypothesis is incorrect. Fossilized remains of *Acanthostega*, a primitive fish, reveal that even though the animal had rudimentary limbs, it could not walk on land. *Acanthostega* lacked ankles, which means that its limbs couldn't support its weight; furthermore, its ribs were too short to prevent the organism's chest cavity from collapsing once the animal left water.

You can identify the conclusion of the author's argument by asking yourself: What opinion does this author hold? Now underline the sentence that you think is the conclusion of the argument above.

The conclusion is the author's main point.

If you underlined “new fossil evidence suggests that this hypothesis is incorrect” you hit the nail on the head.

There are other ways of identifying conclusions in arguments. For example, often you can identify the conclusion by certain key words. Specifically, keep an eye out for the following:

An argument’s conclusion is often signaled by the words:

therefore thus consequently and so in conclusion

You should also look for any words that indicate an opinion, such as the following:

suggest believe hope indicate argue follow

Remember, the conclusion is often the author’s opinion about what *might* happen.

In addition, a conclusion is often a belief about what should or might happen. Look for the following:

should would must will

Practice: Identifying Conclusions

Underline the conclusions of the arguments in the following critical-reasoning passages. Answers can be found in Part V.

1 of 5

Despite the support of the president, it is unlikely that the new defense bill will pass. A bipartisan group of 15 senators has announced that it does not support the legislation.

2 of 5

The earliest known grass fossils date from approximately 55 million years ago. Dinosaurs most likely disappeared from the earth around 60 million years ago. Based on this evidence, as well as fossilized remains of dinosaur teeth that indicate the creatures were more suited to eating ferns and palms, scientists have concluded that grass was not a significant part of the dinosaur diet.

3 of 5

Automaker X has lost over 2 billion dollars this year due to rising costs, declining automobile sales, and new governmental regulations. Because of the company’s poor financial situation, it has asked its employees to pay more for health care and to accept a pay cut. However, the workers at automaker X are threatening to go on strike. If that happens, automaker X will have no choice but to file for bankruptcy.

4 of 5

The rise of obesity among citizens of country Y has been linked to a variety of health problems. In response to this situation, the country’s largest health organization has called for food manufacturers to help combat the problem. Since the leading members of the nation’s food industry have agreed to provide healthier alternatives, reduce sugar and fat content, and reduce advertisements for unhealthy foods, it is likely that country Y will experience a decrease in obesity-related health problems.

5 of 5

Recent advances in technology have led to a new wave of “smart” appliances, including refrigerators that note when food supplies are low and place an order at the grocery store, washing machines that automatically adjust the wash cycle and temperature based upon the clothes in the machine, and doorknobs that can identify the house owner and automatically open the door. A technology expert predicts that, due to these new innovations, machines will soon outnumber humans as the number-one users of the Internet.

Some critical-reasoning questions ask you to find the conclusion of the argument. Here's an example:

18 of 20

Mutation breeding is a method of crop development that requires breeders to first find plants that randomly display the traits researchers are looking for, and then breed those plants with other plants displaying similar traits. In order to bring about the required mutations, researchers bombard plants with thermal neutrons, x-rays, and known carcinogenic chemicals in order to damage the plant's DNA. Today, almost all varieties of wheat grown commercially are products of mutation breeding. Ironically, when scientists discovered how to splice desirable genes directly into the plants, thus avoiding the use of harmful chemicals and radiation, critics derided the new process as potentially dangerous despite the lack of any supporting evidence, resulting in boycotts and bans on genetically modified foods.

The argument as a whole is structured to lead to which of the following conclusions?

- Genetically modified food may have been unfairly stigmatized by its critics.
- Mutation breeding produces safer food than does genetic modification.
- Foods produced by genetic modification are healthier than foods produced by mutation breeding.
- Researchers should stop using mutation breeding in order to modify foods.
- Genetic modification of plants is more cost effective than mutation breeding of plants.

Here's How to Crack It

The conclusion, as you'll recall, is the author's opinion or belief. As you read the argument, look for indicators of the author's opinion. The first three sentences of the argument do not state opinions; the author is simply describing the method of mutation breeding. However, in the fourth sentence, the author uses the word *ironically*. This is an indicator of how the author feels. The author believes it is ironic that genetically modified foods are banned, despite "any supporting evidence" that they are dangerous, while foods created with mutation breeding, which use "harmful chemicals and radiation" account for "almost all varieties of wheat..."

Now we just need to find an answer choice that matches this opinion. Answer choice (A) looks pretty close, so let's hang on to it. Choice (B) is the opposite of what the author argues; the argument implies that genetic modification is safer. Choice (C) is close, but the argument doesn't really discuss which foods are "healthier," just that one type is banned and the other type isn't. Choice (D) also isn't discussed. The author thinks it's ironic that genetically modified foods are banned, but never states that mutation breeding should be stopped. Finally, choice (E) doesn't work because the argument doesn't express any opinion about cost effectiveness. Thus, choice (A) is the best answer.

Finding the Premise

After you identify the conclusion of an argument, your next task is to find the argument's premise. The premise (or premises—there can be more than one) is the evidence that the author gives in support of the conclusion.

You can find the premise of an argument in two ways. First, look for statements of fact. Critical-reasoning passages are usually based on statistics, surveys, polls, or reports and all of these things are premises—in fact, these are the most common types of premises. Second, you can use a strategy we call the "Why?" Test. Once you've found the conclusion, ask yourself "Why" you should accept it; the answer or answers to that question will be the premise(s). Let's look again at the passage from the beginning of the chapter:

For over fifty years, many evolutionary biologists posited that early fish such as *Eusthenopteron* developed limbs as a result of the need to drag themselves across short distances when their watery habitats dried up during periods of drought. However, new fossil evidence suggests that this hypothesis is incorrect. Fossilized remains of *Acanthostega*, a primitive fish, reveal that even though the animal had rudimentary limbs, it could not walk on land. *Acanthostega* lacked ankles, which means that its limbs couldn't support its weight; furthermore, its ribs were too short to prevent the organism's chest cavity from collapsing once the animal left water.

Why should you believe this conclusion?

What facts does the author give in support of the conclusion? In this argument, the author provides the following facts: (1) *Acanthostega* lacked ankles, and (2) the creature's ribs were too short to prevent its chest cavity from collapsing. These facts are the premises of the argument.

Is the statement a fact, something that you could verify or prove? Then it's a premise.

Finally, just like conclusions, premises have certain indicator words. The following words will probably tell you that you're looking at a premise:

An argument's premise is often signaled by the words:

because *due to* *since* *based on*

Practice: Finding the Premise

For each of the following arguments, identify the premise or premises that support the conclusion. Answers can be found in Part V.

1 of 5

Despite the support of the president, it is unlikely that the new defense bill will pass. A bipartisan group of 15 senators has announced that it does not support the legislation.

Conclusion: _____

Why?

Premise: _____

4 of 5

The rise of obesity among citizens of country *Y* has been linked to a variety of health problems. In response to this situation, the country's largest health organization has called for food manufacturers to help combat the problem. Since the leading members of the nation's food industry have agreed to provide healthier alternatives, reduce sugar and fat content, and reduce advertisements for unhealthy foods, it is likely that country *Y* will experience a decrease in obesity-related health problems.

Conclusion: _____

Why?

Premise: _____

2 of 5

The earliest known grass fossils date from approximately 55 million years ago. Dinosaurs most likely disappeared from the earth around 60 million years ago. Based on this evidence, as well as fossilized remains of dinosaur teeth that indicate the creatures were more suited to eating ferns and palms, scientists have concluded that grass was not a significant part of the dinosaur diet.

Conclusion: _____

Why?

Premise: _____

5 of 5

Recent advances in technology have led to a new wave of "smart" appliances, including refrigerators that note when food supplies are low and place an order at the grocery store, washing machines that automatically adjust the wash cycle and temperature based upon the clothes in the machine, and doorknobs that can identify the house owner and automatically open the door. A technology expert predicts that, due to these new innovations, machines will soon outnumber humans as the number-one users of the Internet.

Conclusion: _____

Why?

Premise: _____

3 of 5

Automaker *X* has lost over 2 billion dollars this year due to rising costs, declining automobile sales, and new governmental regulations. Because of the company's poor financial situation, it has asked its employees to pay more for health care and to accept a pay cut. However, the workers at automaker *X* are threatening to go on strike. If that happens, automaker *X* will have no choice but to file for bankruptcy.

Conclusion: _____

Why?

Premise: _____

What's the conclusion?
What's the premise?

Okay. So you know how to identify the conclusion and premise(s) of an argument. Are you ready to try a critical-reasoning question? Here's one way in which ETS will test your knowledge of the parts of an argument.

20 of 20

A common myth is that animals can sense an impending earthquake. And while most geophysicists dispute this assertion and claim that there is no way to predict an earthquake, a new hypothesis for predicting earthquakes is generating interest in the scientific community. This hypothesis is based on a well-known principle: **subjecting rocks to extreme pressures causes the rocks to produce electrical currents**. Now, a leading physicist has proposed that this principle may help predict earthquakes. For example, an earthquake along the San Andreas Fault in California could produce hundreds of thousands of amperes (units of electrical current) that would disrupt the ionosphere surrounding the Earth. **By monitoring the ionosphere for electrical fluctuations, scientists may be able to predict earthquakes.**

In the argument above, the two boldfaced statements play which of the following roles?

- The first statement expresses the conclusion of the argument while the second statement provides support for that conclusion.
- The first statement expresses the conclusion of the argument as a whole; the second statement provides a possible consequence of the conclusion.
- The first statement presents support for the conclusion of the argument as a whole; the second statement states the conclusion of the argument.
- The first statement expresses an intermediary conclusion of the argument while the second statement presents a possible objection to the intermediary conclusion.
- The first statement provides support for a conclusion that the argument opposes; the second statement expresses the conclusion that the argument as a whole opposes.

Here's How to Crack It

The key to cracking this question is using the “Why?” test. Let’s try using the “Why?” test on the two boldfaced statements and see which one works best. If we make the first statement the conclusion, we’d end up with something like this:

Conclusion: Subjecting rocks to extreme pressures causes the rocks to produce electrical currents.

Why?

Premise: By monitoring the ionosphere for electrical fluctuations, scientists may be able to predict earthquakes.

Does that make sense? Nope, so let’s eliminate any answers that say that the first sentence is the argument’s conclusion. That allows us to eliminate choices (A), (B), and (D). Now let’s see what happens if we flip the statements around:

Conclusion: By monitoring the ionosphere for electrical fluctuations, scientists may be able to predict earthquakes.

Why?

Premise: Subjecting rocks to extreme pressures causes the rocks to produce electrical currents.

That makes much more sense. Answer choice (E) states that the argument opposes the conclusion, which it doesn’t, so we can eliminate that choice. Answer choice (C) is the best answer.

The “Why?” test helps to identify premises and conclusions.

Locating Assumptions

Although ETS frequently asks critical-reasoning questions about the premise or the conclusion of an argument, there are a number of other question types that require you to work with one final part of an argument. The final part of an argument is the assumption. The assumption is never explicitly stated in the passage, which means that it can sometimes be tricky to find. Basically, the assumption is the missing link that connects the conclusion of an argument to its premise.

Let's look back at one of the arguments you've already worked on.

Conclusion: It is unlikely that the new defense bill will pass.

Why?

Premise: A bipartisan group of 15 senators has announced that it does not support the legislation.

In order for this argument to be convincing, the reader has to make an assumption that because 15 senators do not support the bill, the bill will probably not pass. If you don't assume that the opposition of 15 senators means that the bill is unlikely to pass, the argument fails. Thus, assumptions are necessary to a successful argument.

To find the assumption or assumptions in an argument, you need to look for a "gap" in the reasoning of the argument. You can often accomplish this by asking yourself the following question:

Just because (premise) is true, does it really mean (conclusion) is true?

For example, let's return to another of the arguments you've already tackled.

Conclusion: Country Y will experience a decrease in obesity-related health problems.

Why?

Premise: The leading members of the nation's food industry have agreed to provide healthier alternatives, reduce sugar and fat content, and reduce advertisements for unhealthy foods.

Now, let's ask ourselves the question: Just because it's true that the food industry has agreed to provide healthier alternatives, reduce sugar and fat content, and reduce advertisements for unhealthy foods, does it really mean that obesity-related health problems will decrease?

If you accept this argument, you must assume that the food industry's actions will lead to a decrease in obesity-related health problems. That's the missing link—or the assumption—required by the argument.

Practice: Locating Assumptions

For each of the following critical-reasoning questions, identify the conclusion and the premise. Then note what assumption is required to make the argument work. Answers can be found in Part V.

1 of 4

City University recently announced the retirement of Professor Jones. Professor Jones is a leading biologist and widely published author and her presence was a major factor in many students' decisions to attend City University. The University predicts no decline in enrollment, however, because it plans to hire two highly credentialed biology professors to replace Professor Jones.

Conclusion: _____

Premise: _____

Assumption: _____

3 of 4

It is easy to demonstrate that extraterrestrial life exists by simply looking at our own solar system. In our solar system, there are eight planets and at least one of them obviously has life on it. Thus, roughly 12.5% of planets in the universe should have life on them.

Conclusion: _____

Premise: _____

Assumption: _____

4 of 4

State A is facing a serious budget shortfall for the upcoming year. Recent polls indicate that 58% of voters in Township B approve of a proposed 2-cent gasoline tax in order to make up the deficit. It is clear, therefore, that the leaders of State A should institute the gas tax.

Conclusion: _____

Premise: _____

Assumption: _____

QUESTION TYPES

Now that you've familiarized yourself with the basics of an argument, let's look at the types of argument questions you'll encounter on the GRE. Each of the following types of questions will require you to first identify the argument's premise and conclusion; after that, your task will vary depending on the type.

Reasoning Questions

You can identify Reasoning questions because they will have the following question stems:

In the argument given, the boldfaced statements play which of the following roles?

Which of the following best describes the function of the boldfaced statements in the argument above?

The argument above is structured to lead to which of the following conclusions?

For Reasoning questions, you must isolate the premise and conclusion, but you don't need to find the assumption.

Assumption Questions

Assumption questions are usually phrased in the following ways:

The argument above assumes which of the following?

The argument above relies on which of the following?

The author's argument presupposes which of the following?

On assumption questions, you need to first locate the premise and conclusion. After that, look for the gap as described in the "Locating Assumptions" section above.

Strengthen Questions

Strengthen questions will ask you to make the argument stronger. You'll be asked to do this by identifying answer choices that will support the assumption. Strengthen questions are often phrased as:

Which one of the following, if true, would most strengthen the argument?

Which of the following, if true, would most support the author's argument?

Supporters of the argument would most likely cite which of following pieces of additional evidence?

To strengthen an argument, find the premise, the conclusion, and the assumption. The correct answer will be a premise that supports the assumption.

Weaken Questions

As we've learned, the assumption is what makes an argument work. It follows, then, that if you attack the assumption, you will weaken the argument. You can identify Weaken questions by looking for the following:

Which one of the following, if true, would most weaken the argument?

Which one of the following, if true, casts the most doubt on the argument above?

Which one of the following, if true, would most undermine the author's argument?

On weaken questions, once again you'll need to find the premise, conclusion, and assumption. The right answer will attack the assumption, breaking the link between the premise and the conclusion.

CRACKING CRITICAL-REASONING QUESTIONS

Ready to tackle some critical-reasoning questions? Let's go through steps you take when you run into one of these questions on the test.

The Basic Approach

When you identify a question as being a critical-reasoning question on the exam, go through the following steps:

1. **Read the Question Carefully.** Don't dive into the passage without being aware of exactly what you're dealing with—start by making sure that it really is critical reasoning and not a plain old reading comprehension passage.
2. **Analyze the Argument.** Identify the premise, conclusion, and assumption of the argument.
3. **Predict the Answer.** Before even looking at the answer choices, try to answer the question in your own words.

4. **Use Process of Elimination.** Process of Elimination (POE) is a valuable tool. If you're not sure what the correct answer is, look for the wrong answers instead; eliminate them, and even if you still can't identify the correct answer, you have a much greater chance of guessing the correct answer.

Try going through these steps on the following question.

After examining the bodies of a dozen beached whales and finding evidence of bleeding around the animals' eyes and brains as well as lesions on their kidneys and livers, environmental groups fear that the Navy's use of sonar is causing serious harm to marine animals. A leading marine biologist reports that sonar induces whales to panic and surface too quickly, which causes nitrogen bubbles to form in their blood.

1 of 20

The argument above relies on which of the following assumptions?

- Marine biologists have documented that other marine animals, including dolphins and sea turtles, have exhibited kidney and liver lesions.
- No studies have been conducted on the possible detrimental effects of sonar on marine animals.
- Whales in captivity panic only when exposed to man-made, rather than natural, sound waves.
- The presence of nitrogen bubbles in the blood has been demonstrated to cause damage to various internal organs.
- It is unlikely that the symptoms found in the beached whales could be caused by any known disease.

Here's How to Crack It

First, read the question. This is an Assumption question—we know this because it asks you to determine what the argument relies on. Next, analyze the argument, precisely identifying the conclusion and premise. You should come up with the following:

Conclusion: The Navy's use of sonar is causing serious harm to marine animals.

What type of question is this?

Why?

Premise: Surfacing too quickly causes nitrogen bubbles to form in the whale's blood.

For Step 2, we need to locate the assumption. Remember to use the question we introduced earlier—here it would be phrased as follows:

"Just because the whales have nitrogen bubbles in their blood, does that really mean that sonar is causing them serious harm?"

In Step 3, we need to try to predict the answer before looking at the answer choices. Remember that arguments require an assumption in order to succeed. In this case, the right answer should say something along the lines of "nitrogen bubbles do cause serious harm." Okay, on to Step 4—process of elimination. Check out the grey box for some POE tips on "assumption" questions.

Eliminate answers that aren't relevant to the argument!

POE for Assumption Questions

When you're using POE on Assumption questions, always eliminate answer choices that do the following:

1. **Give New Information.** The assumption must link the premise and the conclusion. Any answer choices that discuss information that is not part of the original argument are wrong.
2. **Have the Wrong Tone.** The tone of the answer choice should match the tone of the argument. Arguments that have very strong conclusions require very strongly worded answer choices, and arguments that have milder tones require milder answer choices.
3. **Weaken the Argument.** The assumption is necessary to the argument. Eliminate any answer choice that would weaken or hurt the argument—unless of course you're dealing with a "weaken the argument" question!

Strengthen Questions

Here's another critical-reasoning question:

The Japan Aerospace Exploration Agency has announced plans for a new unmanned space probe. The probe, named Hayabusa, will rendezvous with an asteroid some 290 million kilometers away from Earth and attempt to land on the asteroid. After the landing, Hayabusa will release a robotic rover which will photograph the surface of the asteroid and also collect rock and dust samples. The probe will then return to Earth with the samples. Scientists believe that the mission, if successful, will provide important clues about the composition of the early solar system.

2 of 20

Which of the following, if true, most strongly supports the scientists' conclusion about the Hayabusa mission?

- Once the Hayabusa probe reaches the asteroid, researchers calculate that it will have a 60% chance of successfully landing on the asteroid.
- The asteroid targeted by the Hayabusa mission is known to have been formed at the inception of the solar system.
- The Japan Aerospace Exploration Agency has yet to experience a mechanical failure with one of its unmanned space probes.
- Some astronomers believe that many asteroids originate outside the solar system and are captured by the gravitational pull of the sun and planets.
- The Hayabusa probe is the first ever to attempt a landing on an asteroid.

Here's How to Crack It

Following the four steps, you would first identify the question. It's a Strengthen question; we know this because the word "strengthen" is actually used in the question! Second, find the premise, conclusion, and assumption.

Here's what you should end up with:

Conclusion: The mission, if successful, will provide important clues about the composition of the early solar system.

Why?

Premise: Hayabusa will release a robotic rover which will photograph the surface of the asteroid and also collect rock and dust samples.

Assumption: Rock and dust samples from an asteroid will provide scientists with information about the early solar system.

Next, let's predict what the right answer should do. For a strengthen question, we're looking for an answer that supports the assumption. In this case, the right answer should provide some information that confirms the idea that dust and rock samples will aid scientists in understanding the early solar system.

Check out the grey box on this page for some POE guidelines on "strengthen" questions.

Looking back at the answer choices, we see that answer choice (A) is not the best answer. This answer is only half good, indicating that the probe has a better-than-even chance of landing successfully. However, it doesn't address whether the probe's mission will help scientists understand the early solar system. Eliminate this choice. Choice (B) seems to be right on the money. The answer we're looking for should support the assumption that rock and dust samples from an asteroid will provide clues about the early solar system. Choice (B) states that the asteroid in question is, in fact, from the early solar system. Keep looking through—remember that you're looking for the best choice.

Like answer choice (A), choice (C) is half right. However, while it might be helpful to know that it's unlikely that the probe will suffer a mechanical failure, you still have to assume that the mission itself will aid scientists in their attempts to understand the early solar system. That's just too much of a leap. Answer choice (D) actually weakens the argument. If asteroids come from outside the solar system, studying dust from them probably won't help researchers understand much from the solar system. Finally, choice (E) does nothing for the argument. The fact

Always check all five answer choices.

POE for Strengthen Questions

When you're using POE on Strengthen questions, always eliminate answer choices that:

1. **Are Only Half Good.** Some answers will be on the right track, but they won't strengthen the argument enough. Again remember, you're looking for the best answer, not an answer that might be good enough. You shouldn't have to make any assumptions about the answer choice in order for it to strengthen the argument.
2. **Weaken the Argument.** Typically, one of the answer choices will weaken the argument. Unless your task is to weaken the argument, you can easily eliminate it.
3. **Do Nothing.** Some answer choices do nothing to the argument; they neither strengthen nor weaken it. Get rid of these, they're decoys.

On Strengthen questions, note that answer choices that offer new information are okay, provided of course that they help strengthen the argument. Also note that answers that have strong tones are often correct for Strengthen questions.

that the probe is the first of its kind says nothing about its scientific value. It looks like choice (B) is best; choose it and move on.

Weaken Questions

Try one last critical-reasoning question:

Psychologists have just completed an extensive study of recently divorced parents in order to determine which factors contributed most to the dissolution of the marriage. The researchers found that in a great majority of the cases of failed marriages, the couples ate, on average, fewer than ten meals per week with each other. From this data, the psychologists have determined that a failure to spend time together during meal times is a major factor leading to divorce.

3 of 20

Which of the following, if true, would cast the most doubt on the researchers' hypothesis?

- Many couples who have long and successful marriages eat together fewer than ten times per week.
- Most of the couples in the study who were unable to share meals with each other worked outside of the home.
- People who lack a regular dining schedule tend to have more disorders and illnesses of the digestive system.
- Couples in the study who reported that they ate together more than ten times per week also indicated that they tended to perceive their relationships with their spouses as healthy.
- In many cases, people in unhappy marriages tend to express their displeasure by avoiding contact with their partners when possible.

Do you recognize what type of argument this is?

Here's How to Crack It

This is a Weaken question. Once again, we'll break the argument down into its premise, conclusion, and assumption:

Conclusion: A failure to spend time together during meal times is a major factor leading to divorce.

Why?

Premise: In a great majority of the cases of failed marriages, the couples ate, on average, less than ten meals per week with each other.

Assumption: A lack of time spent eating meals together causes marital problems; there is no other cause.

As you can see, this is a causal argument. The assumptions are, first, that there is no other cause, and second, that the cause and effect are not reversed. Since we want to weaken this argument, we can predict that the best answer will provide some other cause for the divorces, or show that the psychologists have the cause and effect backwards.

Check out the grey box for POE guidelines on "weaken" questions.

Looking through the answer choices, you can probably see right away that answer choice (A) is not the correct answer. The argument is not about what successful couples do; it is only concerned with divorced couples. Move on. Choice (B) doesn't really do anything to the argument; it's unclear how this information would affect the causal link assumed in the argument. The same goes for choice (C): All this choice indicates is that there may be other problems linked to eating—it doesn't address the connection between dining and marriage success.

Choice (D) seems like it might strengthen the argument. These couples are reporting a link between eating together more and perceiving their marriages as healthy. Eliminate this choice. Choice (E) is the best answer. This answer choice shows that the researchers have reversed the cause and effect. It is not that a failure to dine together causes marital strife; rather, couples that are already unhappy express it by not eating together. This weakens the argument, and (E) is correct.

POE for Weaken Questions

The guidelines for Weaken questions are basically the same as those for strengthen. Eliminate any answer choices that:

- 1. Are Half Good.** Make sure the answer attacks the assumption thoroughly.
- 2. Strengthen the Argument.** Once again, one answer usually does the opposite of the question task—eliminate the odd man out.
- 3. Do Nothing.** Some answer choices neither strengthen nor weaken the argument: eliminate them.

As is the case with Strengthen questions, new information and extreme tones in Weaken questions need not be eliminated.

OTHER CRITICAL-REASONING QUESTION TYPES

The GRE also contains inference and resolve/explain questions, and these types of questions will require you to use different approaches from those you use for weaken and strengthen questions. Let's go through how to crack inference and resolve/explain questions now.

Inference and resolve/explain questions do not require you to find the premise and conclusion.

Inference Questions

An inference is a conclusion that's based on a set of given facts. You can identify inference questions because they'll look a lot like the following:

If the statements above are true, which of the following must also be true?

Which of the following statements can be properly inferred from the information above?

Based on the information above, which of the following can logically be concluded?

Here's an example:

11 of 20

The Mayville Fire Department always fills its employment vacancies "in-house"—when a firefighter retires or leaves the force, his or her position is filled by interviewing all qualified members of the Mayville Department who are interested in the position. Only if this process fails to produce a qualified candidate does the department begin interviewing potential employees from outside the department. This year, the Mayville Fire Department has hired three new firefighters from outside the department.

On inference questions, you don't have to find the premise and conclusion.

If the statements above are true, which of the following must also be true?

- For the coming year, the Mayville Fire Department will be understaffed unless it hires three additional firefighters.
- Firefighters hired from outside the Mayville Fire Department take longer to properly train for the job.
- At the time of the vacancies in the Mayville Fire Department, either there were no qualified in-house candidates or no qualified in-house candidates were interested in the open positions.
- The three firefighters who left the department had jobs for which no other members of the Mayville Fire Department were qualified to fill.
- The three new firefighters are the first new employees hired by the Mayville Fire Department.

Here's How to Crack It

Inference questions are often associated with critical-reasoning passages that are not structured like the clear-cut arguments we've seen thus far. Often these wacky arguments don't even have conclusions and premises; instead, they might simply resemble a set of facts.

Our strategy for approaching these types of questions, of course, begins with identifying them as inference questions. However, for Step 2, don't attempt to identify a conclusion or premise, simply read the argument. If the argument is complex or hard to follow, don't spend too much time trying to untangle it. Most of the work on inference questions should be done when you get to the answer choices.

For inference questions, don't even do Step 3 (predict the answer). There's no way to predict what sort of inference you'll be asked to make, so proceed directly to Step 4, using POE.

Check out the POE guidelines for inference questions in the grey box.

Let's start with answer choice (A). This choice says that the department will be "understaffed." Is there any part of the argument that indicates that this is true? Nope, so eliminate this choice. Answer choice (B) states that firefighters from outside the department take longer to train, but the argument says nothing at all about training. Eliminate this choice. Choice (C) states that either there were no qualified candidates in house or there were no qualified candidates interested in the jobs. Returning to the argument, we see that the hiring policy is that a vacant

Can you prove your answer choice? If not, eliminate it.

POE for Inference Questions

On inference questions, eliminate answer choices that

1. **Go beyond the Information.** Stick to the facts on inference questions. Avoid answers that are overly broad or general.
2. **Could Be True.** The correct answer on an inference *must* be true. Answers that might be true or could be true are no good.
3. **Use Extreme Language.** Be suspicious of strong language. The presence of words such as *all*, *none*, *always*, *never*, or *impossible* often means that an answer choice wrong.

The key to inference questions is using Process of Elimination: Take each answer choice and return to the argument to see if you can prove that it's true. If you can't point to the part of the argument that supports the answer choice, the answer is wrong.

"position is filled by interviewing all qualified members of the Mayville Department who are interested in the position." If this process fails, the department goes outside the department for candidates. Thus, since Mayville hired three new fire fighters from outside the department, answer choice (C) must be true.

Let's go through the remaining answers. Choice (D) is tempting, but on inference questions, we need to make sure that every part of the answer choice holds up to scrutiny. This answer states that no other members of the department were qualified to take the open positions. This could be true; however, based on the facts presented, it could also be true that there were qualified members who simply weren't interested in applying for the position. Thus, choice (D) isn't the best choice—it isn't better than (C). Finally, choice (E) goes beyond the information presented. There is no way of knowing whether these new firefighters were the first new employees. Answer choice (C) is still the best.

Resolve/Explain

Some critical-reasoning questions will present you with a paradox; a set of facts that seem to contradict each other. On these questions, your task is to find the answer choice that best explains the contradiction. You can recognize these questions because they often contain the following phrases:

Which of the following choices would best explain the situation presented above?

Which of the following, if true, would best resolve the discrepancy above?

Which of the following, if true, best reconciles the seeming paradox above?

Take a look at the following example:

16 of 20

Over the past ten years, the emergence of digital file sharing technology has threatened the traditional market for compact discs. Internet users are now able to share songs from their favorite artists with little or no loss of quality in the music, acquiring the songs they desire without having to purchase the entire compact disc. Music industry leaders contend that this practice violates their copyright and causes untold financial losses. However, consumer groups report that there has been an increase in the sales of compact discs.

Which of the following, if true, would best explain the situation above?

- Some consumers who have downloaded songs from the Internet have been sued by major record companies.
- Research indicates that persons who engage in file sharing or song downloading are usually only casual music fans.
- The music industry is developing new technology to help prevent users from downloading songs.
- Music artists tend to release more material, on average, today than they did ten years ago.
- Compact discs released now often include bonus features that are appealing to fans, such as interviews with the band and music videos, that are not available for download.

Here's How to Crack It

Like inference questions, resolve/explain questions require a slightly different approach. Step 1 remains the same—read the question and identify the question type. Once you've identified the question as a resolve/explain question, read the critical-reasoning passage. However, instead of looking for a premise and conclusion, for Step 2 you're going to look for two facts that are in conflict. The basic pattern for a resolve/explain argument is as follows:

Fact I:

But

Fact II:

For the above argument, the two facts that are in conflict are:

Fact I: Internet users are able to download individual songs instead of purchasing compact discs.

But

Fact II: There has been an increase in compact disc sales.

For resolve/explain questions, as for inference questions, you can skip Step 3. You might be able to predict a possible explanation for the discrepancy, but there's no guarantee that your explanation will be similar to the credited response. Proceed to Step 4, use POE, and as you read each answer choice, ask yourself the following question:

POE for Resolve/Explain Questions

On resolve/explain questions, you should eliminate answer choices that:

1. **Do Nothing.** Many wrong answers simply do nothing to the paradox.
2. **Are Only Half Right.** Some answers will only deal with half of the conflict. Make sure the answer you select addresses both facts.
3. **Worsen the Situation.** Eliminate choices that appear to make the situation worse.

How can both (Fact I) and (Fact II) be true?

Check out the POE guidelines for resolve/explain questions in the grey box.

Let's use Process of Elimination on the answer choices in our example. The first answer choice doesn't resolve the conflict. It might explain why fewer users download music, but it doesn't explain why compact disc sales have increased. Eliminate choice (A). Answer choice (B) does nothing to the paradox. The fact that the people who download music are casual fans doesn't really explain anything. Like answer choice (A), choice (C) is partly correct; however, it doesn't explain the increase in sales. Also, the answer choice states that the industry is "developing" technology; it doesn't state that the technology has been implemented yet. So this couldn't affect the current situation. Choice (D) doesn't help much either. You might assume that more material on the market means that sales could increase even with downloading, but that line of thought requires you to fill in too many missing pieces. The correct answer should do all the work. Look at answer choice (E). This choice states that compact discs feature bonus material that can't be downloaded. This could explain both the fact that people are downloading music and that compact disc sales are increasing. Since choice (E) is a more complete explanation, it's the best answer.

WON'T ALL THIS TAKE TOO MUCH TIME?

While it may seem at first like you will need a lot of time to break down the arguments and apply the strategies, you'll get faster at doing this with practice. It's better to take your time and truly understand how the questions work than to rush through the problems, only to get them wrong.

Working more slowly increases your accuracy, which increases your GRE score!

Critical Reasoning Practice Set

In this practice set follow the steps exactly as we've presented them. Answers can be found in Part V.

1 of 6

A large manufacturer of electronic equipment expects to refurbish 1,800 units next year. Yet it is unlikely that a sufficient number of replacement parts will be available because the number of factory returns has been consistently decreasing over the past five years.

The argument above assumes that

- factory returns provide a significant portion of the replacement parts used by the manufacturer to refurbish electronics equipment
- during the next two years, factory returns will increase in number
- in the coming year, no more than 1,800 people will try to purchase refurbished units from the manufacturer
- in previous years, the manufacturer's predictions as to the number of refurbished units needed have been very inaccurate
- every factory return produces a needed replacement part for the manufacturer

2 of 6

From 1983 to 1993, millions of gallons of liquid waste from commercial manufacturing plants were dumped into inland waterways. There is increasing apprehension that the liquid waste will leak contaminants into local water supplies. That apprehension is unwarranted, as tests of the local water supplies of regions near commercial manufacturers who practiced such dumping during the 1960s showed little or no evidence of such contaminants.

Which of the following, if true, most seriously undermines the argument above?

- Commercial manufacturing plants in the 1960s leaked significantly fewer gallons of liquid waste into local water supplies than did plants from 1983 to 1993.
- In the 1960s, liquid waste dumped by commercial manufacturing plants contained a greater concentration of harmful agents.
- In the 1960s, solid waste pollution of inland waterways constituted a greater hazard to local water supplies than did liquid waste during the period from 1983 to 1993.
- In recent years, environmentalists have made serious attempts to curb liquid waste pollution by commercial manufacturers.
- During the period from 1983 to 1993, commercial manufacturing plants were less likely to dump liquid waste than were plants during the 1960s.

3 of 6

The greater the number of autonomous departments in a government, the more essential is a high level of cooperation. Increased numbers of autonomous departments demand a larger number of specialized policy makers, which leads to a greater burden on administrators and, possibly, to a greater number of difficulties in setting a general policy.

There are always greater numbers of autonomous departments in democratic governments than there are in centralized governments.

Which of the following statements must be true if all of the statements above are true?

- Difficulties in setting general policy occur more often in centralized governments than they do in democratic governments.
- There are more specialized policy makers in centralized governments than there are in democratic governments.
- A high level of cooperation is more essential in democratic governments than it is in centralized governments.
- An administrator's job is easier in a democratic government than it is in a centralized government.
- Autonomous departments operate with greater efficiency in democratic governments than they do in centralized governments.

4 of 6

Statement I. From 1983 to 1991, the yearly level of ultraviolet rays, or UVRs, to which the average person was exposed went down considerably.

Statement II. From 1983 to 1991, the occurrence of retinal irritations caused by UVR exposure went up twofold from previous levels, which were already high. This was true for those people whose exposure was average for each year during the eight-year period.

Which of the following, if true, would reconcile the apparent inconsistency between Statement I and Statement II?

- The retinal irritations caused by UVR are only temporary.
- Atmospheric elements fail to weaken UVRs.
- From 1975 to 1983, the average level of exposure to UVRs also decreased.
- Since 1991, the average level of exposure to UVRs has gone back up to pre-1983 levels.
- The period of time between exposure to UVRs and the incidence of retinal irritations caused by such exposure is usually longer than 8 years.

5 of 6

Since running an automobile engine requires fuel, many drivers turn off the engines in their cars when they make a short stop. Yet, scientific studies demonstrate that, in those cases, the cars actually consume more fuel than they would have if the drivers had left the engines running.

Which one of the following, if true, most contributes to an explanation of the apparently paradoxical results of the studies?

- Starting an automotive engine consumes more fuel than does running the engine for a short time.
- The more often a car engine is started, the less fuel is consumed in bringing the motor up to its running temperature.
- Continual stopping and starting of an automotive engine can decrease the output of the engine.
- Continually running an automotive engine prevents the release of dangerous gases into the atmosphere.
- Many people use their cars for commuting to and from their work places without making any short stops.

6 of 6

The average length of time that a patient lived after being diagnosed with stomach cancer in a certain state increased steadily beginning in 1982. The reason for this increase is that more people experienced a complete remission of their disease than previously. Improved surgical techniques that increased the effectiveness of removing cancerous growths at an advanced stage of development were responsible for the increase in longevity of people diagnosed with stomach cancer.

Which of the following, if true, would most likely be used as evidence to show that improved surgical techniques used on cancer patients diagnosed with stomach cancer were responsible for increasing the longevity of stomach cancer patients?

- After 1982, patients whose cancer was diagnosed at an earlier state underwent more surgery than did those who were diagnosed at a more advanced stage.
- The percentage of people diagnosed with stomach cancer whose cancerous growths were at an advanced stage of development was the same before 1982 as after 1982.
- A greater percentage of the population was diagnosed with stomach cancer from 1982 to 1992 than was prior to 1982.
- Stomach surgery was performed on the same percentage of the general population before 1982 as after 1982.
- Other improvements in health care, including earlier detection and nonsurgical treatments, were instituted at major hospitals throughout the state beginning in 1982.

Summary

- Before answering the questions, attack the passage. Read the passages looking for the main idea, structure, and tone.
- For short passages, read the entire passage. For medium passages, focus on the beginning and end. For longer passages, read the first few lines of each paragraph and the final lines of the entire passage.
- Take a moment to understand the question task. Fetch questions ask you to retrieve information from the passage. Reasoning questions ask you to do something more than simply figure out what the author is saying.
- Return to the passage to find the answer to the question. Don't answer from memory! Go back to the text and find the answer.
- Try to come up with an answer in your own words before looking at the answer choices ETS provides. Remember to look for paraphrases of the text, not direct quotes.
- Eliminate answers that contain extreme language, go beyond the information provided, garble the meaning of the text, or otherwise have information that you can't support from the text.
- Most critical-reasoning questions require you break down an argument. The conclusion is the main point of an argument. The premise is the fact cited in support of the conclusion.
- The assumption is used to link the premise and the conclusion with each other. Without an assumption, an argument breaks down.
- The GRE uses many standard argument patterns. These include causal, analogy, and sampling arguments.
- To crack a critical-reasoning question, read the question first so you understand the task. Some questions require you to identify the conclusion and the premise of an argument. Others ask you to find the assumption or to strengthen or weaken the argument.
- After reading the question, break down the argument into its premise and conclusion and, if necessary, the assumption.
- Try to predict in your own words what the correct answer needs to do in order to answer the question.
- Use Process of Elimination to get rid of bad answers.
- Inference and resolve/explain questions do not require you to find the premise and the conclusion.

Chapter 7

Vocabulary for the GRE

Words, words, words. That's what you'll find in this chapter. The following pages contain the Hit Parade, a list of some of the most common words that appear on the GRE. There are also some handy tips on studying and learning new vocabulary words and exercises to test your progress. Be advised, though, that the words in the chapter ahead are just a starting point. As you prepare for your GRE, keep your eyes open for words you don't know and look them up!

VOCAB, VOCAB, VOCAB

As much as ETS would like to claim that the new GRE doesn't rely as much on vocabulary as the old one did, the simple fact remains that many of the questions, answer choices, and reading passages contain some difficult vocabulary. You can't improve your score substantially without increasing your vocabulary. You might think that studying vocabulary is the most boring part of preparing for the GRE, but it's one of the most important, and it's also the one part of GRE preparation that's actually useful to you beyond the confines of the test itself. And the more words that you recognize (and know the meaning of) on the test, the easier it will be. So there's no avoiding the importance of vocabulary to your success on the GRE. Unfortunately, it is virtually impossible to fairly test someone's vocabulary on a standardized test. If you memorize 1,000 words and on test day none of those words appear, does that mean you have a bad vocabulary? Of course not—it just means that you've been victimized by the limitations of standardized testing.

Improving your vocabulary
is the single most
important thing you
can do to improve your
Verbal score.

This doesn't mean that you should take a defeatist attitude toward learning vocabulary! Even if you only have a few weeks before your test, you can still expand your vocabulary and increase your prospects of doing better on the GRE. One thing you have working in your favor is the fact that ETS loves to do the same things over and over. The words we've collected for you in this chapter are the words that appear most frequently on the GRE. So let's get started learning some new words!

LEARN TO LOVE THE DICTIONARY

Get used to looking up words. ETS uses words that they believe the average college-educated adult should know. These words show up in newspaper and magazine articles, in books, and in textbooks. If you see a word you don't know while studying for the GRE or elsewhere, it's probably a good GRE word. Look it up and make a flash card. Dictionaries will give you the pronunciation, while digital apps can provide quick, handy look-ups for new words. Looking up words is a habit. You may have to force yourself to do it in the beginning, but it becomes more natural over time. Many of the techniques in this book will help you on the GRE but don't have much relevance in day-to-day life, but a great vocabulary and good vocabulary habits will add a tremendous amount of value to your graduate school career and beyond.

Learning New Words

How will you remember all the new words you should learn for the test? By developing a routine for learning new words. Here are some tips:

- To learn words that you find on your own, get in the habit of reading good books, magazines, and newspapers. Start paying attention to words you come across for which you don't know the definition. You might be tempted to just skip these, as usual, but train yourself to write them down and look them up.
- When you look up the word, say it out loud, being careful to pronounce it correctly. This will help you remember it.
- When you look up a word in the dictionary, don't assume that the first definition is the only one you need to know. The first definition may be an archaic one, or one that applies only in a particular context, so scan through all the definitions.
- Now that you've learned the dictionary's definition of a new word, restate it in your own words. You'll find it much easier to remember a word's meaning if you make it your own.
- Mnemonics—Use your imagination to create a mental image to fix the new word in your mind. For example, if you're trying to remember the word *voracious*, which means having an insatiable appetite for an activity or pursuit, picture an incredibly hungry boar, eating huge piles of food. The voracious boar will help you to recall the meaning of the word. The crazier the image, the better.
- Keep a vocabulary notebook, or make a file with a list of new vocabulary words and put it on your desktop. Simply having a notebook with you will remind you to be on the lookout for new words, and using it will help you to remember the ones you encounter. Writing something down also makes it easier to memorize. Jot down the word when you find it, note its pronunciation and definition (in your own words) when you look it up, and jot down your mnemonic or mental image. You might also copy the sentence in which you originally found the word, to remind yourself of how the word looks in context.
- Do the same thing with flashcards. Write the word on one side and the pronunciation, the meaning, and perhaps a mental image on the other. Stick five or six of your flashcards in your pocket every morning and use them when you can.
- Use your new word every chance you get. Make it part of your life. Insert it into your speech at every opportunity. Developing a powerful vocabulary requires lots of exercise.
- Learn word roots. Many words share similar origins. By learning these common roots, you'll be better able to work with words you've never seen before. A good dictionary should list the origin and roots of the words in it.

Learn new words little by little; don't try to learn a ton at once!

THE HIT PARADE

You should start your vocabulary work by studying the Hit Parade, which is a list we've compiled of some of the most frequently tested words on the GRE. We put together this list by analyzing released GREs and keeping tabs on the test to make sure that these words are still popular with ETS. At the very least, answer choices that contain Hit Parade words make very good guesses on questions for which you don't know the answer. Each word on the Hit Parade is followed by the part of speech and a brief definition for the word. Some of the words on this list may have other definitions as well, but the definitions we have given are the ones most likely to appear on the GRE.

We've broken the Hit Parade down into four groups of about 75 words each. Don't try to learn all four groups of words at once—work with one list at a time. Write the words and their definitions down in a notebook or on flashcards. It is very important to write them down yourself, because this will help you remember them. Just glancing through the lists printed in this book won't be nearly as effective: Before doing the exercises for each group, spend some time studying and learning the words first, then use the exercises as a way to test yourself. Answers for the matching exercises appear in Part V of this book.

Hit Parade Group 1

Abscond (verb)	to depart clandestinely; to steal off and hide
Aberrant (adj.)	deviating from the norm (noun form: <i>aberration</i>)
Alacrity (noun)	eager and enthusiastic willingness
Anomaly (noun)	deviation from the normal order, form, or rule; abnormality (adj. form: <i>anomalous</i>)
Approval (noun)	an expression of approval or praise
Arduous (adj.)	strenuous, taxing; requiring significant effort
Assuage (verb)	to ease or lessen; to appease or pacify
Audacious (adj.)	daring and fearless; recklessly bold (noun form: <i>audacity</i>)
Austere (adj.)	without adornment; bare; severely simple; ascetic (noun form: <i>austerity</i>)
Axiomatic (adj.)	taken as a given; possessing self-evident truth (noun form: <i>axiom</i>)
Canonical (adj.)	following or in agreement with accepted, traditional standards (noun form: <i>canon</i>)
Capricious (adj.)	inclined to change one's mind impulsively; erratic, unpredictable

Censure (verb)	to criticize severely; to officially rebuke
Chicanery (noun)	trickery or subterfuge
Connoisseur (noun)	an informed and astute judge in matters of taste; expert
Convolute (adj.)	complex or complicated
Disabuse (verb)	to undeceive; to set right
Discordant (adj.)	conflicting; dissonant or harsh in sound
Disparate (adj.)	fundamentally distinct or dissimilar
Effrontery (noun)	extreme boldness; presumptuousness
Eloquent (adj.)	well-spoken, expressive, articulate (noun form: <i>eloquence</i>)
Enervate (verb)	to weaken; to reduce in vitality
Ennui (noun)	dissatisfaction and restlessness resulting from boredom or apathy
Equivocate (verb)	to use ambiguous language with a deceptive intent (adj. form: <i>equivocal</i>)
Erudite (adj.)	very learned; scholarly (noun form: <i>erudition</i>)
Exculpate (verb)	exonerate; to clear of blame
Exigent (adj.)	urgent, pressing; requiring immediate action or attention
Extemporaneous (adj.)	improvised; done without preparation
Filibuster (noun)	intentional obstruction, esp. using prolonged speechmaking to delay legislative action
Fulminate (verb)	to loudly attack or denounce
Ingenuous (adj.)	artless; frank and candid; lacking in sophistication
Inured (adj.)	accustomed to accepting something undesirable
Irascible (adj.)	easily angered; prone to temperamental outbursts
Laud (verb)	to praise highly (adj. form: <i>laudatory</i>)
Lucid (adj.)	clear; easily understood
Magnanimity (noun)	the quality of being generously noble in mind and heart, esp. in forgiving (adj. form: <i>magnanimous</i>)
Martial (adj.)	associated with war and the armed forces
Mundane (adj.)	of the world; typical of or concerned with the ordinary

Nascent (adj.)	coming into being; in early developmental stages	Sporadic (adj.)	occurring only occasionally, or in scattered instances
Nebulous (adj.)	vague; cloudy; lacking clearly defined form	Squander (verb)	to waste by spending or using irresponsibly
Neologism (noun)	a new word, expression, or usage; the creation or use of new words or senses	Static (adj.)	not moving, active, or in motion; at rest
Noxious (adj.)	harmful, injurious	Stupefy (verb)	to stun, baffle, or amaze
Obtuse (adj.)	lacking sharpness of intellect; not clear or precise in thought or expression	Stymie (verb)	to block; to thwart
Obviate (verb)	to anticipate and make unnecessary	Synthesis (noun)	the combination of parts to make a whole (verb form: <i>synthesize</i>)
Onerous (adj.)	troubling; burdensome	Torque (noun)	a force that causes rotation
Paean (noun)	a song or hymn of praise and thanksgiving	Tortuous (adj.)	winding, twisting; excessively complicated
Parody (noun)	a humorous imitation intended for ridicule or comic effect, esp. in literature and art	Truculent (adj.)	fierce and cruel; eager to fight
Perennial (adj.)	recurrent through the year or many years; happening repeatedly	Veracity (noun)	truthfulness, honesty
Perfidy (noun)	intentional breach of faith; treachery (adj. form: <i>perfidious</i>)	Virulent (adj.)	extremely harmful or poisonous; bitterly hostile or antagonistic
Perfunctory (adj.)	cursory; done without care or interest	Voracious (adj.)	having an insatiable appetite for an activity or pursuit; ravenous
Perspicacious (adj.)	acutely perceptive; having keen discernment (noun form: <i>perspicacity</i>)	Waver (verb)	to move to and fro; to sway; to be unsettled in opinion
Prattle (verb)	to babble meaninglessly; to talk in an empty and idle manner		
Precipitate (adj.)	acting with excessive haste or impulse		
Precipitate (verb)	to cause or happen before anticipated or required		
Predilection (noun)	a disposition in favor of something; preference		
Prescience (noun)	foreknowledge of events; knowing of events prior to their occurring (adj. form: <i>prescient</i>)		
Prevaricate (verb)	to deliberately avoid the truth; to mislead		
Qualms (noun)	misgivings; reservations; causes for hesitancy		
Recant (verb)	to retract, esp. a previously held belief		
Refute (verb)	to disprove; to successfully argue against		
Relegate (verb)	to forcibly assign, esp. to a lower place or position		
Reticent (adj.)	quiet; reserved; reluctant to express thoughts and feelings		
Solicitous (adj.)	concerned and attentive; eager		
Sordid (adj.)	characterized by filth, grime, or squalor; foul		

Group 1 Exercises

Match the following words to their definitions. Answers can be found in Part V.

- | | |
|-------------------------------------------|-------------------|
| 1. Improvised; without preparation | A. Veracity |
| 2. A newly coined word or expression | B. Recant |
| 3. A song of joy and praise | C. Extemporaneous |
| 4. To praise highly | D. Stymie |
| 5. Truthfulness; honesty | E. Paean |
| 6. Frank and candid | F. Lucid |
| 7. Associated with war and the military | G. Laud |
| 8. To retract a belief or statement | H. Onerous |
| 9. Cursory; done without care or interest | I. Tortuous |
| 10. Troubling; burdensome | J. Neologism |
| 11. To criticize; to officially rebuke | K. Martial |
| 12. Winding; twisting; complicated | L. Ingenuous |
| 13. To block; to thwart | M. Censure |
| 14. Clear; easily understood | N. Perfunctory |

Hit Parade Group 2

Abate (verb)	to lessen in intensity or degree
Accolade (noun)	an expression of praise
Adulation (noun)	excessive praise; intense adoration
Aesthetic (adj.)	dealing with, appreciative of, or responsive to art or the beautiful
Ameliorate (verb)	to make better or more tolerable
Ascetic (noun)	one who practices rigid self-denial, esp. as an act of religious devotion
Avarice (noun)	greed, esp. for wealth (adj. form: <i>avaricious</i>)
Axiom (noun)	a universally recognized principle (adj. form: <i>axiomatic</i>)
Burgeon (verb)	to grow rapidly or flourish
Bucolic (adj.)	rustic and pastoral; characteristic of rural areas and their inhabitants
Cacophony (noun)	harsh, jarring, discordant sound; dissonance (adj. form: <i>cacophonous</i>)
Canon (noun)	an established set of principles or code of laws, often religious in nature (adj. form: <i>canonical</i>)
Castigation (noun)	severe criticism or punishment (verb form: <i>castigate</i>)
Catalyst (noun)	a substance that accelerates the rate of a chemical reaction without itself changing; a person or thing that causes change
Caustic (adj.)	burning or stinging; causing corrosion
Chary (adj.)	wary; cautious; sparing
Cogent (adj.)	appealing forcibly to the mind or reason; convincing
Complaisance (noun)	the willingness to comply with the wishes of others (adj. form: <i>compliant</i>)
Contentious (adj.)	argumentative; quarrelsome; causing controversy or disagreement
Contrite (adj.)	regretful; penitent; seeking forgiveness (noun form: <i>contrition</i>)
Culpable (adj.)	deserving blame (noun form: <i>culpability</i>)
Dearth (noun)	smallness of quantity or number; scarcity; a lack
Demur (verb)	to question or oppose
Didactic (adj.)	intended to teach or instruct
Discretion (noun)	cautious reserve in speech; ability to make responsible decisions (adj. form: <i>discrete</i>)
Disinterested (adj.)	free of bias or self-interest; impartial

Dogmatic (adj.)	expressing a rigid opinion based on unproved or improvable principles (noun form: <i>dogma</i>)
Ebullience (noun)	the quality of lively or enthusiastic expression of thoughts and feelings (adj. form: <i>ebullient</i>)
Eclectic (adj.)	composed of elements drawn from various sources
Elegy (noun)	a mournful poem, esp. one lamenting the dead (adj. form: <i>elegiac</i>)
Emollient (adj.)/ (noun)	soothing, esp. to the skin; making less harsh; mollifying; an agent that softens or smoothes the skin
Empirical (adj.)	based on observation or experiment
Enigmatic (adj.)	mysterious; obscure; difficult to understand (noun form: <i>enigma</i>)
Ephemeral (adj.)	brief; fleeting
Esoteric (adj.)	intended for or understood by a small, specific group
Eulogy (noun)	a speech honoring the dead (verb form: <i>eulogize</i>)
Exonerate (verb)	to remove blame
Facetious (adj.)	playful; humorous
Fallacy (noun)	an invalid or incorrect notion; a mistaken belief (adj. form: <i>fallacious</i>)
Furtive (adj.)	marked by stealth; covert; surreptitious
Gregarious (adj.)	sociable; outgoing; enjoying the company of other people
Harangue (verb)/ (noun)	to deliver a pompous speech or tirade; a long, pompous speech
Heretical (adj.)	violating accepted dogma or convention (noun form: <i>heresy</i>)
Hyperbole (noun)	an exaggerated statement, often used as a figure of speech (adj. form: <i>hyperbolic</i>)
Impecunious (adj.)	lacking funds; without money
Incipient (adj.)	beginning to come into being or to become apparent
Inert (adj.)	unmoving; lethargic; sluggish
Innocuous (adj.)	harmless; causing no damage
Intransigent (adj.)	refusing to compromise (noun form: <i>intransigence</i>)
Inveigle (verb)	to obtain by deception or flattery
Morose (adj.)	sad; sullen; melancholy
Odious (adj.)	evoking intense aversion or dislike
Opaque (adj.)	impenetrable by light; not reflecting light
Oscillation (noun)	the act or state of swinging back and forth with a steady, uninterrupted rhythm (verb form: <i>oscillate</i>)
Penurious (adj.)	penny-pinching; excessively thrifty; ungenerous

Pernicious (adj.)	extremely harmful; potentially causing death
Peruse (verb)	to examine with great care (noun form: <i>perusal</i>)
Pious (adj.)	extremely reverent or devout; showing strong religious devotion (noun form: <i>piety</i>)
Precursor (noun)	one that precedes and indicates or announces another
Preen (verb)	to dress up; to primp; to groom oneself with elaborate care
Prodigious (adj.)	abundant in size, force, or extent; extraordinary
Prolific (adj.)	producing large volumes or amounts; productive
Putrefy (verb)	to rot; to decay and give off a foul odor (adj. form: <i>putrid</i>)
Quaff (verb)	to drink deeply
Quiescence (noun)	stillness; motionlessness; quality of being at rest (adj. form: <i>quiescent</i>)
Redoubtable (adj.)	awe-inspiring; worthy of honor
Sanction (noun)/(verb)	authoritative permission or approval; a penalty intended to enforce compliance; to give permission or authority to
Satire (noun)	a literary work that ridicules or criticizes a human vice through humor or derision (adj. form: <i>satirical</i>)
Squalid (adj.)	sordid; wretched and dirty as from neglect (noun form: <i>squalor</i>)
Stoic (adj.)	indifferent to or unaffected by pleasure or pain; steadfast (noun form: <i>stoicism</i>)
Supplant (verb)	to take the place of; to supersede
Torpid (adj.)	lethargic; sluggish; dormant (noun form: <i>torpor</i>)
Ubiquitous (adj.)	existing everywhere at the same time; constantly encountered; widespread
Urbane (adj.)	sophisticated; refined; elegant (noun form: <i>urbanity</i>)
Vilify (verb)	to defame; to characterize harshly
Viscous (adj.)	thick; sticky (noun form: <i>viscosity</i>)

Group 2 Exercises

Match the following words to their definitions. Answers can be found in Part V.

1. Brief; fleeting
2. A long, pompous speech
3. Arousing strong dislike or aversion
4. To free from blame or responsibility
5. Arousing fear or awe; worthy of honor; formidable
6. Very harmful; deadly
7. To drink deeply
8. Stinging; corrosive; sarcastic; biting
9. Impressively great in size, force, or extent; enormous
10. Greed; hunger for money
11. Unmoving; lethargic
12. Impartial; unbiased
13. Lack; scarcity
14. To win over by deception, coaxing or flattery

- A. Pernicious
- B. Ephemeral
- C. Avarice
- D. Quaff
- E. Caustic
- F. Odious
- G. Dearth
- H. Inert
- I. Disinterested
- J. Exonerate
- K. Inveigle
- L. Prodigious
- M. Harangue
- N. Redoubtable

Hit Parade Group 3

Acumen (noun)	keen, accurate judgment or insight
Adulterate (verb)	to reduce purity by combining with inferior ingredients
Amalgamate (verb)	to combine several elements into a whole (noun form: <i>amalgamation</i>)
Archaic (adj.)	outdated; associated with an earlier, perhaps more primitive, time
Aver (verb)	to state as a fact; to declare or assert
Bolster (verb)	to provide support or reinforcement
Bombastic (adj.)	pompous; grandiloquent (noun form: <i>bombast</i>)
Diatribe (noun)	a harsh denunciation
Dissemble (verb)	to disguise or conceal; to mislead
Eccentric (adj.)	departing from norms or conventions
Endemic (adj.)	characteristic of or often found in a particular locality, region, or people
Evanescence (adj.)	tending to disappear like vapor; vanishing
Exacerbate (verb)	to make worse or more severe
Fervent (adj.)	greatly emotional or zealous (noun form: <i>fever</i>)
Fortuitous (adj.)	happening by accident or chance

Germane (adj.)	relevant to the subject at hand; appropriate in subject matter
Grandiloquence (noun)	pompous speech or expression (adj. form: <i>grandiloquent</i>)
Hackneyed (adj.)	rendered trite or commonplace by frequent usage
Halcyon (adj.)	calm and peaceful
Hedonism (noun)	devotion to pleasurable pursuits, esp. to the pleasures of the senses (a <i>hedonist</i> is someone who pursues pleasure)
Hegemony (noun)	the consistent dominance of one state or ideology over others
Iconoclast (noun)	one who attacks or undermines traditional conventions or institutions
Idolatrous (adj.)	given to intense or excessive devotion to something (noun form: <i>idolatry</i>)
Impassive (adj.)	revealing no emotion
Imperturbable (adj.)	marked by extreme calm, impassivity, and steadiness
Implacable (adj.)	not capable of being appeased or significantly changed
Impunity (noun)	immunity from punishment or penalty
Inchoate (adj.)	in an initial stage; not fully formed
Infelicitous (adj.)	unfortunate; inappropriate
Insipid (adj.)	without taste or flavor; lacking in spirit; bland
Loquacious (adj.)	extremely talkative (noun form: <i>loquacity</i>)
Luminous (adj.)	characterized by brightness and the emission of light
Malevolent (adj.)	having or showing often vicious ill will, spite, or hatred (noun form: <i>malevolence</i>)
Malleable (adj.)	capable of being shaped or formed; tractable; pliable
Mendacity (noun)	the condition of being untruthful; dishonesty (adj. form: <i>mendacious</i>)
Meticulous (adj.)	characterized by extreme care and precision; attentive to detail
Misanthrope (noun)	one who hates all other humans (adj. form: <i>misanthropic</i>)
Mitigate (verb)	to make or become less severe or intense; to moderate
Obdurate (adj.)	unyielding; hardhearted; intractable
Obsequious (adj.)	exhibiting a fawning attentiveness
Occlude (verb)	to obstruct or block
Opprobrium (noun)	disgrace; contempt; scorn
Pedagogy (noun)	the profession or principles of teaching, or instructing

Pedantic (adj.)	overly concerned with the trivial details of learning or education; show-offish about one's knowledge
Penury (noun)	poverty; destitution
Pervasive (adj.)	having the tendency to permeate or spread throughout
Pine (verb)	to yearn intensely; to languish; to lose vigor
Pirate (verb)	to illegally use or reproduce
Pith (noun)	the essential or central part
Pithy (adj.)	precise and brief
Placate (verb)	to appease; to calm by making concessions
Platitude (noun)	a superficial remark, esp. one offered as meaningful
Plummet (verb)	to plunge or drop straight down
Polemical (adj.)	controversial; argumentative
Prodigal (adj.)	recklessly wasteful; extravagant; profuse; lavish
Profuse (adj.)	given or coming forth abundantly; extravagant
Proliferate (verb)	to grow or increase swiftly and abundantly
Queries (noun)	questions; inquiries; doubts in the mind; reservations
Querulous (adj.)	prone to complaining or grumbling; peevish
Rancorous (adj.)	characterized by bitter, long-lasting resentment (noun form: <i>rancor</i>)
Recalcitrant (adj.)	obstinately defiant of authority; difficult to manage
Repudiate (verb)	to refuse to have anything to do with; to disown
Rescind (verb)	to invalidate; to repeal; to retract
Reverent (adj.)	marked by, feeling, or expressing a feeling of profound awe and respect (noun form: <i>reverence</i>)
Rhetoric (noun)	the art or study of effective use of language for communication and persuasion
Salubrious (adj.)	promoting health or well-being
Solvent (adj.)	able to meet financial obligations; able to dissolve another substance
Specious (adj.)	seeming true, but actually being fallacious; misleadingly attractive; plausible but false
Spurious (adj.)	lacking authenticity or validity; false; counterfeit
Subpoena (noun)	a court order requiring appearance and/or testimony
Succinct (adj.)	brief; concise
Superfluous (adj.)	exceeding what is sufficient or necessary
Surfeit (verb)	an overabundant supply; excess; to feed or supply to excess
Tenacity (noun)	the quality of adherence or persistence to something valued; persistent determination (adj. form: <i>tenacious</i>)

Tenuous (adj.)	having little substance or strength; flimsy; weak
Tirade (noun)	a long and extremely critical speech; a harsh denunciation
Transient (adj.)	fleeting; passing quickly; brief
Zealous (adj.)	fervent; ardent; impassioned, devoted to a cause (a <i>zealot</i> is a zealous person)

Group 3 Exercises

Match the following words to their definitions. Answers can be found in Part V.

- | | |
|--------------------------------------------------------|-------------------------|
| 1. Brief; concise; tersely cogent | A. Hegemony |
| 2. Prone to complaining; whining | B. Aver |
| 3. Fawning; ingratiating | C. Insipid |
| 4. Marked by bitter, deep-seated resentment | D. Pithy |
| 5. Controversial; argumentative | E. Placate |
| 6. Dominance of one state or ideology | F. Prodigal over others |
| 7. Uninteresting; tasteless; flat; dull | G. Querulous |
| 8. Thin; flimsy; of little substance | H. Surfeit |
| 9. Excess; overindulgence | I. Rancorous |
| 10. Wasteful; recklessly extravagant | J. Bombastic |
| 11. To appease; to pacify with concessions | K. Obsequious |
| 12. To assert; to declare; to allege; to state as fact | L. Evanescence |
| 13. Pompous; grandiloquent | M. Polemical |
| 14. Tending to vanish like vapor | N. Tenuous |

Hit Parade Group 4

Acerbic (adj.)	having a sour or bitter taste or character; sharp; biting
Aggrandize (verb)	to increase in intensity, power, influence, or prestige
Alchemy (noun)	a medieval science aimed at the transmutation of metals, esp. base metals into gold (an <i>alchemist</i> is one who practices alchemy)
Amenable (adj.)	agreeable; responsive to suggestion
Anachronism (noun)	something or someone out of place in terms of historical or chronological context
Astringent (adj.)	having a tightening effect on living tissue; harsh; severe; something with a tightening effect on tissue
Contiguous (adj.)	sharing a border; touching; adjacent
Convention (noun)	a generally agreed-upon practice or attitude
Credulous (adj.)	tending to believe too readily; gullible (noun form: <i>credulity</i>)

Cynicism (noun)	an attitude or quality of belief that all people are motivated by selfishness (adj. form: <i>cynical</i>)
Decorum (noun)	polite or appropriate conduct or behavior (adj. form: <i>decorous</i>)
Derision (noun)	scorn, ridicule, contemptuous treatment (adj. form: <i>derisive</i> ; verb form: <i>deride</i>)
Desiccate (verb)	to dry out or dehydrate; to make dry or dull
Dilettante (noun)	one with an amateurish or superficial interest in the arts or a branch of knowledge
Disparage (verb)	to slight or belittle
Divulge (verb)	to disclose something secret
Fawn (verb)	to flatter or praise excessively
Flout (verb)	to show contempt for, as in a rule or convention
Garrulous (adj.)	pointlessly talkative; talking too much
Glib (adj.)	marked by ease or informality; nonchalant; lacking in depth; superficial
Hubris (noun)	overbearing presumption or pride; arrogance
Imminent (adj.)	about to happen; impending
Immutable (adj.)	not capable of change
Impetuous (adj.)	hastily or rashly energetic; impulsive and vehement
Indifferent (adj.)	having no interest or concern; showing no bias or prejudice
Inimical (adj.)	damaging; harmful; injurious
Intractable (adj.)	not easily managed or directed; stubborn; obstinate
Intrepid (adj.)	steadfast and courageous
Laconic (adj.)	using few words; terse
Maverick (noun)	an independent individual who does not go along with a group or party
Mercurial (adj.)	characterized by rapid and unpredictable change in mood
Mollify (verb)	to calm or soothe; to reduce in emotional intensity
Neophyte (noun)	a recent convert; a beginner; novice
Obfuscate (verb)	to deliberately obscure; to make confusing
Obstinate (adj.)	stubborn; hard-headed; uncompromising
Ostentatious (adj.)	characterized by or given to pretentious display; showy
Pervade (verb)	to permeate throughout (adj. form: <i>pervasive</i>)
Phlegmatic (adj.)	calm; sluggish; unemotional
Plethora (noun)	an overabundance; a surplus
Pragmatic (adj.)	practical rather than idealistic

Presumptuous (adj.)	overstepping due bounds (as of propriety or courtesy); taking liberties
Pristine (adj.)	pure; uncorrupted; clean
Probity (noun)	adherence to highest principles; complete and confirmed integrity; uprightness
Proclivity (noun)	a natural predisposition or inclination
Profligate (adj.)	excessively wasteful; recklessly extravagant (noun form: <i>profligacy</i>)
Propensity (noun)	a natural inclination or tendency; penchant
Prosaic (adj.)	dull; lacking in spirit or imagination
Pungent (adj.)	characterized by a strong, sharp smell or taste
Quixotic (adj.)	foolishly impractical; marked by lofty romantic ideals
Quotidian (adj.)	occurring or recurring daily; commonplace
Rarefy (verb)	to make or become thin, less dense; to refine
Recondite (adj.)	hidden; concealed; difficult to understand; obscure
Refulgent (adj.)	radiant; shiny; brilliant
Renege (verb)	to fail to honor a commitment; to go back on a promise
Sedulous (adj.)	diligent; persistent; hard-working
Shard (noun)	a piece of broken pottery or glass
Soporific (adj.)	causing drowsiness; tending to induce sleep
Sparse (adj.)	thin; not dense; arranged at widely spaced intervals
Spendthrift (noun)	one who spends money wastefully
Subtle (adj.)	not obvious; elusive; difficult to discern
Tacit (adj.)	implied; not explicitly stated
Terse (adj.)	brief and concise in wording
Tout (verb)	to publicly praise or promote
Trenchant (adj.)	sharply perceptive; keen; penetrating
Unfeigned (adj.)	genuine; not false or hypocritical
Untenable (adj.)	indefensible; not viable; uninhabitable
Vacillate (verb)	to waver indecisively between one course of action or opinion and another
Variegated (adj.)	multicolored; characterized by a variety of patches of different color
Vexation (noun)	annoyance; irritation (noun form: <i>vex</i>)
Vigilant (adj.)	alertly watchful (noun form: <i>vigilance</i>)
Vituperate (verb)	to use harsh condemnatory language; to abuse or censure severely or abusively; to berate
Volatile (adj.)	readily changing to a vapor; changeable; fickle; explosive (noun form: <i>volatility</i>)

Group 4 Exercises

Match the following words to their definitions. Answers can be found in Part V.

- | | |
|--------------------------------------------------------|----------------------|
| 1. Acid or biting; bitter in taste or tone | A. Anachronism |
| 2. Sleep-inducing; causing drowsiness | B. Contiguous |
| 3. A surplus; an overabundance | C. Dilettante |
| 4. One with superficial interest in a subject | D. Intractable |
| 5. Arrogance; overbearing pride | E. Prosaic |
| 6. Sharing a border; touching; adjacent | F. Quixotic |
| 7. Talking too much; rambling | G. Recondite |
| 8. Something out of place in history or chronology | H. Vituperate |
| 9. Difficult to understand; obscure; hidden | I. Acerbic |
| 10. Dull; unimaginative; ordinary | J. Garrulous |
| 11. Unemotional; calm | K. Hubris |
| 12. Stubborn; obstinate; difficult to manage or govern | L. Soporific |
| 13. Condemn with harsh, abusive words; | M. Phlegmatic berate |
| 14. Foolishly impractical; marked by lofty ideals | N. Plethora |

BEYOND THE HIT PARADE

So you've finished the Hit Parade and you're now the master of many more words than you were before. What to do next? Why, go *beyond the Hit Parade* of course! The Hit Parade was just the beginning. To maximize your score on the GRE you must be relentless in increasing your vocabulary. Don't let up. Keep learning words until the day you sit down for the exam. The three following lists of extra words don't have exercises, so just keep working with your notebook or flashcards and get your friends to quiz you. You are a vocabulary machine!

Beyond the Hit Parade Group 1

The following list contains some of those simple-sounding words with less common secondary meanings that ETS likes to test on the GRE.

Alloy (verb)	to commingle; to debase by mixing with something inferior; <i>unalloyed</i> means pure
Appropriate (verb)	to take for one's own use; to confiscate
Arrest, arresting (verb)/(adj.)	to suspend; to engage; holding one's attention: as in arrested adolescence, an arresting portrait
August (adj.)	majestic, venerable
Bent (noun)	leaning, inclination, proclivity, tendency

Broach (verb)	to bring up; to announce; to begin to talk about
Brook (verb)	to tolerate; to endure; to countenance
Cardinal (adj.)	major, as in cardinal sin
Chauvinist (noun)	a blindly devoted patriot
Color (verb)	to change as if by dyeing, i.e., to distort, gloss, or affect (usually the first)
Consequential (adj.)	pompous, self-important (primary definitions are: logically following; important)
Damp (verb)	to diminish the intensity or check the vibration of a sound
Die (noun)	a tool used for shaping, as in a tool-and-die shop
Essay (verb)	to test or try; to attempt; to experiment
Exact (verb)	to demand; to call for; to require; to take
Fell (verb)	to cause to fall by striking
Fell (adj.)	inhumanly cruel
Flag (verb)	to sag or droop; to become spiritless; to decline
Flip (adj.)	sarcastic, impertinent, as in flippant: a flip remark
Ford (verb)	to wade across the shallow part of a river or stream
Grouse (verb)	to complain or grumble
Guy (noun)	a rope, cord, or cable attached to something as a brace or guide; to steady or reinforce using a guy: Think <i>guide</i> .
Intimate (verb)	to imply, suggest, or insinuate
List (verb)	to tilt or lean to one side
Lumber (verb)	to move heavily and clumsily
Meet (adj.)	fitting, proper
Milk (verb)	to exploit; to squeeze every last ounce of
Mince (verb)	to pronounce or speak affectedly; to euphemize to speak too carefully. Also, to take tiny steps; to tiptoe exacting, fastidious, extremely precise
Nice (adj.)	exacting, fastidious, extremely precise
Obtain (adj.)	to be established, accepted, or customary
Occult (adj.)	hidden, concealed, beyond comprehension
Pedestrian (adj.)	commonplace, trite, unremarkable, quotidian
Pied (adj.)	multicolored, usually in blotches
Pine (verb)	to lose vigor (as through grief); to yearn
Plastic (adj.)	moldable, pliable, not rigid
Pluck (noun)	courage, spunk, fortitude
Prize (verb)	to pry, to press or force with a lever; something taken by force, spoils
Rail (verb)	to complain about bitterly

Rent (verb)	torn (past tense of <i>rend</i>); an opening or tear caused by such
Quail (verb)	to lose courage; to turn frightened
Qualify (verb)	to limit
Sap (verb)	to enervate or weaken the vitality of
Sap (noun)	a fool or nitwit
Scurvy (adj.)	contemptible, despicable
Singular (adj.)	exceptional, unusual, odd
Stand (noun)	a group of trees
Steep (verb)	to saturate or completely soak, as in to let a tea bag steep
Strut (noun)	the supporting structural cross-part of a wing
Table (verb)	to remove (as a parliamentary motion) from consideration
Tender (verb)	to proffer or offer
Waffle (verb)	to equivocate; to change one's position
Wag (noun)	wit, joker

Beyond the Hit Parade Group 2

Abjure (verb)	to renounce or reject solemnly; to recant; to avoid
Adumbrate (verb)	to foreshadow vaguely or intimately; to suggest or outline sketchily; to obscure or overshadow
Anathema (noun)	a solemn or ecclesiastical (religious) curse; accursed or thoroughly loathed person or thing
Anodyne (adj.)/(noun)	soothing; something that assuages or allays pain or comforts
Apogee (noun)	farthest or highest point; culmination; zenith
Apostate (noun)	one who abandons long-held religious or political convictions
Apotheosis (noun)	deification; glorification to godliness; an exalted example; a model of excellence or perfection
Asperity (noun)	severity, rigor; roughness, harshness; acrimony, irritability
Asseverate (verb)	to aver, allege, or assert
Assiduous (adj.)	diligent, hard-working, sedulous
Augury (noun)	omen, portent
Belligerent (adj.)	belligerent, pugnacious, warlike

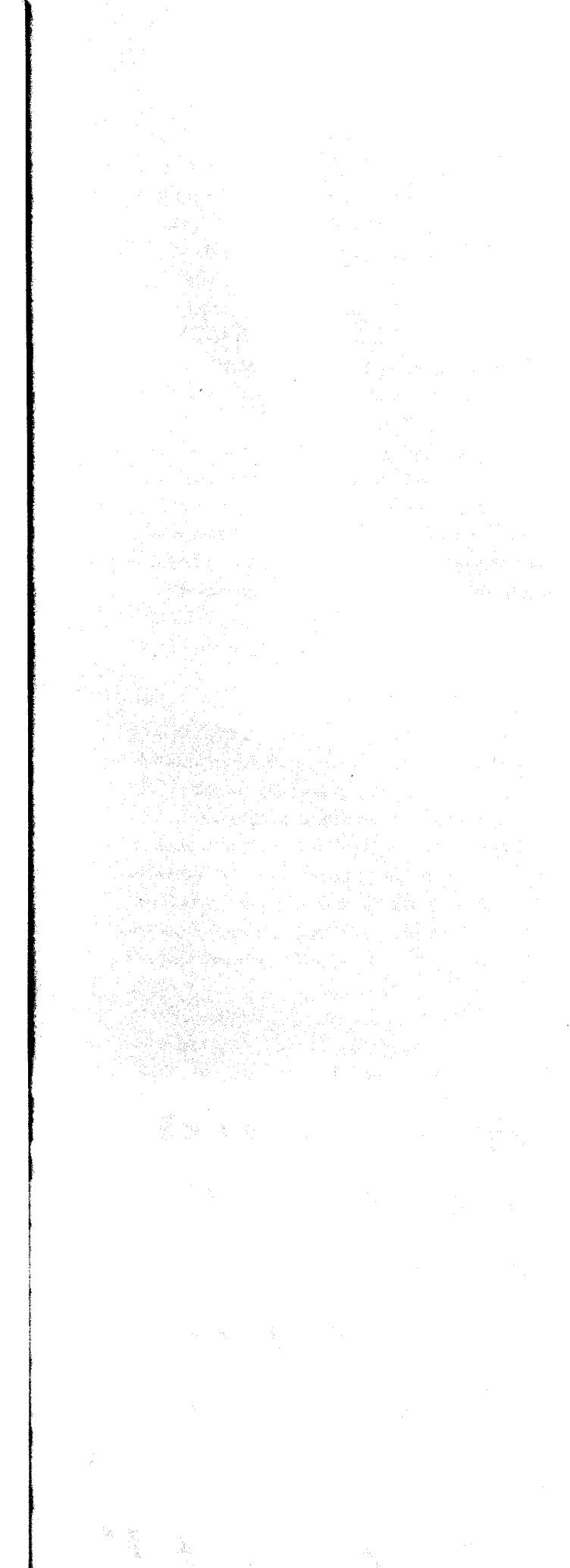
Calumniate (verb)	to slander, to make a false accusation; <i>calumny</i> means slander, aspersion	Insouciant (adj.)	unconcerned, carefree, heedless
Captious (adj.)	disposed to point out trivial faults; calculated to confuse or entrap in argument	Inveterate (adj.)	deep rooted, ingrained, habitual
Cavil (verb)	to find fault without good reason	Jejune (adj.)	vapid, uninteresting, nugatory; childish, immature, puerile
Celerity (noun)	speed, alacrity; think <i>accelerate</i>	Lubricious (adj.)	lewd, wanton, greasy, slippery
Chimera (noun)	an illusion; originally, an imaginary fire-breathing she-monster	Mendicant (noun)	a beggar, supplicant
Contumacious (adj.)	insubordinate, rebellious; <i>contumely</i> means insult, scorn, aspersion	Meretricious (adj.)	cheap, gaudy, tawdry, flashy, showy; attracting by false show
Debacle (noun)	rout, fiasco, complete failure	Minatory (adj.)	menacing, threatening (reminds you of the Minotaur, a threatening creature indeed)
Denuoement (noun)	an outcome or solution; the unraveling of a plot	Nadir (noun)	low point, perigee
Descry (verb)	to discriminate or discern	Nonplussed (adj.)	baffled, bewildered, at a loss for what to do or think
Desuetude (noun)	disuse	Obstreperous (adj.)	noisily and stubbornly defiant, aggressively boisterous
Desultory (adj.)	random; aimless; marked by a lack of plan or purpose	Ossified (adj.)	tending to become more rigid, conventional, sterile, and reactionary with age; literally, turned into bone
Diaphanous (adj.)	transparent, gauzy	Palliate (verb)	to make something seem less serious, to gloss over, to make less severe or intense
Diffident (adj.)	reserved, shy, unassuming; lacking in self-confidence	Panegyric (noun)	formal praise, eulogy, encomium; <i>panegyrical</i> means expressing elaborate praise
Dirge (noun)	a song of grief or lamentation	Parsimonious (adj.)	cheap, miserly
Encomium (noun)	glowing and enthusiastic praise; panegyric, tribute, eulogy	Pellucid (adj.)	transparent, easy to understand, limpid
Eschew (verb)	to shun or avoid	Peroration (noun)	the concluding part of a speech; flowery, rhetorical speech
Excoriate (verb)	to censure scathingly, to upbraid	Plangent (adj.)	pounding, thundering, resounding
Execrate (verb)	to denounce, to feel loathing for, to curse, to declare to be evil	Prolix (adj.)	long-winded, verbose; <i>prolixity</i> means verbosity
Exegesis (noun)	critical examination, explication	Propitiate (verb)	to appease; to conciliate; <i>propitious</i> means auspicious, favorable
Expiate (verb)	to atone or make amends for	Puerile (adj.)	childish, immature, jejune, nugatory
Extirpate (verb)	to destroy, to exterminate, to cut out, to excise	Puissance (noun)	power, strength; <i>puissant</i> means powerful, strong
Fatuous (adj.)	silly, inanely foolish	Pusillanimous (adj.)	cowardly, craven
Fractious (adj.)	quarrelsome, rebellious, unruly, refractory, irritable	Remonstrate (verb)	to protest, to object
Gainsay (verb)	to deny, to dispute, to contradict, to oppose	Sagacious (adj.)	having sound judgment; perceptive, wise; like a sage
Heterodox (adj.)	unorthodox, heretical, iconoclastic	Salacious (adj.)	lustful, lascivious, bawdy
Imbroglio (noun)	difficult or embarrassing situation	Salutary (adj.)	remedial, wholesome, causing improvement
Indefatigable (adj.)	not easily exhaustible; tireless, dogged	Sanguine (adj.)	cheerful, confident, optimistic
Ineluctable (adj.)	certain, inevitable	Saturnine (adj.)	gloomy, dark, sullen, morose
Inimitable (adj.)	one of a kind, peerless		

Sententious (adj.)	aphoristic or moralistic; epigrammatic; tending to moralize excessively
Stentorian (adj.)	extremely loud and powerful
Stygian (adj.)	gloomy, dark
Sycophant (noun)	toady, servile, self-seeking flatterer; parasite
Tendentious (adj.)	biased; showing marked tendencies
Timorous (adj.)	timid, fearful, diffident
Tyro (noun)	novice, greenhorn, rank amateur
Vitiate (verb)	to corrupt, to debase, to spoil, to make ineffective
Voluble (adj.)	fluent, verbal, having easy use of spoken language

Part III

How to Crack the Math Section

- 8 The Geography of the Math Section
- 9 Numbers and Equations
- 10 Real World Math
- 11 Geometry
- 12 Math Et Cetera



Chapter 8

The Geography of the Math Section

This chapter contains an overview of the content and structure you'll see on the Math sections of the GRE. It provides valuable information on pacing strategies and the various question formats you'll encounter on the GRE. It also goes over how to use basic test-taking techniques such as Process of Elimination and Ball-parking as they relate to math questions. After finishing this chapter, you'll have a good idea of what the Math section of the GRE looks like and some basic approaches to help you navigate it.

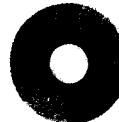
WHAT'S IN THE MATH SECTION

The GRE Math section primarily tests math concepts you learned in the seventh through tenth grade, including arithmetic, algebra, and geometry. ETS alleges that the Math sections on the new version of the exam better test the reasoning skills that you'll use in graduate school, but what the Math section primarily tests is your comfort level with some basic math topics and your ability to take a test with strange-looking questions under timed conditions.

Junior High School?

The Math section of the GRE mostly tests how much you remember from the math courses you took in seventh, eighth, ninth, and tenth grade. But here's some good news: GRE math is easier than SAT math. Why? Because many people study little or no math in college. If the GRE tested college-level math, everyone but math majors would bomb the test.

If you're willing to do a little work, this is good news for you. By brushing up on the modest amount of math you need to know for the test, you can significantly increase your GRE Math score. All you have to do is shake off the dust.



Need more info? Check out the DVD.

Predictable Triggers

We know exactly what ETS is going to test and how they're going to test it. The math side of the test consists of a series of utterly predictable triggers, to which we have designed a series of highly scripted responses. ETS wants you to see each problem as a new challenge to solve. What you will find, however, is that there are only about 20 math concepts that are being tested. All of the questions you will see are just different ways of asking about these different concepts. Most of these concepts you already know. Once you recognize what's being tested, even the trickiest questions become familiar and easy to solve.

It's Really a Reading Test

In constructing the Math section, ETS is limited to the math that nearly everyone has studied: arithmetic, basic algebra, basic geometry, and elementary statistics. There's no calculus (or even precalculus), no trigonometry, and no major-league algebra or geometry. Because of these limitations, ETS has to resort to traps in order to create hard problems. Even the most commonly missed GRE math problems are typically based on relatively simple principles. What makes the problems difficult is that these simple principles are disguised.

Many test takers have no problem doing the actual calculations involved in the math questions on the GRE; in fact, you'll even be allowed to use a calculator (more on that soon). However, on this test your ability to carefully read the problems and figure out how to set them up is more important than your ability to make calculations.

As you work through this section, don't worry about how quickly you're doing the problems. Instead, take the time to really understand what the questions are asking; pay close attention to the wording of the problems. Most math errors are the result of careless mistakes caused by not reading the problem carefully enough!

Read and Copy Carefully

You can do all the calculations right and still get a question wrong. How? What if you solve for x but the question asked for the value of $x + 4$? Ugh. Always reread the question before you choose an answer. Take your time and don't be careless. The problem will stay on the screen as long as you want it to, so reread the question and double-check your work before answering it.

Or how about this? The radius of the circle was 5, but when you copied the picture onto your scratch paper, you accidentally made it 6. Ugh! If you make a mistake copying down information from the screen, you'll get the question wrong no matter how perfect your calculations are. You have to be extra careful when copying down information.

THE CALCULATOR

As we mentioned above, on this new GRE you'll be given an on-screen calculator. The calculator program on the GRE is a rudimentary one that gives you the five basic operations: add, subtract, multiply, divide, and square root, plus a decimal function and a positive/negative feature. It also follows the order of operations, or PEMDAS (more on this topic in Chapter 9). The calculator also has the ability to transfer the answer you've calculated directly into the answer box for certain questions. The on-screen calculator can be a huge advantage—if it's used correctly!

As you might have realized by this point, ETS is not exactly looking out for your best interests. Giving you a calculator might seem like an altruistic act, but rest assured that ETS knows that there are certain ways in which calculator use can be exploited. Keep in mind the following:

1. **Calculators Can't Think.** Calculators are good for one thing and one thing only: calculation. You still have to figure out how to set up the problem correctly. If you're not sure what to calculate, then a calculator isn't helpful. For example, if you do a percent calculation on your calculator and then hit "Transfer Display," you will have to remember to move the decimal point accordingly, depending on whether the question asks for a percent or a decimal.
2. **The Calculator as a Liability.** ETS will give you questions that you can solve with a calculator, but the calculator can actually be a liability. You will be tempted to use it. For example, students who are uncomfortable adding, subtracting, multiplying, or dividing fractions may be tempted to convert all fractions to decimals using the calculator. Don't do it. You are better off mastering fractions than avoiding

You will score higher if you spend your time working carefully. Double-check your work before you hit confirm.

them. Working with exponents and square roots is another place where the calculator will be tempting but may yield really big and awkward numbers or long decimals. You are much better off learning the rules of manipulating exponents and square roots (there are only five rules). Most of these problems will be faster and cleaner to solve with rules than with a calculator. The questions may also use numbers that are too big for the calculator. Time spent trying to get an answer out of a calculator for problems involving really big numbers will be time wasted. Find another way around.

3. **A Calculator Won't Make You Faster.** Having a calculator should make you more accurate, but not necessarily faster. You still need to take time to read each problem carefully and set it up. Don't expect to blast through problems just because you have a calculator.
4. **The Calculator Is No Excuse for Not Using Scratch Paper.** Scratch paper is where good technique happens. Working problems by hand on scratch paper will help to avoid careless errors or skipped steps. Just because you can do multiple functions in a row on your calculator does not mean that you should be solving problems on your calculator. Use the calculator to do simple calculations that would otherwise take you time to solve. Make sure you are still writing steps out on your scratch paper, labeling results, and using set-ups. Accuracy is more important than speed!

Of course, you should not fear the calculator; by all means, use it and be grateful for it. Having a calculator should help you eliminate all those careless math mistakes.

GEOGRAPHY OF A MATH SECTION

Math sections contain 20 questions each. Test takers are allowed 35 minutes per section. The first 7 or 8 questions of each math section are quantitative comparisons, while the remainder are a mixed bag of problem solving, all that apply, numeric entry, and charts and graphs. Each section covers a mixture of algebra, arithmetic, quantitative reasoning, geometry, and real-world math.

QUESTION FORMATS

Much like the Verbal section, the Math section on the GRE contains a variety of different question formats. Let's go through each question format and discuss how to crack it.

Standard Multiple Choice

These questions are the basic five-answer multiple-choice questions. These are great candidates for POE (Process of Elimination) strategies we will discuss later in this chapter.

Multiple Choice, Multiple Answer

These questions appear similar to the standard multiple-choice questions; however, on these you will have the opportunity to pick more than one answer. There may be anywhere from three to eight answer choices. Here's an example of what these will look like:

11 of 20

If $\frac{1}{12} < x < \frac{1}{6}$, then x could equal which of the following?

Indicate all possible answers.

- $\frac{2}{9}$
- $\frac{1}{5}$
- $\frac{1}{10}$
- $\frac{2}{15}$
- $\frac{2}{25}$

Your approach on these questions won't be radically different from the approach you use on standard multiple-choice questions. But obviously, you'll have to consider all of the answers—make sure you read each question carefully and remember that more than one answer can be correct. For example, for this question, you'd click on choices (C), (D), and (E). You must select *every* correct choice to get credit for the problem.

Enter a Number

Some questions on the GRE won't even have answer choices, and you'll have to generate your own answer. For example:

14 of 20

Renaldo earns a monthly commission of 10.5% of his total sales for the month, plus a flat salary of \$2,500. If Renaldo earns \$3,025 in a certain month, what were his total sales? Disregard the \$ sign when entering your answer.

Click on the box, then type in a number.

On this type of question, POE is not going to help you! That means if you're not sure how to do one of these questions, you should immediately move on. Leave it blank and come back to it in your second pass through the test.

To answer this question, you'd enter 5,000 into the box. Alternately, you could transfer your work directly from the on-screen calculator to the text box.

MAXIMIZE YOUR SCORE

As you're probably aware by now, doing well on the Math section will involve more than just knowing some math. It will also require the use of some good strategies. Let's go through some good strategies now; make sure you read this section carefully; it will be important for you to keep these techniques in mind as you work through the content chapters that follow this one!



Need more info? Check out the DVD.

The Two Roles of Techniques

The techniques are there to ensure that the questions that you should get right, you do get right. A couple of careless errors on easy questions will kill your score. The techniques are not just tools; they are proven standard approaches that save time and effort and guarantee points. Use these techniques on every question. Turn them into a habitual approach that you use every time.

Take the Easy Test First

The new GRE offers the opportunity to mark a question and return to it. Since all questions count equally toward your score, why not do the easy ones first? Getting questions right is far more important than getting to every question, so start with the low hanging fruit. There is no law that says you have to take the test in the

order in which it is given. If you see a question you don't like, keep moving. Play to your strengths and get all of the questions that you're good at in the bank, before you start spending time on the hard ones. It makes no sense to spend valuable minutes wrestling with hard questions while there are still easy ones on the table. It makes even less sense if you end up having to rush some easy ones (making mistakes in the process), as a result. Free yourself from numerical hegemony! Take the easy test first!

Bend, Don't Push

Eighty percent of the errors on the math side of the test are really reading errors. It is a four-hour test and at some point during these four hours your brain is going to get tired. When this happens you will read, see, or understand questions incorrectly. Once you see a problem wrong, it is nearly impossible to un-see it and see it correctly. When this happens, even simple problems can become extremely frustrating. If you solve a problem and your answer is not one of the choices, this is what has happened. When you would swear that a problem can't be solved, this is what has happened. When you have absolutely no idea how to solve a problem, this is what has happened. If you find yourself with half a page full of calculations and are no closer to the answer, this is what has happened. You are in La La Land. Once you are in La La Land, you can continue to push on that problem all day and you won't get any closer.

There is a good chance that you are already familiar with this frustration. The first step is to learn to recognize it when it is happening. Here are some keys to recognizing when you are off track.

You know you are in La La Land when...

- You have spent more than three minutes on a single problem.
- Your hand is not moving.
- You don't know what to do next.
- Your answer is not one of the choices.
- You're spending lots of time with the calculator and working with some ugly numbers.

Once you recognize that you are in La La Land, get out. Continuing to push on a problem, at this point, is a waste of your time. You could easily spend three or four precious minutes on this problem and be no closer to the answer. Spend those three or four minutes on other questions. That time should be yielding you points, not frustration.

After you have done two or three other questions, return to the one that was giving you trouble. Most likely, the reason it was giving you trouble is that you missed something or misread something the first time around. If the problem is still difficult, walk away again.



Need more info? Check out the DVD.

This is called Bend, Don't Push. The minute you encounter any resistance on the test, walk away. Bend. There are plenty of other easier points for you to get with that time. Then return to the problem a few questions later. It's OK to take two or three runs at a tough problem. If you run out of time before returning to the question, so be it. Your time is better spent on easier problems anyway, since all problems count the same.

Forcing yourself to walk away can be difficult, especially when you have already invested time in a question. You will have to train yourself to recognize resistance when it occurs, to walk away, and then to remember to come back. Employ this technique anytime you are practicing for the GRE. It will take some time to master. Be patient and give it a chance to work. With this technique, there are no questions that are out of your reach on the GRE.

POE: Ballparking and Trap Answers

Use Process of Elimination whenever you can on questions that are in standard multiple-choice format. Always read the answer choices before you start to solve a math problem because often they will help guide you—you might even be able to eliminate a couple of answer choices before you begin to calculate the answer.

Two effective POE tools are Ballparking and Trap Answers.

You Know More Than You Think

Say you were asked to find 30 percent of 50. Wait—don't do any math yet. Let's say that you glance at the answer choices and you see these:

- 5
- 15
- 30
- 80
- 150

Think about it. Whatever 30 percent of 50 is, it must be less than 50, right? So any answer choice that's greater than 50 can't be right. That means you should eliminate both (D) and (E) before you even do any calculations! Thirty percent is less than half, so we can get rid of anything greater than 25, which means that choice (C) is gone too. What is 10% of 50? Eliminate choice (A). You're done. The only answer left is (B). This process is known as Ballparking. Remember that the answers are part of the question. There are more than four times the number of wrong answers on the GRE as there are right ones. If it were easy to find the right ones, you wouldn't need this book. It is almost always easier to identify and eliminate the wrong answers than it is to calculate the right one. Just make sure that you are using your scratch paper to eliminate answer choices instead of keeping track in your head.

Ballparking helps you eliminate answer choices and increases your odds of zeroing in on the correct answer. The key is to eliminate any answer choice that is "out of the ballpark."

Let's look at another problem:

16 of 20

A 100-foot rope is cut so that the shorter piece is $\frac{2}{3}$ the length of the longer piece. How many feet long is the shorter piece?

- 75
- $66\frac{2}{3}$
- 50
- 40
- $33\frac{1}{3}$

Here's How to Crack It

Now, before we dive into the calculations, let's use a little common sense. The rope is 100 feet long. If we cut the rope in half, each part would be 50 feet. However, we didn't cut the rope in half; we cut it so that there's a longer part and a shorter part. What has to be true of the shorter piece then? It has to be smaller than 50 feet. If it weren't, it wouldn't be shorter than the other piece. So looking at our answers, we can eliminate (A), (B), and (C) without doing any real math. That's Ballparking. By the way, the answer is (D) and you'll learn how to tackle this type of problem when you get to Chapter 9.

Trap Answers

ETS likes to include "trap answers" in the answer choices to their math problems. Trap answers are answer choices that appear correct upon first glance. Often these answers will look so tempting that you'll choose them without actually bothering to complete the necessary calculations. Watch out for this! If a problem seems way too easy, be careful and double-check your work.

What are the trap answers in the problem about the rope?

Look at the next problem:

17 of 20

The price of a jacket was reduced by 10%. During a special sale, the price was discounted another 10%. What was the total percentage discount from the original price of the jacket?

- 15%
- 19%
- 20%
- 21%
- 25%

Here's How to Crack It

The answer might seem like it should be 20 percent. But wait a minute: Does it seem likely that the GRE is going to give you a problem that you can solve just by adding $10 + 10$? Probably not. Choice (C) is a trap answer.

To solve this problem, imagine that the original price of the jacket was \$100. After a 10 percent discount the new price is \$90. But now when we take another 10 percent discount, we're taking it from \$90, not \$100. 10 percent of 90 is 9, so we take off another \$9 from the price and our final price is \$81. That represents a 19 percent total discount because we started with a \$100 jacket. The correct answer is (B).



Need more info? Check out the DVD.

HOW TO STUDY

Make sure you learn the content of each of the following chapters before you go on to the next one. Don't try to cram everything in all at once. It's much better to do a small amount of studying each day over a longer period; you will master both the math concepts and the techniques if you focus on the material a little bit at a time.

Practice, Practice, Practice

Practice may not make "perfect," but it sure will help. Use everyday math calculations as practice opportunities. Balance your checkbook without a calculator! Make sure your check has been added correctly at a restaurant, and figure out the exact percentage you want to leave for a tip. The more you practice simple adding, subtracting, multiplying, and dividing on a day-to-day basis, the more your arithmetic skills will improve for the GRE.

After you work through this book, be sure to practice doing questions on our online tests and on real GREs. There are always sample questions at ets.org, and practice will rapidly sharpen your test-taking skills.

Finally, unless you trust our techniques, you may be reluctant to use them fully and automatically on the real GRE. The best way to develop that trust is to practice before you get to the real test.

Summary

- The GRE contains two 35-minute Math sections. Each section has 20 questions.
- The GRE tests math concepts up to about the tenth grade level of difficulty.
- You will be allowed to use a calculator on the GRE. The calculator is part of the on-screen display.
- The Math section employs a number of different question formats, including multiple choice, fill in the blank, and quantitative comparison questions.
- Use the Two-Pass system on the Math section. Find the easier questions and do them first. Use your remaining time to work some of the more difficult questions.
- When you get stuck on a problem, walk away. Do a few other problems to distract your brain, and then return to the question that was giving you problems.
- Ballpark or estimate the answers to math questions and eliminate answers that don't make sense.
- Watch out for trap answers. If an answer seems too easy or obvious, it's probably a trap.
- Always do your work on your scratch paper, not in your head. Even when you are Ballparking, make sure that you are eliminating answer choices on your scratch paper. If your hand isn't moving, you're stuck and you need to walk away, or you're doing work in your head, which leads to errors.

Chapter 9 Numbers and Equations

Numbers and equations form the basis of all the math questions on the GRE. Simply put, the more comfortable you are working with numbers and equations, the easier the math portion of the exam will be. This chapter gives you a review of all the basic mathematical concepts including properties of numbers; factors and multiples; exponents and square roots; and lessons on manipulating and solving equations. This chapter also introduces you to one of The Princeton Review's key mathematical strategies: Plugging In.

IN THE BEGINNING...

...there were numbers. If you wish to do well on the GRE Math section, you'll have to be comfortable working with numbers. The concepts tested on the GRE are not exceptionally difficult, but if you are even the least bit skittish about numbers you'll have a harder time working the problems.

You may be a little rusty when it comes to working with numbers but you'll be surprised at how quickly you'll become comfortable again.

This chapter will familiarize you with all the basics you need to know about numbers and how to work with them. If you're a mathphobe or haven't used math in a while, take it slowly and make sure you're comfortable with this chapter before moving onto the succeeding ones.

GRE MATH VOCABULARY

Quick—what's an integer? Is 0 even or odd? How many even prime numbers are there?

Before we go through our techniques for specific types of math problems, we'll acquaint ourselves with some basic vocabulary and properties of numbers. The GRE loves to test your knowledge of integers, fractions, decimals, and all those other concepts you probably learned years ago. Make sure you're comfortable with the topics in this chapter before moving on. Even if you feel fairly at ease with number concepts, you should still work through this chapter. ETS is very good at coming up with questions that require you to know ideas forwards and backwards.

The math terms we will review in this section are very simple, but that doesn't mean they're not important. Every GRE math question uses simple terms, rules, and definitions. You absolutely need to know this math "vocabulary." Don't worry; we will cover only the math terms that you *must* know for the GRE.

Digits

Digit refers to the numbers that make up other numbers. There are 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and every number is made up of a collection of digits. For example, the number 10,897 has five digits: 1, 0, 8, 9, and 7. Each of the digits in a number has its own name, which is designated by a place value. In the number 10,897:

- 7 is the ones or units digit.
- 9 is the tens digit.
- 8 is the hundreds digit.
- 0 is the thousands digit.
- 1 is the ten-thousands digit.

Numbers

A **number** is simply a digit or a collection of digits. There are, of course, an infinite number of numbers. Basically, any combination of digits you can imagine is a number, which includes 0, negative numbers, fractions and decimals, and even weird numbers such as $\sqrt{2}$.

Integers

The **integers** are the counting numbers, such as -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, and so on.

Notice that fractions, such as $\frac{1}{2}$, are not integers.

Remember that the number zero is an integer! Positive integers get bigger as they move away from 0 (6 is bigger than 5); negative integers get smaller as they move away from zero (-6 is smaller than -5).

GRE problems like to try to trip you up on the difference between a number and an integer.

Remember: Fractions are NOT integers.

PROPERTIES OF NUMBERS AND INTEGERS

Now that you've learned the proper names for various types of numbers, let's look at properties of numbers and integers.

Positive or Negative

Numbers can be positive or negative. Negative numbers are less than zero, while positive numbers are greater than zero. Zero, itself, is neither positive nor negative—all other numbers are one or the other.

Even or Odd

Only integers possess the property of being even or odd. Fractions, decimals, and other non-integers can never be even or odd. Integers that are even are those that are divisible by 2; odd integers are those integers that are not divisible by 2.

- Here are some even integers: -4, -2, 0, 2, 4, 6, 8, 10.
- Here are some odd integers: -3, -1, 1, 3, 5, 7, 9, 11.

Zero

Zero has a number of special properties that are tested frequently on the GRE. Technically, zero is a multiple of every number, but this fact is rarely tested on the GRE.

Zero is a special little number. It is an integer, but it is neither positive nor negative. However:

- 0 is even.
- 0 plus any other number is equal to that other number.
- 0 multiplied by any other number is equal to 0.
- You cannot divide by 0.

Keep in Mind

- Fractions are neither even nor odd.
- Any integer is even if its units digit is even; any integer is odd if its units digit is odd.
- The results of adding and multiplying odd and even integers are as follows:
 - even + even = even
 - odd + odd = even
 - even + odd = odd
 - even × even = even
 - odd × odd = odd
 - even × odd = even

Be careful: Don't confuse odd and even with positive and negative!

If you have trouble remembering some of these rules for odd and even, don't worry. As long as you remember that there are rules, you can always figure them out by plugging in numbers. Let's say you forget what happens when an odd number is multiplied by an odd number. Just pick two odd numbers, say 3 and 5, and multiply them. $3 \times 5 = 15$. Now you know: odd × odd = odd.

Consecutive Integers

Consecutive integers are integers listed in order of increasing value without any integers missing in between them. Here are some examples:

- 0, 1, 2, 3, 4, 5
- $-6, -5, -4, -3, -2, -1, 0$
- $-3, -2, -1, 0, 1, 2, 3$

By the way, fractions and decimals cannot be consecutive, only integers can be consecutive. However, you can have different types of consecutive integers. For example consecutive even numbers could be 2, 4, 6, 8, 10. Consecutive multiples of four could be 4, 8, 12, 16.

Absolute Value

The absolute value of a number is equal to its distance away from 0 on the number line, which means that the absolute value of any number is always positive, whether the number itself is positive or negative. The symbol for absolute value is a set of double lines: $| |$. Thus $|-5| = 5$, and $|5| = 5$.

FACTORS, MULTIPLES, AND DIVISIBILITY

Now let's look at some ways that integers are related to each other.

Factors

A factor of a particular number is a number that will divide evenly into the number in question. For example, 1, 2, 3, 4, 6, and 12 are all factors of 12 because each number divides evenly into 12. In order to find all the factors of a particular number, write down the factors systematically in pairs of numbers that, when multiplied together, make 12, starting with 1 and the number itself:

- 1 and 12
- 2 and 6
- 3 and 4

If you always start with 1 and the number itself and work your way up, you'll make sure you got them all.

Multiples

A multiple of a number is one that the number itself is a factor of. For example, the multiples of 8 are all the numbers of which 8 is a factor: 8, 16, 24, 32, 40 and so on and so on. Note that there are an infinite number of multiples for any given number. Also, zero is a multiple of every number, although this concept is rarely tested on the GRE.

There are only a few factors of any number; there are many multiples of any number.

Prime Numbers

A prime number is an integer that only has two factors: itself and one. Thus, 37 is prime because the only integers that divide evenly into it are 1 and 37, while 10 is not prime because its factors are 1, 2, 5, and 10.

Here is a list of all the prime numbers that are less than 30: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.

- 0 is not a prime number.
- 1 is not a prime number.
- 2 is the only even prime number.
- Prime numbers are positive integers. There's no such thing as a negative prime number or a prime fraction.

1 is not prime!

DIVISIBILITY

A number is always divisible by its factors. If you're not sure if one number is divisible by another, a surefire way to find out is to use the calculator. However, there are also certain rules you can use to determine whether one number is a factor of another.

- An integer is divisible by 2 if its units digit is divisible by 2. For example, we know just by glancing at it that 598,447,896 is divisible by 2, because the units digit, 6, is divisible by 2.
- An integer is divisible by 3 if the sum of its digits is divisible by 3. For example, we know that 2,145 is divisible by 3 because $2 + 1 + 4 + 5 = 12$, and 12 is divisible by 3.
- An integer is divisible by 4 if its last two digits form a number that's divisible by 4. For example, 712 is divisible by 4 because 12 is divisible by 4.
- An integer is divisible by 5 if its units digit is either 0 or 5.
- An integer is divisible by 6 if it's divisible by both 2 and 3.
- An integer is divisible by 8 if its last three digits form a number that's divisible by 8. For example, 11,640 is divisible by 8 because 640 is divisible by 8.
- An integer is divisible by 9 if the sum of its digits is divisible by 9.
- An integer is divisible by 10 if its units digit is 0.

Remainders

If one number is not divisible by another—meaning that the second number is not a factor of the first number—you'll have a number left over when you divide. This left-over number is called a remainder; you probably remember working with remainders in grade school.

For example, when 4 is divided by 2, there's nothing left over so there's no remainder. In other words, 4 is divisible by 2. You could also say that the remainder is 0.

Five divided by 2 is 2, with 1 left over; 1 is the remainder. Thirteen divided by 8 is 1, with 5 left over as the remainder.

If a question asks about a remainder, don't use the calculator. Use long division.

MORE MATH VOCABULARY

In a way, the Math section is almost as much of a vocabulary test as the Verbal section. Below, you'll find some more standard terms that you should commit to memory before you do any practice problems.

Term	Meaning
<i>sum</i>	the result of addition
<i>difference</i>	the result of subtraction
<i>product</i>	the result of multiplication
<i>quotient</i>	the result of division
<i>divisor</i>	the number you divide by
<i>numerator</i>	the top number in a fraction
<i>denominator</i>	the bottom number in a fraction
<i>consecutive</i>	in order from least to greatest
<i>term</i>	the numbers used in an equation

BASIC OPERATIONS WITH NUMBERS

Now that you've learned about numbers and their properties, you're ready to begin working with them. As we mentioned above, there are four basic operations you can perform on a number: addition, subtraction, multiplication, and division.

Order of Operations

Unfortunately, when you work with numbers you can't just perform the four operations in any way you please. Instead, math has some very specific rules to follow, which are commonly referred to as the order of operations.

It is absolutely necessary that you perform these operations in exactly the right order. In many cases, the correct order will be apparent from the way the problem is written. In cases where the correct order is not apparent, you need to remember the following mnemonic.

Please Excuse My Dear Aunt Sally, or PEMDAS.

What does PEMDAS stand for?

$$\begin{array}{c} P \mid E \mid MD \mid AS \\ \rightarrow \quad \rightarrow \end{array}$$

P stands for “parentheses.” Solve anything in parentheses first.

E stands for “exponents.” Solve exponents next. (We’ll review exponents soon.)

M stands for “multiplication” and D stands for “division.” The arrow indicates that you do all your multiplication and division together in the same step, going from left to right.

A stands for “addition” and S stands for “subtraction.” Again, the arrow indicates that you do all your addition and subtraction together in one step, from left to right.

Let’s look at an example:

$$12 + 4(2 + 1)^2 \div 6 - 7 =$$

Here’s How to Crack It

Start by doing all the math inside the parentheses. $2 + 1 = 3$. Now the problem looks like this:

$$12 + 4(3)^2 \div 6 - 7 =$$

Next we have to apply the exponent. $3^2 = 9$. Now this is what we have:

$$12 + 4(9) \div 6 - 7 =$$

Now we do multiplication and division from left to right. $4 \times 9 = 36$, and $36 \div 6 = 6$, which gives us

$$12 + 6 - 7 =$$

Finally, we do the addition and subtraction from left to right. $12 + 6 = 18$, and $18 - 7 = 11$. Therefore,

$$12 + 4(2 + 1)^2 \div 6 - 7 = 11$$

Multiplication and Division

When multiplying or dividing, keep the following rules in mind:

- positive \times positive = positive $2 \times 2 = 4$
- negative \times negative = positive $-2 \times -2 = 4$
- positive \times negative = negative $2 \times -2 = -4$
- positive \div positive = positive $8 \div 2 = 4$
- negative \div negative = positive $-8 \div -2 = 4$
- positive \div negative = negative $8 \div -2 = -4$

Before taking the GRE, you should have your times tables memorized from 1 through 15. It will be a tremendous advantage if you can quickly and confidently figure out, for example, what 7×12 is (it’s 84).

It seems like a small thing, but memorizing your times tables will really help you on test day.

A FEW LAWS

These two basic laws are not necessary for success on the GRE, so if you have trouble with them, don’t worry too much. However, ETS likes to use these laws to make certain math problems more difficult to work with. If you’re comfortable with these two laws, you’ll be able to simplify problems using them, so it’s definitely worth it to use them.

Associative Laws

There are two associative laws—one for addition and one for multiplication. For the sake of simplicity, we’ve lumped them together.

Here’s what you need to know:

When you are adding or multiplying a series of numbers, you can regroup the numbers in any way you’d like.

Here are some examples:

$$\begin{aligned} 4 + (5 + 8) &= (4 + 5) + 8 = (4 + 8) + 5 \\ (a + b) + (c + d) &= a + (b + c + d) \\ 4 \times (5 \times 8) &= (4 \times 5) \times 8 = (4 \times 8) \times 5 \\ (ab)(cd) &= a(bcd) \end{aligned}$$

Write everything down on scratch paper! Don’t do anything in your head!

Distributive Law

This is often tested on the GRE. Here's what it looks like:

$$\begin{aligned}a(b + c) &= ab + ac \\a(b - c) &= ab - ac\end{aligned}$$

For example:

$$12(66) + 12(24) = ?$$

Here's How to Crack It

This is in the same form as $ab + ac$. Using the distributive law, this must equal $12(66 + 24)$, or $12(90) = 1,080$.

EXPONENTS AND SQUARE ROOTS

Exponents and square roots are a popular topic on the GRE. Here's the information you need to know in order to work with them.

What Are Exponents?

Exponents are a sort of mathematical shorthand for repeated multiplication. Instead of writing $(2)(2)(2)(2)$, you can use an exponent and write 2^4 . The little 4 is the **exponent** and the 2 is called the **base**. If you're stuck on an exponent problem, it's often helpful to write out the repeated multiplication: When in doubt, expand it out!

There are only five rules for exponents:

1. $a^2 = a \cdot a$
2. $a^2 \cdot a^3 = (a \cdot a)(a \cdot a \cdot a) = a^{2+3} = a^5$
3. $(a^2)^3 = (a \cdot a)(a \cdot a)(a \cdot a) = a^{2 \cdot 3} = a^6$
4. $\frac{a^2}{a^3} = \frac{a \cdot a}{a \cdot a \cdot a} = \frac{1}{a} = a^{2-3} = a^{-1}$
5. $15^{12} - 15^{11} = 15^{11}(15 - 1) = 15^{11}(14)$

Multiplication with Exponents

It's simple to multiply two or more numbers that are raised to exponents, as long as they have the same base. In this situation, all you have to do is add up the exponents. For example:

$$\begin{aligned}2^2 \times 2^4 &= \\2^2 + 4 &= 2^6\end{aligned}$$

You can see that this is true when you expand it out, which is just as good a way to solve the problem:

$$\begin{aligned}2^2 \times 2^4 &= \\2 \times 2 \times 2 \times 2 \times 2 \times 2 &= 2^6\end{aligned}$$

Be careful, though. This rule does not apply to addition. $2^2 + 2^4$ does not equal 2^6 . There's no quick and easy method for adding numbers with exponents.

Division with Exponents

Dividing two or more numbers with the same base that are raised to exponents is simple, too. All you have to do is subtract the exponents. For example:

$$2^6 \div 2^2 = 2^{6-2} = 2^4$$

You can see that this is true when you expand it out:

$$2^6 \div 2^2 = (2 \times 2 \times 2 \times 2 \times 2 \times 2) \div (2 \times 2) = 2 \times 2 \times 2 \times 2 = 2^4$$

Once again, don't assume this same shortcut applies to subtraction of numbers with exponents. It doesn't.

Another time you might need to divide with exponents is when you see a negative exponent. In this situation, you just put 1 over it (in other words, take its reciprocal) and get rid of the negative. For example:

$$3^{-2}$$

should be rewritten as

$$\frac{1}{3^2}$$

and this gives us:

$$\frac{1}{9}$$

Exponents and Parentheses

When there are exponents inside and outside the parentheses, you simply multiply them:

$$(4^5)^2 = \\ 4^{5 \times 2} = \\ 4^{10}$$

This is what the shorthand notation is really telling us to do:

$$(4^5)^2 = \\ (4 \times 4 \times 4 \times 4 \times 4)(4 \times 4 \times 4 \times 4 \times 4) = 4^{10}$$

If You Expand It Out, You'll Never Be in Doubt

When solving problems that involve exponents, it's extremely important to pay careful attention to terms within parentheses. When an exponent appears on the outside of a parenthetical expression, expanding it out is the best way to ensure that you don't make a careless mistake. For example, $(3x)^2 = (3x)(3x) = 9x^2$, not $3x^2$.

The same is true of fractions within parentheses: $\left(\frac{3}{2}\right)^2 = \left(\frac{3}{2}\right)\left(\frac{3}{2}\right) = \frac{9}{4}$.

The Peculiar Behavior of Exponents

- Raising a number greater than 1 to a power greater than 1 results in a bigger number. For example, $2^2 = 4$.
- Raising a fraction that's between 0 and 1 to a power greater than 1 results in a smaller number. For example, $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$.
- A negative number raised to an even power becomes positive. For example, $(-2)^2 = 4$, because $(-2)(-2) = 4$.
- A negative number raised to an odd power remains negative. For example, $(-2)^3 = -8$, because $(-2)(-2)(-2) = -8$.
- A number raised to a negative power is equal to 1 over the number raised to the positive power. For example, $2^{-2} = \frac{1}{2^2} = \frac{1}{4}$.
- A number raised to the 0 power is 1, no matter what the number is. For example, $1,000^0 = 1$. Note, however, that 0 to the 0 power is undefined.

- A number raised to the first power is ALWAYS the number itself. For example, $1,000^1 = 1,000$.

Here's an example of a question you might see on the GRE:

12 of 20

If $a \neq 0$, then $\frac{(a^6)^2}{a \cdot a^2} =$

- a^5
- a^6
- a^7
- a^8
- a^9

Always cross off wrong answer choices on your scratch paper.

Here's How to Crack It

In the numerator, we have $(a^6)^2$, which is a^{12} . In the denominator, we have $a \cdot a^2$, which is a^3 . So, $a^{12} \div a^3 = a^9$. That's choice (E).

Let's try another—this time, a quant comp:

2 of 20

Quantity A Quantity B

$$27^4 \qquad\qquad\qquad 9^6$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

ALWAYS write down A, B, C, D for quant comps.

Here's How to Crack It

Looks scary, huh? But remember what you learned about quant comp problems in the math introduction. Your job is to compare the two quantities, not calculate their values. First of all, eliminate (D)—when just numbers are being compared, the answer can always be determined. Now, as they're written, we can't compare these exponents—they don't have the same base. But we can fix that. Both 27 and 9 are powers of 3: 27 is $3 \times 3 \times 3$, so 27^4 is $(3 \times 3 \times 3)^4$. This equals $(3 \times 3 \times 3)(3 \times 3 \times 3)(3 \times 3 \times 3)(3 \times 3 \times 3)$, also known as 3^{12} . That takes care of Column A. In Column B, 9 is 3×3 , so 9^6 is $(3 \times 3)^6$. This equals $(3 \times 3)(3 \times 3)(3 \times 3)(3 \times 3)(3 \times 3)(3 \times 3)$, also known as 3^{12} . So, we have 3^{12} in Column A and 3^{12} in Column B. They're equal, and the answer is (C).

What Is a Square Root?

The sign $\sqrt{}$ indicates the square root of a number. For example, $\sqrt{2}$ means that some value, squared, equals 2.

If $x^2 = 16$, then $x = \pm 4$. You must be especially careful to remember this on quantitative comparison questions. But when ETS asks you for the value of $\sqrt{16}$, or the square root of any number, it is asking you for the positive root only. Although squaring -5 will result in 25, just as squaring 5 will, when ETS asks for $\sqrt{25}$, the only answer it's looking for is 5.

Playing with Square Roots

You multiply and divide square roots just like you would any other number.

You can multiply and divide any square roots, but you can add or subtract roots only when they are the same.

$$\sqrt{3} \times \sqrt{12} = \sqrt{36} = 6$$

$$\sqrt{\frac{16}{4}} = \frac{\sqrt{16}}{\sqrt{4}} = \frac{4}{2} = 2$$

However, you can't add or subtract square roots unless the roots are the same.

So, $\sqrt{2} + \sqrt{2} = 2\sqrt{2}$. (Just pretend there's an invisible 1 in front of the root sign.) But $\sqrt{2} + \sqrt{3}$ does not equal $\sqrt{5}$. In order to add different roots, you need to estimate their values first and then add them. We'll cover how to estimate roots in the pages to come.

Here's an example:

3 of 20

$$z^2 = 144$$

Quantity A Quantity B

$$z \qquad \sqrt{144}$$

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.

Here's How to Crack It

You want to pick choice (C), don't you? After all, if z^2 is 144, then the square root of 144 must be z , right? Not so fast. If $z^2 = 144$, then z could be either 12 or -12 . But when the radical sign ($\sqrt{}$) is used, only the positive root is being referred to. Therefore, Column A is equal to 12 or -12 , but Column B is 12. And that gives us (D) as the answer.

Estimating and Simplifying Roots

When you have a perfect square, such as 25 or 36, finding the square root is easy. $\sqrt{25} = 5$ and $\sqrt{36} = 6$. But what about finding $\sqrt{32}$? You could use your calculator, although that may be too time-consuming. Since 32 is between 25 and 36, you can estimate that $\sqrt{32}$ must be between $\sqrt{25}$ and $\sqrt{36}$. So $\sqrt{32}$ is somewhere between 5 and 6. You also know that 32 is closer to 36 than it is to 25, so $\sqrt{32}$ will be closer to 6 than it is to 5, and will probably be about 5.6 or 5.7 (it's actually 5.66). This process of estimating roots for numbers that aren't perfect squares can be extremely helpful in eliminating answer choices through Ballparking.

The other thing you might be able to do with a root is simplify it. As we've seen, 32 isn't a perfect square, but one of its factors is a perfect square. 32 can be split into 16×2 , which means that $\sqrt{32}$ is the same thing as $\sqrt{16 \times 2}$. We can get the square root of 16 and move that outside the square root symbol, giving us $4\sqrt{2}$.

$4\sqrt{2}$ has exactly the same value as $\sqrt{32}$, it's just written in simpler form. Since, on the GRE, answer choices will nearly always be in simplest terms, it's important to know how to do this.

Try the following problem:

14 of 20

$$\frac{\sqrt{75}}{\sqrt{27}} =$$

- $\frac{5}{3}$
- $\frac{25}{9}$
- 3
- $3\sqrt{3}$
- $3\sqrt{5}$

Here's How to Crack It

First, let's try to simplify each of these roots. $\sqrt{75}$ has a factor that is a perfect square—25, so it can be rewritten as $\sqrt{25 \times 3}$ and simplified to $5\sqrt{3}$. $\sqrt{27}$ has the perfect square 9 as a factor, so it can be written as $\sqrt{9 \times 3}$ and then simplified to $3\sqrt{3}$. This means that $\frac{\sqrt{75}}{\sqrt{27}}$ is equal to $\frac{5\sqrt{3}}{3\sqrt{3}}$; the $\sqrt{3}$ in the top and bottom will cancel, leaving you with $\frac{5}{3}$. The answer is (A).

Learn These Four Values

To make calculations of square roots easier, you should memorize the following values. You should be able to recite them without hesitation.

$$\sqrt{1} = 1$$

$$\sqrt{2} = 1.4$$

$$\sqrt{3} = 1.7$$

$$\sqrt{4} = 2$$

You'll see them again when we discuss geometry, in Chapter 11.

ALGEBRA: OPERATIONS WITH LETTERS

Algebra is simply a way of performing operations without numbers; in algebraic expressions, a variable stands in for the missing number or numbers. While the GRE Math section is not by and large an algebra test, you should be comfortable with the basics of working with equations.

Dealing with Variables

Now that you've familiarized yourself with number concepts, it's time to put your knowledge to work. The math topics found in this chapter—together with the information in the next chapter—form the crux of the GRE Math section. Master these and you'll score well on test day. Expect to see a number of problems dealing with fractions, percents, rates, averages, and equations, so pay particular attention to these topics, which we discuss in Chapter 10.

So far, we've been showing you how to manipulate numbers, but many GRE math problems involve variables (such as n , x , or y). It's time to learn how to deal with those.

Manipulating Equations

When working with equations, you can do pretty much anything you want to them as long as you follow the golden rule:

Whatever you do on one side of the equals sign you must also do on the other side.

Don't assume you'll always need to solve for the variable on the GRE; sometimes you'll simply have to manipulate the equation to get the answer.

Solving for One Variable

You can solve equations that have just one variable. In these cases, you start by isolating the variable on one side of the equation and the numbers on the other side. You can do this by adding, subtracting, multiplying, or dividing both sides of the equation by the same number. Just remember that anything you do to one side of an equation, you must do to the other side. Be sure to write down every step. Let's look at a simple example:

$$3x - 4 = 5$$

Here's How to Crack It

In this case, you can collect all the constants on the right side of the equation by adding 4 to both sides of the equation. (If for some reason you wanted to move the 5 to the left side of the equation, you would have to subtract 5 from both sides. That's just how it works.) In general, you can eliminate negative numbers by adding them to both sides of the equation, just as you can eliminate positives by subtracting them from both sides of the equation.

$$\begin{array}{r} 3x - 4 = 5 \\ + 4 = + 4 \\ \hline 3x = 9 \end{array}$$

The above rule also applies to numbers in the equation that are divided or multiplied. So in this case, in order to get rid of the 3 that's multiplied by the variable, x , we would need to divide both sides of the equation by 3 to solve for x .

$$\begin{array}{r} \frac{3x}{3} = \frac{9}{3} \\ x = 3 \end{array}$$

Let's try another one:

$$5x - 13 = 12 - 20x$$

Here's How to Crack It

Again, we want to get all the x values on the same side of the equation:

$$\begin{array}{r} 5x - 13 = 12 - 20x \\ + 20x \quad \quad \quad + 20x \\ \hline 25x - 13 = 12 \end{array}$$

Now let's get rid of that negative 13:

$$\begin{array}{r} 25x - 13 = 12 \\ + 13 + 13 \\ \hline 25x = 25 \end{array}$$

It might be pretty obvious that x is 1, but let's just finish it:

$$\begin{array}{r} 25x = 25 \\ \frac{25x}{25} = \frac{25}{25} \\ x = 1 \end{array}$$

Let's try another one:

$$5x + \frac{3}{2} = 7x$$

Here's How to Crack It

First multiply both sides by 2 to get rid of the fraction. Remember to multiply all of the members of the equation!

$$10x + 3 = 14x$$

Always write A, B, C, D, E on your scratch paper to represent the answer choices (or A, B, C, D if it's quant comp)

You must always do the same thing to both sides of an equation.

Now collect the x 's on the same side:

$$\begin{array}{r} 10x + 3 = 14x \\ -10x \quad -10x \\ \hline 3 = 4x \end{array}$$

Now finish it up:

$$\begin{array}{r} 3 = 4x \\ \frac{3}{4} = \frac{4x}{4} \\ \frac{3}{4} = x \end{array}$$

INEQUALITIES

In an equation, one side is always equal to another. In an inequality, one side of the equation does *not* equal the other. Equations contain equal signs, while inequalities contain one of the following symbols:

\neq	is not equal to
$>$	is greater than
$<$	is less than
\geq	is greater than or equal to
\leq	is less than or equal to

The point of the inequality sign always points to the smaller value.

You can manipulate any inequality in the same way you can an equation, with one important difference. When you multiply or divide both sides of an inequality by a negative number, the direction of the inequality symbol must change. That is, if $x > y$, then $-x < -y$.

To see what we mean, take a look at this simple inequality:

$$12 - 6x > 0$$

Here's How to Crack It

You could manipulate this inequality without ever multiplying or dividing by a negative number by just adding $6x$ to both sides. The sign stays the same. Then divide both sides by positive 6. Again, the sign stays the same.

$$\begin{array}{r} 12 - 6x > 0 \\ + 6x > + 6x \\ \hline 12 > 6x \\ \frac{12}{6} > \frac{6x}{6} \\ 2 > x \end{array}$$

But suppose you subtract 12 from both sides at first:

$$\begin{array}{r} 12 - 6x > 0 \\ -12 > -12 \\ -6x > -12 \\ \frac{-6x}{-6} < \frac{-12}{-6} \\ x < 2 \end{array}$$

Notice that the sign flipped because you divided both sides by a negative number. But the answer means the same thing: the first answer says that the number 2 is greater than x , and the second says that x is less than the number 2!

Sometimes, ETS will give you a range for two variables and then combine them in some way. It looks something like this:

If $0 < x < 10$, and $-10 < y < -1$, then what is the range for $x - y$?

Here's How to Crack It.

First, treat the inequality sign like an equal sign. You need all possible combinations of $x - y$, which means that you need the biggest x minus the biggest y , the biggest x minus the smallest y , the smallest x minus the biggest y , and the smallest x minus the smallest y . There is a simple set-up to do this.

Flip the sign! When you multiply or divide both sides of an inequality by a negative number, the greater than/less than sign points the opposite way.