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GRE Review
Study Guide

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Roslyn Heights, New York

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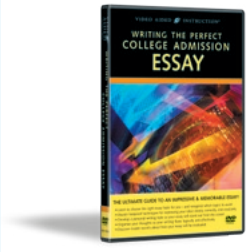

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GRE Review Study Guide

Introduction

For easier studying and maximum success, we recommend that you view the program over a number of short sessions: don't try to absorb too much at one time. Review the entire program, or specific sections, as many times as you find necessary in order to master the material.

Remember, you control the pace of your own learning with Video Aided Instruction. While watching this program, you can use the following buttons on your remote control or DVD player:

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Also, be sure to keep plenty of scrap paper handy so you can jot down ideas, work through concepts, and more. Finally, be sure to use the myriad on-screen graphics to take notes for yourself—when you're done, you'll have a notebook you can refer back to again and again.

About Your Instructors

Karl Weber, M.A., is an educator, editor, and bestselling author in fields ranging from business to politics to test preparation. He has worked on books with such notable figures as management guru Adrian Slywotzky, Loews Hotels CEO Jonathan M. Tisch, former President Jimmy Carter, and 2006 Nobel Peace Prize winner Muhammad Yunus.

Peter Lanzer, M.B.A., is a dynamic educator with over 30 years of experience teaching high school and college math. His groundbreaking test prep TV shows appeared regularly on "The Learning Channel." Today, through his many popular video programs, Mr. Lanzer shares his expertise, energy, and enthusiasm with grateful math students around the world.

INTRODUCTION

PART 1 – Overview of the GRE

Directions: See DVD program.

PART 2 – Taking the Computer-Based GRE

Directions: See DVD program.

PART 3 – Test-Taking Strategies for the Computer-Based GRE

Directions: See DVD program.

ANALYTICAL WRITING

PART 1 – Overview of Analytical Writing

Directions: See DVD program.

PART 2 – Analytical Writing on the Computer-Based GRE

Directions: See DVD program.

PART 3 – The Issue Task

Directions: Each of the following topics consists of a brief statement that expresses an opinion about some issue. Within a period of 30 minutes, select one of these topics, and plan and write an essay that presents your perspective on the given issue. An essay that doesn't respond directly to one of these topics will receive a score of zero.

You can choose to agree with the opinion expressed in the topic, disagree with it, or qualify it in some way: the position you present will not affect your score. Your score will relate directly to how well you: present ideas that are relevant to the issue; support your perspective on the issue with reasons and examples (drawn from your experience, observations, reading, and/or studies); organize, develop, and express your ideas; and demonstrate a command of standard written English. A full listing of the possible Issue Task topics is typically made available at the official GRE website, http://www.ets.org/gre/.

SAMPLE TOPIC 1

Originality does not mean thinking something that was never thought before; it means putting old ideas together in new ways.

SAMPLE TOPIC 2

The function of science is to reassure; the purpose of art is to upset. Therein lies the value of each.

SAMPLE TOPIC 3

Scandals—whether in politics, academia, or other areas—can be useful. They focus our attention on problems in ways that no speaker or reformer ever could.

SAMPLE TOPIC 4

The way people look, dress, and act reveals their attitudes and interests. You can tell much about a society's ideas and values by observing the appearance and behavior of its people.

SAMPLE TOPIC 5

Many of the world's lesser-known languages are being lost as fewer and fewer people speak them. The governments of countries in which these languages are spoken should act to prevent such languages from becoming extinct.

SAMPLE ESSAY 1 *(ISSUE TASK, TOPIC 5)*

As global communications increase and transportation systems improve, more and more of the world's least-spoken languages are in danger of extinction. Some linguists, anthropologists, and other experts have suggested that the governments of countries in which these languages are still used ought to take steps to protect and preserve them for future generations. But while the impulse behind this idea is understandable and even admirable, in the end it is a flawed and impractical concept.

From the point of view of a scholar, the reasons for trying to preserve little-used languages are clear. Obscure languages spoken in little-known parts of the world may be treasure troves of historical knowledge. They may also preserve elements of human culture that are otherwise unknown — old songs, stories, myths, legends, and proverbs that contain the wisdom of an entire people. Because these cultural artifacts may never have been written down or translated into other languages, they are in danger of disappearing forever once the few remaining speakers of the language in which they are preserved die out. In this way, much fascinating and potentially important information may be lost to scholars.

But do these arguments show that governments should adopt policies and programs to preserve little-used languages? There are strong reasons to conclude that the answer is no.

First, there is the question of practicality. Preserving a dying language by artificial means is extremely difficult. When few people want to use a particular language, and the great majority of those living in a certain place prefer to use a different tongue, how can they be forced to choose the language they view as old-fashioned, limited, or inaccessible? Government hardly has the power to control the private choices people make in their homes and workplaces. It can set up school programs to teach and encourage the old language, as the Irish government has done, but these are usually not effective. Most students forget their language lessons as soon as they leave the classroom. In the end, linguistic change is a natural process that reflects social change and that governments have little power to direct.

Second, it's not clear that government programs to preserve dying languages would benefit the people most affected — the speakers of those languages. After all, these obscure languages are dying for a reason. When only a few people understand a particular language, they are cut off from

the rest of society. Imagine, for example, a tribe in a remote jungle in Africa or New Guinea that uses a language known only by a few hundred people. Unless they convert to a mainstream tongue, how can these people read newspapers, get jobs in the city, or take part in national elections? Being forced to use their local language would isolate them from the broader economy and limit their opportunities to benefit from social progress.

Finally, on a national scale, there is the danger that encouraging the maintenance of local languages will promote social disunity. Look at the example of India, where, until modern times, hundreds of widely varying languages were spoken by groups whose numbers were often very small. It's hard to imagine how a national government or a national economy could operate in such a state of mutual incomprehension. This is why both the former British rulers of India and the modern democratic government of the country have chosen to encourage the use of English as a neutral, unifying language, even though this means the gradual death of the obscure ancient languages of India. As a result, India today has a thriving democracy and a growing modern economy.

Certainly something is lost whenever a language dies. But a government whose chief responsibility is the long-term welfare of its people shouldn't preserve old languages for cultural or historic reasons. The practical advantages of adopting a shared modern language are greater than any cultural losses it may entail.

PART 4 – The Argument Task

Directions: Each of the following topics consists of an argument presented in the form of a short passage. Within a period of 30 minutes, select one of these topics, and plan and write an essay that critiques the given argument. NOTE: You are ***NOT*** being asked to present your views on the subject at hand. An essay that doesn't directly critique one of the arguments from these topics will receive a score of zero.

Your score will relate directly to how effectively you: analyze the line of reasoning in the argument; recognize what, if any, questionable assumptions underlie the thinking; understand how well any evidence that is cited supports the conclusion; appreciate what sort of evidence would strengthen or refute the given argument; perceive what changes in the argument would make it more logically sound; identify what additional information might help you better evalute its conclusion; present ideas that are relevant to the issue; support your critique of the argument with relevant reasons and examples (drawn from your experience, observations, reading, and/or studies); organize, develop, and express your critique of the argument; and demonstrate a command of standard written English. A full listing of the possible Argument Task topics is typically made available at the official GRE website, http://www.ets.org/gre/.

SAMPLE TOPIC 1

Milk and dairy products are rich in vitamin D and calcium—substances essential for building and maintaining bones. Many people therefore say that a diet rich in dairy products can help prevent osteoporosis, a disease that is linked to both environmental and genetic factors and that causes the bones to weaken significantly with age. But a long-term study of a large number of people found that those who consistently consumed dairy products throughout the years of the study have a higher rate of bone fractures than any other participants in the study. Since bone fractures are symptomatic of osteoporosis, this study result shows that a diet rich in dairy products may actually increase, rather than decrease, the risk of osteoporosis.

SAMPLE TOPIC 2

The following appeared in a letter to the school board in the town of Centerville.

"All students should be required to take the driver's education course at Centerville High School. In the past two years, several accidents in and around Centerville have involved teenage drivers. Since a number of parents in Centerville have complained that they are too busy to teach their teenagers to drive, some other instruction is necessary to ensure that these teenagers are safe drivers. Although there are two driving schools in Centerville, parents on a tight budget cannot afford to pay for driving instruction. Therefore, an effective and mandatory program sponsored by the high school is the only solution to this serious problem."

SAMPLE TOPIC 3

Two years ago, radio station WCQP in Rockville decided to increase the number of call-in advice programs that it broadcast; since that time, its share of the radio audience in the Rockville listening area has increased significantly. Given WCQP's recent success with call-in advice programming, and citing a nationwide survey indicating that many radio listeners are quite interested in such programs, the station manager of KICK in Medway recommends that KICK include more call-in advice programs in an attempt to gain a larger audience share in its listening area.

SAMPLE TOPIC 4

Woven baskets characterized by a particular distinctive pattern have previously been found only in the immediate vicinity of the prehistoric village of Palea and therefore were believed to have been made only by the Palean people. Recently, however, archaeologists discovered such a "Palean" basket in Lithos, an ancient village across the Brim River from Palea. The Brim River is very deep and broad, and so the ancient Paleans could have crossed it only by boat, and no Palean boats have been found. Thus it follows that the so-called Palean baskets were not uniquely Palean.

SAMPLE TOPIC 5

The following appeared in a memo from the owner of a chain of cheese stores located throughout the United States.

"For many years, all the stores in our chain have stocked a wide variety of both domestic and imported cheeses. Last year, however, all of the five bestselling cheeses at our newest store were domestic cheddar cheeses from Wisconsin. Furthermore, a recent survey by *Cheeses of the World* magazine indicates an increasing preference for domestic cheeses among its subscribers. Since our company can reduce expenses by limiting inventory, the best way to improve profits in all of our stores is to discontinue stocking many of our varieties of imported cheese and concentrate primarily on domestic cheeses."

end of **DISC 1** ● *start of* **DISC 2**

SAMPLE ESSAY 2 *(ARGUMENT TASK, TOPIC 5)*

There are several significant problems with the argument presented by the owner of the chain of cheese stores regarding his company's strategy in stocking domestic rather than imported cheeses. Some are fairly obvious, some more subtle.

The most obvious weakness in the argument, perhaps, is its reliance on evidence that seems scanty at best, potentially irrelevant at worst. The memo cites the fact that, "Last year … the five bestselling cheeses at our newest store were all domestic cheddar cheeses from Wisconsin." This is an exceedingly narrow base of data on which to rely in crafting a sweeping overhaul of the company's strategy. We notice that the argument is based on sales from a single store rather than from the entire chain, and that it relies on sales data from a single year rather than a longstanding sales pattern. Both are serious weaknesses, suggesting that this piece of evidence may be severely slanted, indicative not of a national trend but of a merely local or short-lived peculiarity.

In a similar fashion, the memo cites as evidence the fact that "a recent survey by *Cheeses of the World* magazine indicates an increasing preference for domestic cheeses among its subscribers." Here again we have a single data point that may be idiosyncratic rather than broadly-based. Do readers of *Cheeses of the World* magazine have the same preferences as cheese buyers generally? Were those who chose to participate in the survey similar in their tastes to the general run of cheese lovers? Does the survey result suggest a long-term trend in favor of domestic cheeses, or perhaps simply a one-year fad? The argument as presented gives us no way to answer these important questions.

These weaknesses in the evidence presented would, all alone, be sufficient reason to reject the memo's argument. But there are other, more subtle reasons as well. Even if it were true that most cheese lovers prefer domestic cheeses to imported cheeses, there might be excellent reasons to stock and display imported cheeses. For example, it might be true that an interesting, attractive array of unusual imported cheeses might play an important role in drawing customers into the stores — even customers who end up buying mainly domestic cheeses. If the imported cheeses are banished, that walk-in traffic might be diminished, resulting, ultimately, in decreased sales.

It might also be the case that foreign cheeses are higher-priced and produce greater profit margins, so that even a foreign cheese that sells relative smaller volume than a domestic cheese might actually play a greater role in the profitability of the cheese store chain. Finally, it's possible that a broad assortment of imported cheeses might, taken together, produce a large share of the cheese stores' revenue, even if no single imported cheese was popular enough to crack the chain's list of its five bestsellers.

It could well be that the owner's decision to stock domestic cheeses might be analogous to the decision by the owner of a music store to carry at any given time only the ten bestselling music CDs. Such a decision might appear logical at first glance, but the longer we consider it, the less sensible it becomes. Would any music fan really want to visit such a sparsely-stocked store? And how would music lovers ever discover new acts they might enjoy if stores carried only a few blockbuster hits? Basing inventory decisions strictly on bestseller lists could be a recipe for the long-term decline of the store chain and even of the entire industry.

For all these reasons, I would urge the owner of the cheese store chain to examine a much broader base of evidence before making any decision about changing the inventory balance of his stores. I would want much more solid grounds for such a decision before betting the future of my company on it.

ANALYTICAL WRITING QUICK TIPS

When writing your response to the ***Issue*** task, be sure to:

- Start with a strong introduction that answers the question and takes a firm position on one side of the issue.
- Give specific reasons and examples to defend your stance.
- Discuss why the opposing views aren't as compelling.
- End with a strong conclusion that summarizes your essay and extends your ideas further.

When writing your response to the ***Argument*** task, be sure to:

- Start with a strong introduction that answers the question and takes a firm position on the relative strength (or weakness) of the argument.
- Identify the important assumptions, fallacies, and other flaws in the argument.
- Give specific reasons and examples to defend your stance.
- Discuss why the opposing views aren't as compelling.
- End with a strong conclusion that summarizes your essay and extends your ideas further.

When writing and revising your responses to both tasks, ask yourself:

- Are my ideas clear and understandable? Do they flow gracefully from one point to the next? Be sure to:
  - Make sure your ideas are in a logical order.
  - Use the paragraph as your structural unit.
  - Include a topic sentence in each paragraph.
  - Use signpost words and phrases to guide the reader and connect one idea to the next.
  - Use transitions appropriately.
- Is my writing concise and is the style interesting? Be sure to:
  - Omit needless words, repetition, or redundancy.
  - Look for lifeless words that have no energy and convey no meaning. Rephrase to eliminate them.
  - Look for "to be" verbs. Consider using action verbs instead.
  - Look for passive verbs. Consider using active verbs instead.
  - Look for sentences containing numerous adjectives, adverbs, or other modifiers. Consider using more specific, descriptive, or colorful verbs or nouns instead.
  - Avoid paragraphs that include only one sentence.
- Do the right points get emphasis? Do I sound smart? Be sure to:
  - Spill the beans.
  - Don't overstate or understate your thesis.
  - Be specific.
  - Use sentence structure to emphasize connections among ideas.
  - Vary sentence length and sentence structure.
  - Vary your vocabulary choices. Be careful not to overuse any words or phrases.
- Is my writing as free of errors in grammar, spelling, usage, and mechanics as possible? Be sure to:
  - Make all subjects and verbs agree, and use verb tenses and pronouns correctly.
  - Consider rephrasing sentences to avoid any clunky sentence structures, "questionable" spellings, etc.

VERBAL REASONING

PART 1 – Overview of Reading Comprehension

Directions: See DVD program.

PART 2 – Tackling the Reading Comprehension Questions

Directions: Each statement or passage is followed by one or more questions. Select the ***best*** answer choice to each question, based on what is ***stated*** or ***implied*** in the related statement or passage. You aren't expected to have any prior knowledge of the subject matter contained within the statements or passages.

PASSAGE 1

Questions 1–5 are based on this passage.

Although Alfred Wegener was not the first scientist to propose the idea that the continents have moved over time, his 1912 outline of the hypothesis was the first detailed description of the concept and the first to offer a respectable mass of supporting evidence. It is appropriate, then, that the theory of "continental drift," as it is often called today, was most widely known as "Wegener's hypothesis" during the more than fifty years of debate that preceded its ultimate acceptance by most earth scientists.

In brief, Wegener's hypothesis stated that, in the late Paleozoic era, all of the present-day continents were part of a single giant land mass, Pangaea, that occupied almost half of the Earth's surface. About 40 million years ago, Pangaea began to break into fragments that slowly moved apart, ultimately forming the various continents we know today. Wegener supported his argument with data drawn from geology, paleontology, zoology, climatology, and other fields. So impressive was his array of evidence that his hypothesis could not be ignored. However, until the 1960s, most scientists were reluctant to accept Wegener's ideas. There are several reasons why this was so.

QUESTION 3

First, although Wegener showed that continental movement was consistent with much of the geological and other evidence—for example, the apparent family relationships among forms of plants and animals now separated by vast expanses of ocean, once geographically united on the hypothetical Pangaea—he failed to suggest any causal mechanism for continental drift sufficiently powerful and plausible to be convincing.

QUESTION 2

Second, while the period during which Wegener's theory was propounded and debated saw rapid developments in many branches of geology and an explosion of new knowledge about the nature of the Earth and the forces at work in its formation, little of this evidence seemed to support Wegener. For example, data drawn from the new science of seismology, including experimental studies of the behavior of rocks under high pressure, suggested that the Earth has far too much internal strength and rigidity to allow continents to "drift" across its surface. Measurements of the Earth's gravitational field made by some of the early scientific satellites offered further evidence in support of this view as late as the early 1960s.

Third, and perhaps most significant, Wegener's theory seemed to challenge one of the most deeply-held philosophical bases of geology—the doctrine of uniformitarianism, unchanging, continuous forces. Belief in the intervention of unexplained, sporadic, and dramatic shaping events—known as catastrophism—was considered beyond the pale by mainstream geologists. Wegener was not, strictly speaking, a catastrophist—he did not suggest that some massive cataclysm had triggered the breakup of Pangaea—but his theory did imply a dramatic change in the face of the Earth occurring relatively late in geologic history. Such a belief, viewed as tainted with catastrophism, was abhorrent to most geologists throughout the first half of this century.

1. The primary purpose of the passage is to explain
   - ◯ the history of the theory of continental drift
   - ◯ how Wegener's hypothesis came to be accepted by the majority of earth scientists
   - ◯ the nature of Wegener's hypothesis and the reasons for its early rejection
   - ◯ how Wegener collected the data that led to his development of the idea of continental drift
   - ◯ how evidence drawn from seismology was used to counter Wegener's hypothesis

2. In the context in which it appears, "propounded" most nearly means
   - ◯ formulated
   - ◯ debated
   - ◯ accepted
   - ◯ promulgated
   - ◯ repudiated

3. The two highlighted portions of the passage play which of the following roles?
   - ◯ The first states the central thesis of a scientific hypothesis; the second describes evidence that calls the hypothesis into question.
   - ◯ The first describes the process by which a scientific hypothesis was formulated; the second describes the process by which it was subsequently tested.
   - ◯ The first summarizes the evidence offered on behalf of a scientific hypothesis; the second provides a specific example of such evidence.
   - ◯ The first provides support for an indeterminate conclusion that supports a further conclusion stated in the passage; the second provides support for that further conclusion.
   - ◯ The first states the central thesis of a scientific hypothesis; the second states the traditional view that the hypothesis calls into question.

4. The author of the passage refers to the scientific information gathered by satellites in order to suggest the
   - ◯ philosophical changes that ultimately led to the acceptance of Wegener's hypothesis
   - ◯ dramatic advances in earth science during the 1960s
   - ◯ differing directions taken by various earth scientists in the decades following Wegener
   - ◯ nature of some of the evidence that appeared to refute Wegener
   - ◯ need for experimental demonstration before any new geological theory can be accepted

5. The passage implies that the most significant reason for the opposition to Wegener's hypothesis on the part of many scientists was its

   - ◯ indirect challenge to a fundamental premise of geology
   - ◯ lack of supporting evidence from fields other than geology
   - ◯ inability to be tested by experimental means
   - ◯ conflict with data drawn from the fossil record
   - ◯ failure to provide a comprehensive framework for Earth history

PASSAGE 2

Questions 6 and 7 are based on this passage.

The strength of the film lay in its own ingenuity and invention. And this in every instance originated in cinema's role of entertaining a large and avid public. A generation of filmmakers grew up whose essential vision belonged to no other medium that that of the cinema, and whose public was a universal audience spread across the world. Like the first dramas of Shakespeare, their art was not a product of the salon, but of the common playhouse. This is what gave them their strength and freshness.

QUESTION 6

However, there has always been a price to be paid. The salon artist has only a known patron, or group of patrons, to satisfy, and if he is strong enough he can, like the painters of the Renaissance, mold their taste in the image of his own. This can also be true of the greater and more resolute artists of the cinema, from Chaplin in the nineteen twenties to, say, Bergman or Antonioni in the sixties. But the larger the dimension of the public and the more costly the medium to produce, the greater are the pressures brought to bear on the less conventional creator to make his work conform to the pattern of the more conventional creator.

6. In the argument given, the highlighted portion plays which of the following roles?

   - ◯ It emphasizes the large and supportive audience enjoyed by some early filmmakers.
   - ◯ It highlights the role of film as a profit-making enterprise.
   - ◯ It suggests the strength of personality and depth of artistic conviction required for success in filmmaking.
   - ◯ It underscores filmmakers' independence from the restrictions of other artforms.
   - ◯ It reminds the reader of the relative newness of film as an artistic medium.

7. According to the passage, the pressures to conform that a filmmaker experiences are in proportion to the

   - ◯ difficulty of finding the support of a patron
   - ◯ cost of producing a film
   - ◯ conservatism of the viewing audience
   - ◯ personal talents of the filmmaker
   - ◯ diversity of the film-going public

PASSAGE 3

Questions 8 and 9 are based on this passage.

As the climate in the Middle East changed beginning around 7000 B.C.E., conditions emerged that were conducive to a more complex and advanced form of civilization in both Egypt and Mesopotamia. The process began when the swampy valleys of the Nile in Egypt and of the Tigris and Euphrates rivers in Mesopotamia became drier, producing riverine lands that were both habitable and fertile, and attracting settlers armed with the newly developed techniques of agriculture.

These rivers profoundly shaped the way of life along their banks. In Mesopotamia, the management of water in conditions of unpredictable drought, flood, and storm became the central economic and social challenge. Villagers began early to build simple earthworks, dikes, canals, and ditches to control the waters and reduce the opposing dangers of drought during the dry season (usually the spring) and flooding at harvest time.

Such efforts required a degree of cooperation among large numbers of people that had not previously existed. The individual village, containing only a dozen or so houses and families, was economically vulnerable; but when several villages, probably under the direction of a council of elders, learned to share their human resources in the building of a coordinated network of water-control systems, the safety and prosperity of all improved. In this new cooperation, the seeds of the great Mesopotamian civilizations were being sown.

For the following question, consider each of the choices separately and select <u>all</u> that apply.

8. It can be inferred from the passage that a necessary precursor to the development of the great Mesopotamian civilizations was

- ☐ the invention of basic methods of agriculture
- ☐ a recognition of the cyclical patterns of drought and flooding characteristic of the Tigris and Euphrates rivers
- ☐ development of trade routes connecting settlements on the banks of Mesopotamian rivers

For the following question, consider each of the choices separately and select <u>all</u> that apply.

9. According to the passage, the unpredictability of water supplies in Mesopotamia had which of the following social effects?

- ☐ It led to warfare over water rights among rival villages.
- ☐ It encouraged cooperation in the creation of water-management systems.
- ☐ It drove farmers to settle in fertile grasslands far from the uncontrollable rivers.

PASSAGE 4

Questions 10 and 11 are based on this passage.

The Sahara is sometimes pictured as a sea of sand dunes washing onto the Sahel and yearly swallowing large chunks of farming land due to declining levels of rainfall. Yet this explanation offers little insight into the real causes of desertification in the Sahel, where precipitation has actually changed little in recent centuries. The problem originated in the late nineteenth century French colonial disruption of the indigenous system of property rights and market interactions, followed by government policies that intensified pressure on the land.

QUESTION 11

Eager to modernize the region, the French implemented a three-pronged development scheme: digging more wells, conducting veterinary and medical campaigns, and opening new markets in the south. As the French dug new wells, they established no clear ownership rights, which led to depletion of water supplies. The veterinary and medical campaigns increased the populations of both humans and animals, which led to overgrazing and put further pressure on the land. Forests were razed as individuals collected wood for burning. Stripped of trees and ground cover, the soil broke down, gradually turning the area into a barren wasteland.

10. Select the sentence that describes a cause-and-effect relationship whose existence the author of the passage doubts.

11. In the context in which it appears, "depletion" most nearly means

- ◯ overuse
- ◯ redistribution
- ◯ conservation
- ◯ contamination
- ◯ increase

PASSAGE 5

Questions 12 and 13 are based on this passage.

In the contemporary city, where religion has been relegated to a secondary role of importance to only a few, art has largely taken over the role of religion as a source of spiritual, intellectual, and emotional meaning. Thus the great museum is the modern equivalent of the medieval cathedral, dominating the landscape of the city, lending it prestige, and attracting pilgrims from near and far.

No wonder, then, that many devotees expect art to be treated with the same air of hushed reverence that was once reserved for occasions of worship or devotion. For them, any association of art with the profane—and in particular with the marketplace, where the sacred qualities of art are reduced to the crass values of dollars and cents—is a kind of blasphemy. It's an idealistic view of art—but also an absurd one, since art has always been bought and sold, and always will be. This fact needn't degrade art any more than the collection of donations from worshipers in a church invalidates their devotion.

12. According to the passage, the modern equivalent of the pilgrims who visited medieval cathedrals are the

- ◯ artists who create masterpieces
- ◯ art lovers who visit museums
- ◯ residents of contemporary cities
- ◯ worshipers who offer donations to churches
- ◯ critics who exaggerate the spiritual qualities of art

13. The passage implies that "devotees" regard the buying and selling of art as a form of

- ◯ desecration
- ◯ absurdity
- ◯ devotion
- ◯ idealism
- ◯ reverence

end of **DISC 2** ● *start of* **DISC 3**

PART 3 – Overview of Text Completions

Directions: See DVD program.

PART 4 – Tackling the Text Completion Questions

Directions: For each blank, select one answer choice from the corresponding column. Fill all blanks in the way that best completes the text.

1. Scientists have come to recognize the dinosaurs as one of the most _____ life forms ever to inhabit the Earth; they dominated the planet for over one hundred million years, longer than any other major group of animals yet seen.

prolific
fascinating
enormous
diverse
successful

2. Although Sullivan, ablaze with revolutionary zeal, _____ Burnham as a defender of the architectural status quo, later critics considered Burnham's work on the Columbian Exposition of 1893 a pioneering example of modern urban planning.

studied
denounced
lauded
disgusted
envied

3. Like Henry James, whose long, abstruse sentences mirror the complex (i)_____ states of his characters, Proust uses a (ii)_____ prose style to represent his narrator's complicated mental processes.

Blank (i)
moral
psychological
personal

Blank (ii)
distinctive
pellucid
convoluted

4. When once-exotic products such as tea, coffee, sugar, and tobacco began to a arrive in European ports in the 15th and 16th centuries, it represented a milestone in economic history. But the availability of such products to a (i)_____ of people living in relative luxury didn't represent the emergence of mass markets as we understand them today; it merely established one necessary (ii)_____ such markets.

Blank (i)	Blank (ii)
myriad	example of
network	precondition for
handful	experiment with

5. When Darwin first presented his theory of evolution, he was well aware that apparent (i)_____ in the fossil record would be seized upon as signs of the weakness of his theory. Since Darwin proposed that species evolved from previous species through the accumulation of small changes over time, it would seem logical to assume that fossils representing every (ii)_____ ought to be available. This made the nineteenth-century quest for new fossils especially (iii)_____, since it was believed that the discovery of "missing links" between species, or the failure to make such discovery, might determine the fate of Darwin's theory.

Blank (i)	Blank (ii)	Blank (iii)
anomalies	variation	ambiguous
gaps	species	controversial
discrepancies	epoch	urgent

6. Some political activists see grounds for (i)_____ in the (ii)_____ of China's environmental problems. So vast a challenge, they say, is beyond the capability of government officials to master. They will be forced to accept help with policing local polluters from citizens' organizations, thereby creating an opening wedge for the eventual emergence of a more (iii)_____ society.

Blank (i)	Blank (ii)	Blank (iii)
optimism	enormity	centralized
concern	solubility	democratic
anxiety	complexity	capitalistic

7. The (i)_____ of journalism prevent television reporters from directly exposing the dishonesty of the public officials who are their sources. It's not considered good form to begin a story by saying, "The president's press secretary today uttered the following lies." The reporter's remaining outlet is a continual (ii)_____, which vents his frustration and sends viewers a message of generalized cynicism and disdain for politics.

Blank (i)	Blank (ii)
economics	lassitude
strictures	sneer
legalities	levity

8. Methodological disputes are not the only reason the new views of pre-Columbian civilizations in America are (i)_____. Current battles over ecological issues are implicated in the debate. If native Americans had (ii)_____ the continent prior to the arrival of the European invaders, what becomes of the pristine wilderness whose mythic (iii)_____ today's environmentalists hope to restore?

Blank (i)	Blank (ii)	Blank (iii)
controversial	reshaped	wealth
noteworthy	inhabited	purity
opaque	explored	scale

PART 5 – Overview of Sentence Equivalence

Directions: See DVD program.

PART 6 – Tackling the Sentence Equivalence Questions

Directions: Select the <u>two</u> answer choices that, when used to complete the sentence, fit the meaning of the sentence as a whole <u>and</u> produce completed sentences that are alike in meaning.

1. Although the article has been criticized as highly _____, the author insists that his goal was simply to describe the facts objectively.

   - ☐ partisan
   - ☐ revelatory
   - ☐ repetitive
   - ☐ verbose
   - ☐ biased
   - ☐ pedantic

2. Reliance on income from a single commodity has made the economies of many nations highly _____, for a drought or disease that destroyed the crop could impoverish the entire country.

   - ☐ competitive
   - ☐ stable
   - ☐ vulnerable
   - ☐ efficient
   - ☐ insecure
   - ☐ variable

3. The film turned out to be a mere vehicle for its leading lady, whose sparkling wit and undeniable charm were sadly incapable of compensating for the _____ of the script.

   - ☐ insipidity
   - ☐ vapidity
   - ☐ prolixity
   - ☐ incoherence
   - ☐ viciousness
   - ☐ grandiosity

4. One of the great ironies of literary history is the fact that Johnson, the most _____ author of his day, should now be remembered chiefly as the subject of a biography that is far more widely read than any of his own works.

   - ☐ talented
   - ☐ renowned
   - ☐ celebrated
   - ☐ versatile
   - ☐ obscure
   - ☐ reviled

5. Many candidates have distorted the facts about their opponents' records in a desperate attempt to dissuade voters from evaluating their merits objectively, but few have done so as _____ as Tynan.

   - ☐ frequently
   - ☐ colorfully
   - ☐ thoughtfully
   - ☐ egregiously
   - ☐ flagrantly
   - ☐ rarely

PART 7 – Improving Your Vocabulary

Directions: See DVD program.

VERBAL REASONING QUICK TIPS

For every question:

- Use the process of elimination to improve your chances of guessing correctly.
- For ***Multiple-Choice*** questions with only one correct answer choice (*ovals*):
  - If all of the answer choices are definitely incorrect, then the remaining answer choice must be correct!
- For ***Multiple-Choice*** questions with one or more correct answer choices (*checkboxes*), ***Text Completion*** questions with two or more blanks (*i*, *ii*, *iii*, etc.), and ***Sentence Equivalence*** questions:
  - For these kinds of questions, you must choose all the correct answer choices, and none of the incorrect ones. There's no credit for an answer that is partially correct.
  - Be sure you follow any instructions that indicate the number of correct answer choices (e.g., "Indicate both such statements" means you must select exactly two answer choices).
- Answer every question, even if you have to guess at random. Don't leave any questions blank!

For ***Reading Comprehension*** questions:

- When reading each passage, ask yourself:
  - What is the main idea of this passage as a whole?
  - What is the topic sentence of each paragraph?
  - What is the overall structure of this passage?
  - What are the key details in this passage (names, dates, terms, etc.)?
  - Can I use context clues, word roots, etc. to guess the meaning of any unfamiliar words?
- When considering each answer choice, ask yourself:
  - Does this distort, exaggerate, or contradict in any way what's stated or implied in the passage?
  - Does this accurately reflect what's stated or implied in the passage?
  - Does this answer the question perfectly?

For ***Text Completion*** questions:

- Look for signpost words that offer clues to sentence structure and word meaning.
- Try substituting your own word(s) in for each blank before reading the answer choices.
- When considering each answer choice, ask yourself:
  - Does this word work well within the context of the sentence?
  - Does this word match the tone of the sentence?
  - Can I use word roots, etc. to guess the meaning of any unfamiliar words?

For ***Sentence Equivalence*** questions:

- Look for signpost words that offer clues to sentence structure and word meaning.
- Try substituting your own words in for each blank before reading the answer choices.
- When considering each answer choice, ask yourself:
  - Do both of these words work equally well in the context of the sentence?
  - Do both of these words match the tone of the sentence?
  - Are these words truly synonymous?
  - Is the meaning of the sentence identical with both of these words?
  - Can I use word roots, etc. to guess the meaning of any unfamiliar words?

end of **DISC 3** ● *start of* **DISC 4**

QUANTITATIVE REASONING

PART 1 – Overview of Quantitative Reasoning

Directions: See DVD program.

PART 2 – Tackling the Multiple-Choice & Numeric Entry Questions

Directions: Solve each problem and select the best answer choice(s) or provide the correct answer.

The following information applies to GRE Quantitative Reasoning questions:

- All numbers used are real numbers.
- In figures, charts, and diagrams, the position of points, angles, regions, etc. can be assumed to be in the order shown; angle measurements can be assumed to be positive. Lines shown as straight can be assumed to be straight. Figures can be assumed to lie in a plane unless otherwise indicated. Figures that accompany questions are intended to provide information useful in answering the questions. Unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or measurement, but by using your knowledge of mathematics.

Topic 1: Arithmetic

1. Mrs. Wilson's recipe for apple pie calls for $2\frac{2}{3}$ cups of flour per pie. Using a 25-pound bag of flour, where each cup weighs $\frac{1}{4}$ pound, she baked as many complete apple pies as she could. If she donated 12 of her pies to a charity for free, and then sold the remaining pies for $11.90 each, how much revenue did she earn?

   ◯ $294.25 ◯ $297.50 ◯ $303.45 ◯ $309.40 ◯ $440.30

2. At Somerset High School, 20% of the students are juniors. One-eighth of the juniors are in the chorus, and 80% of the school's chorus members are not juniors. If 10 juniors in the chorus are male, and the remaining two-thirds of the juniors in the chorus are female, how many students who attend Somerset High School are NOT in the chorus?

   Enter your answer in the box.

   ☐ students

3. Jessica hired a typist to type her business plan. The typist she hired typed at the rate of 75 words per minute and charged Jessica $22.50 per hour. Once typed, each page of the business plan contained exactly 25 lines and an average of 18 words per line. Which <u>two</u> of the following could be the total amount that Jessica paid to have her business plan typed?

   Indicate <u>both</u> such amounts.

   ☐ $122.60 ☐ $139.50 ☐ $146.25 ☐ $148.00 ☐ $161.75

4. The manager of an office supplies chain store purchased 2,000 leather chairs at $240 each and plans to give her customers a 20% discount on the chairs during a Labor Day sale. At what price should she mark each of these chairs before the sale, so that when she sells one of the chairs during the sale, she makes a 40% profit on its cost?

   ◯ $384 ◯ $400 ◯ $420 ◯ $438.60 ◯ $450

5. Bob and Dave work at an oil refinery. Today, Dave earns more than Bob, and they each earn more than $40 per hour but less than $50 per hour. Starting next month, Bob will get a 25% raise and Dave will get a 20% raise. Which of the following statements must be true regarding their new hourly wages next month?

   Indicate all such statements.

   ☐ Dave will earn more per hour than Bob.
   ☐ Bob's dollar increase per hour will be larger than Dave's.
   ☐ Bob will earn less than $60 per hour.
   ☐ Dave will earn more than $48 per hour.

6. The population of Peabody is $\frac{1}{4}\%$ that of Shelton. Quincy's population is equal to 1,000% of Peabody's. If Quincy's population is 25% larger than Rockville's, then Rockville's population is equal to what percent of Shelton's?

   ◯ $\frac{1}{2}\%$ ◯ 1% ◯ 2% ◯ 5% ◯ 25%

7. Alan shopped at a men's store that sells three types of items only: shirts for $30 each, ties for $20 each, and sweaters for $40 each. He spent exactly $250 and purchased at least one of each type of item. If Alan bought as many shirts as possible, what is the greatest number of items he could have bought in total?

   Enter your answer in the box.

   ☐ items

8. When a certain positive six-digit integer that ends in 938 is divided by 573, the result is a three-digit integer. If a list of digits is then created that contains exactly one of each digit that appears within the six-digit integer, how many more unique odd digits would this list contain than unique even digits?

   ◯ 0 ◯ 1 ◯ 2 ◯ 3 ◯ 4

9. The letters j and k represent two digits in the number $4j9{,}785{,}j3k$. If this nine-digit number is divisible by both 5 and 9, which of the following could be the value of $j - k$?

   Indicate all such values.

   ☐ –4 ☐ –3 ☐ –2 ☐ 0 ☐ 3
   ☐ 7 ☐ 9

10. If a is a positive odd integer and b is a positive even integer, which two of the following statements are FALSE?

    Indicate both such statements.

    ☐ a^{a-b} must be odd
    ☐ $a^{a+1} + b^{b-1}$ must be even
    ☐ $ab - b$ must be even
    ☐ $2a^a - 1$ must be odd

11. If x is a positive even integer and y is a positive odd integer, which of the following statements CANNOT be true?

    Indicate all such statements.

    ☐ $x + y$ is divisible by 3
    ☐ $2x + 3y$ is divisible by 6
    ☐ $3x + 2y$ is divisible by 4

12. If $-1 < p < 0$, which of the following statements must be true?
Indicate all such statements.

☐ $\frac{|p|}{2} = -\frac{p}{2}$ ☐ $p^4 < p^6$ ☐ $p^7 < p^8$ ☐ $p^{-1} > p$

☐ $4p < 4^p$ ☐ $\frac{p-1}{p+1} \neq 0$ ☐ $\frac{p+1}{3} < \frac{p-1}{2}$

13. When the fraction $\frac{22}{7}$ is written in decimal form, the first six digits to the right of the decimal point repeat indefinitely. How many of the first 364 digits to the right of the decimal point are primes?
Enter your answer in the box.

[ ] digits

14. On the number line, $w < x < y < z$. The distance from x to y is the same as the distance from w to x. The distance from x to z is five times the distance from w to x. What is the value of $\frac{z-y}{y-w}$?

◯ $\frac{1}{2}$ ◯ 1 ◯ 2 ◯ 3 ◯ 4

15. What is the smallest integer value of g that satisfies the inequality $-\frac{1}{2} > \frac{10}{g}$?
Enter your answer in the box.

$g =$ [ ]

16. If $M = \{-24, -4, 0, 8, 15\}$ and $N = \left\{-3, -\frac{1}{2}, \frac{1}{3}, 1, 6\right\}$, and m is a number in set M and n is a number in set N, what is the difference between the greatest possible value of $\frac{m}{n}$ and the lowest possible value of $\frac{m}{n}$?

◯ 48 ◯ 52 ◯ 117 ◯ 120 ◯ 144

17. Which of the following is closest to the value of $\sqrt{\sqrt[3]{0.000125}}$?

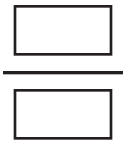
◯ 0.08 ◯ 0.13 ◯ 0.20 ◯ 0.22 ◯ 0.38

18. If x represents the width of the average molecule of oxygen and y represents the width of the average human hair, and if x is approximately equal to 3.6×10^{-10} m and y is approximately equal to 0.000072 m, then which of the following statements must be true?

◯ y is approximately $\frac{1}{20{,}000}$ of x
◯ y is approximately twice x
◯ y is approximately 2,000 times x
◯ y is approximately 200,000 times x
◯ y is approximately 2,000,000 times x

19. Of the 24 executives attending an IT luncheon, 3/4 ate dessert and 2/3 drank coffee. If at least 2 of the executives chose not to have dessert or coffee, what is the smallest possible fraction of the executives who could have had both dessert and coffee?

    Enter your answer as a fraction in the boxes.



20. If 18 of Mr. Abel's horses were sent to the track for a race, there would be at most 37 of his horses left behind, and if he were to purchase 18 additional horses, he would then own more than 71 horses in total. What is the difference between the largest possible number of horses Mr. Abel could currently own and the smallest possible number of horses he could currently own?

    Enter your answer in the box.

end of **DISC 4** *start of* **DISC 5**

Topic 2: Algebra

1. When the sum of $4 - 3x$ and $2x^2 + 9x + 5$ is subtracted from $6x^2 - px + 10$, the result is $4x^2 + 9x + 1$. What is the value of p?

   ◯ –15 ◯ –3 ◯ 3 ◯ 6 ◯ 15

2. If $\frac{1}{2}r + 11 = -1\frac{1}{3}r$, then what is the value of $\frac{66 + 11r}{11r - 66}$?

   ◯ –6 ◯ –1 ◯ 0 ◯ 6
   ◯ The value of the given expression is undefined.

   • *ERRATUM NOTICE* •

   During problem 2, a graphic regarding division by zero includes a subtle error. The graphic should read as follows:

   $$\frac{n}{0} = \text{undefined (meaningless) when } n \neq 0$$

   because there is *NO* value that can be multiplied by 0 to yield n. But what happens when $n = 0$?

   $$\frac{0}{0} = \text{indeterminate}$$

   because *ANY* value can be multiplied by 0 to yield 0. We sincerely apologize for any confusion that this error may cause.

3. If $\frac{a+b}{a} = -\frac{7}{5}$, what is the value of $\frac{2a+b}{a+b}$?

   ◯ $-\frac{5}{7}$ ◯ 0 ◯ $\frac{2}{7}$ ◯ 1 ◯ 2

4. If $2x + 3$ is a factor of $6x^2 + 17x - k$, then what is the value of k?

   Enter your answer in the box.

   $k =$ ☐

5. If $m^2 + n^2 = 35$ and $(m + n)^2 = 7$, then $(m - n)^2 =$

   ◯ –14 ◯ 5 ◯ 28 ◯ 56 ◯ 63

6. If $x^4 = 1 + \frac{(9{,}999^2 - 9{,}999)(10{,}000)}{9{,}999^2 - 1}$, then which of the following could be the value of x^3?

   Indicate <u>all</u> such values.

   ☐ –10,001 ☐ –9,999 ☐ –1,000 ☐ 729
   ☐ 999 ☐ 10,001

7. What is the greatest positive integer k such that 3^k is a factor of 18^{12}?

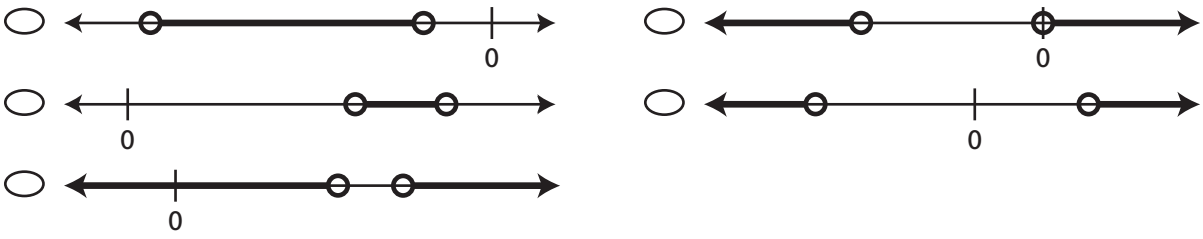
   ◯ 12 ◯ 18 ◯ 24 ◯ 32 ◯ 36

8. If n is an integer and $(-49)^{2n}\left(7^{n^2-5}\right) = 1$, then n could be

   Enter your answer in the box.

   $n =$ ☐

9. Which of the following could be the graph of all values of k that satisfy the inequality $\left|\frac{1+k}{-5}\right| > 1.2$?



10. The parking lot at Andersen's Car Rental Company contains 50% more mid-size cars than full-size cars, and the ratio of compact cars to mid-size cars on the lot is 5 : 4. If the lot contains 120 mid-size cars, how many more compact cars does it contain than full-size cars?

Enter your answer in the box.

11. At two law firms, all of the attorneys consume paper at the exact same rate. The larger law firm employs 60 attorneys, and 150 reams of paper last them 10 days. If the smaller law firm employs 10 fewer attorneys, how many days do 200 reams of paper last them?

○ 12 ○ 16 ○ 20 ○ 24 ○ 30

12. Last winter, h homes in Rockville used a total of b barrels of heating oil. If there are 42 gallons in a barrel, and each home used an average of g gallons of oil per day, how many days did the oil last?

○ $\frac{hb}{42g}$ ○ $\frac{42bg}{h}$ ○ $\frac{42b}{gh}$ ○ $\frac{42}{bgh}$ ○ $\frac{bg}{42h}$

13. Eight people agreed to rent a fishing boat for an afternoon at a total cost of x dollars. If three of these people had to cancel, how many extra dollars did each of the remaining people then have to pay?

○ $\frac{x}{8} - 4$ ○ $\frac{3x}{40}$ ○ $\frac{x}{10} - 2$ ○ $\frac{3x-4}{5}$ ○ $\frac{16x}{5}$

14. Alex and Sam work at a bicycle factory, but Alex works twice as quickly as Sam does. Yesterday, they had to assemble 50 bicycles in total. Alex began working at 8 AM, Sam began working with him at 10 AM, they had a mandatory 45-minute break for lunch at 12:15 PM, and they finished assembling all 50 bicycles at 4:45 PM. At what time would Alex have finished assembling all of the bicycles by himself if Sam hadn't helped him?

○ 6:15 PM ○ 7 PM ○ 7:15 PM ○ 7:45 PM ○ 8:15 PM

15. Mrs. Cobb drove 240 miles each way to get to and from a business conference. On her return trip home, she was able to drive 20 mph faster than she had during her trip to the conference, and she arrived home in ¾ of the time it had taken her to drive to the conference. In miles per hour, which of the following is closest to Mrs. Cobb's average rate for her roundtrip travel?

○ 68 ○ 69 ○ 70 ○ 71 ○ 72

16. At the end of the day, the cash register at Maya's Diner contained a total of $22,320 in $1, $5, $10, and $20 bills. If the register contained half as many $5 bills as $10 bills and five times as many $20 bills as $10 bills, then what is the LEAST number of $1 bills the register could have contained?

Enter your answer in the box.

[ ] $1 bills

17. A licensed plumber and his apprentice are working together on a job. The plumber's daily wage exceeds twice the apprentice's daily wage by $80. If they complete the job in 3 days and earn at least $1,680 but less than $2,085 in total, which of the following could be the apprentice's daily wage?

Indicate all such amounts.

☐ $150 ☐ $160 ☐ $178 ☐ $203
☐ $205 ☐ $211

week	# of ham sandwiches sold	# of turkey sandwiches sold	# of roast beef sandwiches sold	total revenue earned each week from these sales
1	10	20	30	$260
2	150	30	0	$$R$
3	40	20	20	$300

Note: The prices of the sandwiches did not change during the given period.

18. During a certain three-week period, John's Deli sold ham sandwiches, turkey sandwiches, and roast beef sandwiches in the quantities shown in the table. What is the value of R?

◯ $410 ◯ $540 ◯ $570 ◯ $590 ◯ $620

19. If $f(x) = 2^x$ and $g(x) = x + 3$, then which of the following is equal to $f(g(x)) - f(x)$?

◯ $7f(x)$ ◯ $6f(x)$ ◯ $5f(x)$ ◯ $4f(x)$ ◯ $2f(x)$

20. If $f(x) = \frac{\sqrt{x-1}}{x-4}$, $g(x) = x - 1$, and $h(x) = x$, then which of the following are NOT in the domain of $f(g(h(x)))$?

Indicate all such values.

☐ –2 ☐ 0 ☐ 1 ☐ 2 ☐ 4
☐ 5 ☐ 6

21. The four points A (–3, –4), B (–5, 1), C (4, 1), and D (–2, 7) are drawn on the standard (x, y) coordinate plane. When a certain circle is drawn whose center is at C, one of the other given points lies on the circle, one of them lies inside the circle, and the remaining point lies outside the circle. Which of the following is the equation of the circle?

◯ $(x-4)^2 + (y-1)^2 = 8$
◯ $(x-4)^2 + (y-1)^2 = 9$
◯ $(x-4)^2 + (y-1)^2 = 72$
◯ $(x-4)^2 + (y-1)^2 = 74$
◯ $(x-4)^2 + (y-1)^2 = 81$

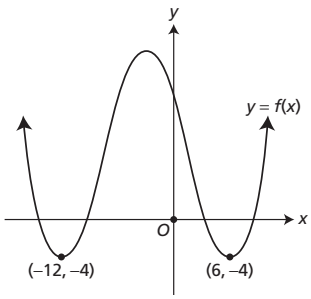
22. In the standard (x, y) coordinate plane, $\ell_1 \perp \ell_2$ and the two lines intersect at the x-axis. If the equation of ℓ_1 is $2x + y - 6.8 = 0$, to the nearest square unit, what is the area of the triangle bounded by ℓ_1, ℓ_2, and the y-axis ?

◯ 12 ◯ 13 ◯ 14 ◯ 15 ◯ 16

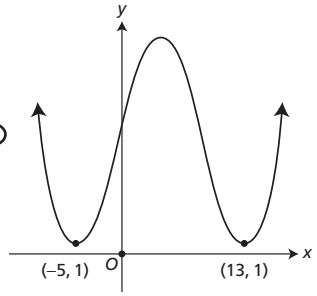
23. Points $P\,(0, a)$, $Q\,(b, c)$, and $R\,(0, 2)$ form triangle PQR in the standard (x, y) coordinate plane, where $a < -2$, $b > 0$, and $c < 0$. If triangle PQR is reflected about the origin, triangle $P'Q'R'$ is formed. Which of the following statements must be true?

Indicate all such statements.

☐ Point Q' is located at $(b, -c)$.
☐ The distance between points P and P' must be > 4.
☐ QP is parallel to $Q'P'$.
☐ Triangle $P'Q'R'$ can have a right angle at R'.
☐ If point Q were located at $(10, -3)$, then the x-intercept of the line passing through points Q' and R' would be -3.



24. Given the graph $y = f(x)$ as shown above, which of the following represents the graph of $y = f(x + 5) + 7$?

◯


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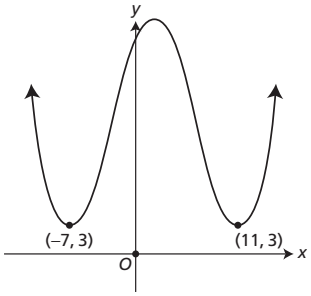

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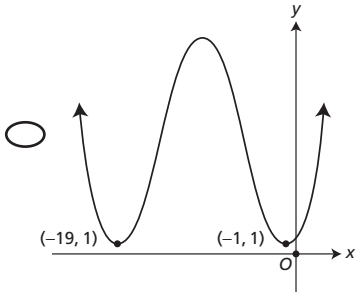

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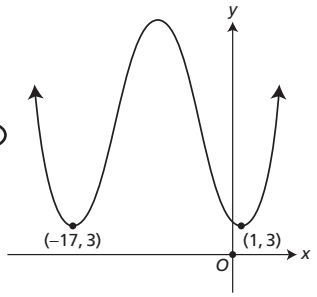
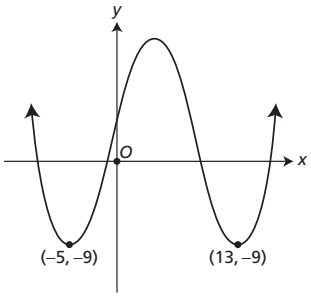
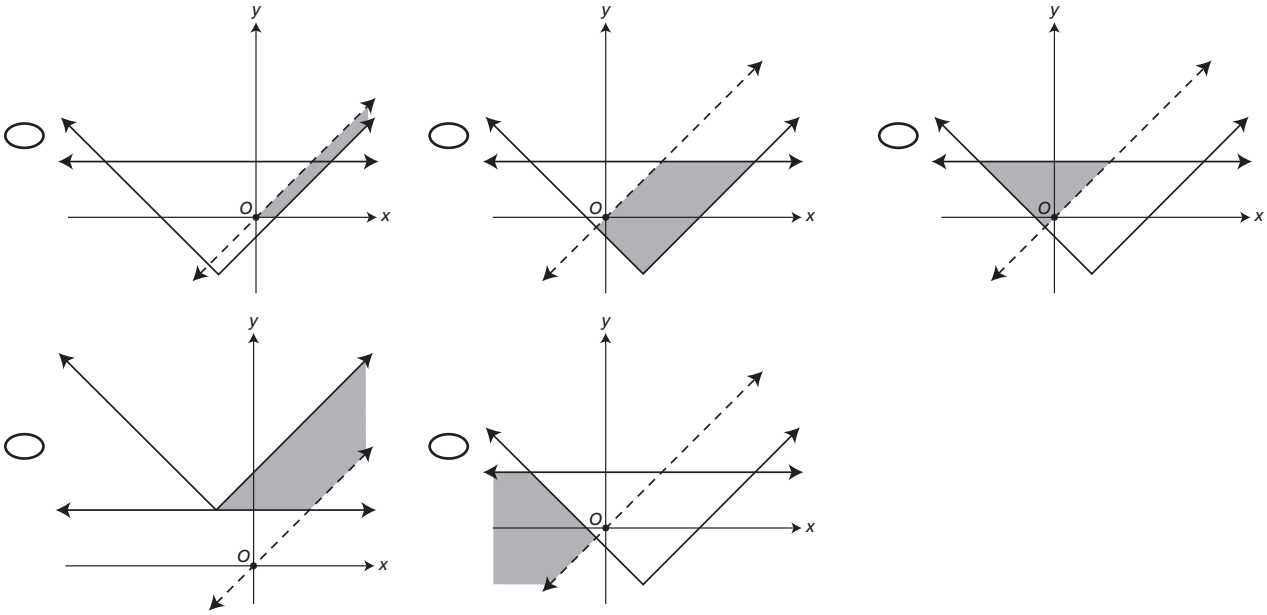


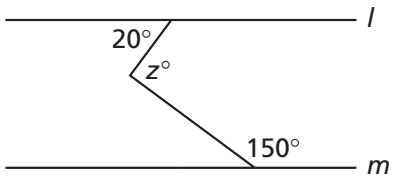
◯


25. In which of the following graphs does the shaded region represent the solution set of $y + 3 \geq |x - 2|$, $y - x < 0$, and $y \leq 3$?



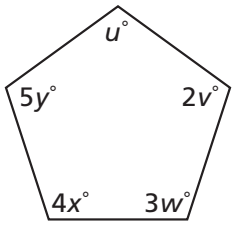
end of **DISC 5** ● *start of* **DISC 6**

Topic 3: Geometry



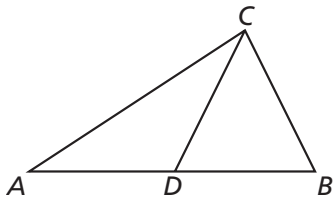
1. In the figure above, if $l \parallel m$, what is the value of z?

○ 100 ○ 90 ○ 50 ○ 30 ○ 20



2. In the figure above, if $u + 2v + 3w + 4x = 500$, what is the value of y?

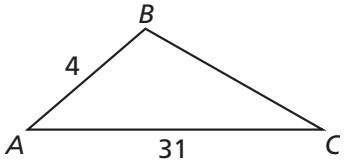
○ 8 ○ 40 ○ 44 ○ 220 ○ 540



3. In the above triangle ACB, $AC = CB$ and D is a point on AB between points A and B. Which of the following statements must be true?

Indicate all such statements.

☐ $m\angle ACB$ could be twice $m\angle A$.
☐ If $m\angle ACB = 60°$, then $m\angle ADC < 60°$.
☐ If $m\angle ACD \neq m\angle DCB$, then $AD \neq DB$.
☐ $AB > CB$
☐ $CB > CD$



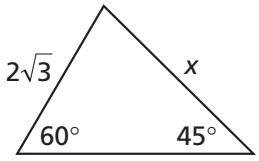
4. In $\triangle ABC$ above, $m\angle C < m\angle A < m\angle B$. If the lengths of all three sides of the triangle are integers, then which of the following values could be the perimeter of the triangle?

Indicate all such values.

☐ 62 ☐ 63 ☐ 65 ☐ 67
☐ 68 ☐ 70

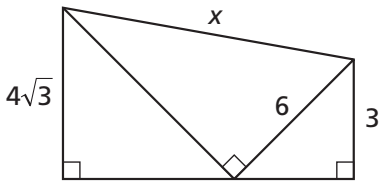
5. In order to drive from Tanglewood to Deerfield, Elton must first drive 3 miles east to Morrisville, then 12 miles south to Sommerville, and finally 2 miles east to Deerfield. How many miles will Elton save if soon he will be able to take a new, straight road connecting Tanglewood to Deerfield?

◯ 4 ◯ 8 ◯ 12 ◯ 13 ◯ 17



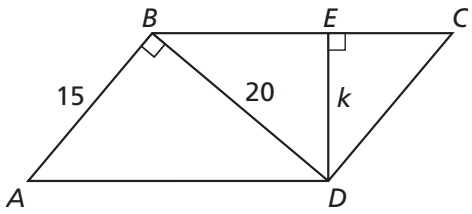
6. In the figure above, what is the value of x?

◯ $\sqrt{2}$ ◯ $2\sqrt{3}$ ◯ $3\sqrt{2}$ ◯ 6 ◯ $6\sqrt{2}$



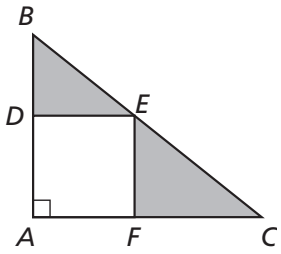
7. In the figure above, what is the value of x?

◯ 6 ◯ 8 ◯ 9 ◯ 10
◯ The value of x cannot be determined from the information given.



8. In the figure above, $ABCD$ is a parallelogram. What is the value of k?

◯ 11.25 ◯ 12.0 ◯ 12.5 ◯ 12.75 ◯ 13.25

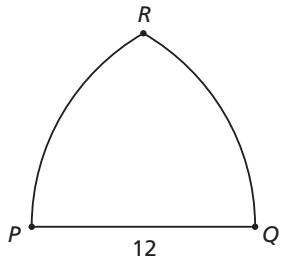


9. In the figure above, if $ADEF$ is a square, $AB = 20$, and $AC = 5$, what is the area of the entire shaded portion?

◯ 4 ◯ 16 ◯ 32 ◯ 34 ◯ 84

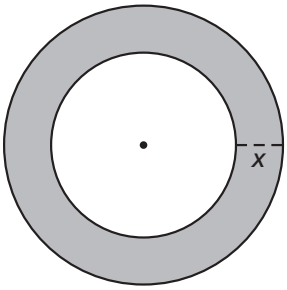
10. A jogger is running on a circular track with a radius of 280 feet at the rate of 880 ft/min. To the nearest minute, how many minutes will it take her to go around the track 3 times?

◯ 2 ◯ 3 ◯ 6 ◯ 7 ◯ 12



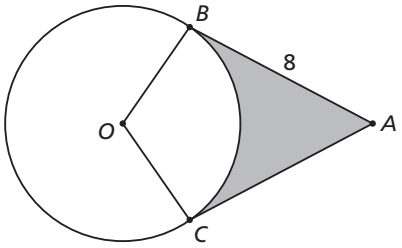
11. In the figure above, RQ is an arc of a circle whose center is P and RP is an arc of a circle whose center is Q. If $PQ = 12$, in terms of π, what is the length of arc RQ?

○ 12π ○ 8π ○ 6π ○ 4π ○ π



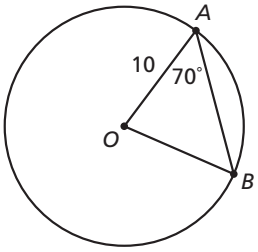
12. The figure above consists of two circles that have the same center. The area of the outer circle is 9 times the area of the inner circle. If the area of the shaded region is 32π, what is x, the width (or thickness) of the shaded region?

Enter your answer in the box.



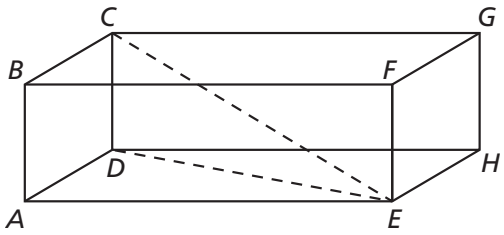
13. In the figure above, point O is the center of the circle. If tangents AC and AB are perpendicular to each other, in terms of π, what is the area of the shaded region?

○ $64 - 20\pi$ ○ $64 - 18\pi$ ○ $64 - 16\pi$ ○ $64 - 8\pi$ ○ $64 - 4\pi$



14. If O is the center of the circle above, then the area of $\triangle OAB$ is closest to

○ 49 ○ 41 ○ 40 ○ 38 ○ 32



15. A furniture company packages each of its dining room chairs inside a rectangular box that measures 3 ft $\times$ 4 ft $\times$ 5 ft. They must now pack their boxed chairs into a shipping container whose interior is shaped exactly like the rectangular solid above, where $DE = 13$ ft, $CE = \sqrt{269}$ ft, and CD is twice as long as AD. What is the maximum number of boxed chairs that the furniture company could fit within the shipping container?

Enter your answer in the box.

[ ] boxed chairs

Topic 4: Data Analysis

1. The Monday dinner menu at Maya's Diner includes four different kinds of items: 4 soup selections, 7 entrée selections, several beverage selections, and several dessert selections. If there are 336 possible meals that consist of one soup, one entrée, one beverage, and one dessert, which of the following could NOT be the number of dessert selections offered on Monday?

   Indicate all such values.

   ☐ 1 ☐ 3 ☐ 5 ☐ 6 ☐ 7
   ☐ 8 ☐ 14

2. The postal codes in a certain English-speaking country consist of exactly five characters arranged in this order: two letters followed by three digits. If no repetitions of any letters or digits are allowed within any single postal code, and if none of the postal codes end with a zero, how many different postal codes are possible using this scheme?

   ◯ 676,000 ◯ 608,400 ◯ 468,000 ◯ 421,200 ◯ 67,600

Questions 3–5 refer to the following information.

Yesterday, the human resources director at Acme Corp. interviewed applicants for a job opening. Before they were interviewed, all of the applicants—two men (Adam and Bill) and four women (Chloe, Diane, Emily, and Felicia)—sat together in the lobby in a straight row of six seats.

3. In how many different ways could the applicants have been arranged in the seats?

   Enter your answer in the box.

   ☐ ways

4. In how many different ways could the applicants have been arranged in the seats if all of the women sat next to each other and all of the men sat next to each other?

   ◯ 12 ◯ 24 ◯ 48 ◯ 72 ◯ 96

5. The human resources director saw the applicants individually at random for interviews. In how many different orders could the applicants have been selected for the first four interviews?

   ◯ 120 ◯ 144 ◯ 180 ◯ 360 ◯ 720

Questions 6 and 7 refer to the following information.

Acme Corp. decides to form a four-person team to evaluate applicants for a job opening. This team will be drawn from six of the company's employees: two men (Ron and Steve) and four women (Trish, Ursula, Valerie, and Wendy).

6. How many different teams are possible?

   ◯ 8 ◯ 12 ◯ 15 ◯ 16 ◯ 30

7. How many of the possible teams could consist of exactly one man and three women?

   ◯ 4 ◯ 6 ◯ 8 ◯ 10 ◯ 12

Questions 8 and 9 refer to the following information.

A yellow box and a green box each contain marbles. Each marble is either red, white, or blue. Each box contains at least one marble of each color and twice as many white marbles as red marbles.

8. One marble is chosen at random from the yellow box, which contains 18 marbles in total. If the probability that the chosen marble is blue equals 1/6, then what is the probability that it is NOT red?

   ◯ $\frac{13}{18}$ ◯ $\frac{1}{3}$ ◯ $\frac{5}{18}$ ◯ $\frac{2}{9}$ ◯ $\frac{1}{6}$

9. If the green box contains 25 marbles in total, what are the chances that it contains 9 blue marbles?

   Enter your answer as a percent in the box.

   ☐ %

10. Lucy, Maggie, and Nicole are in a three-person bicycle race. Lucy is half as likely to win as Maggie and three times as likely to win as Nicole. What are the chances that Maggie does NOT win the race?

    ◯ 10% ◯ 20% ◯ 30% ◯ 40% ◯ 70%

11. Mark's final grade in Computer Science last semester was the average of his scores on 5 tests. On each of the tests, he received a score that was a whole number ranging from 0 to 100 inclusive. The average of his scores on the first 2 tests was 89. If the difference in his scores on the next 2 tests was 78, what is the highest possible final grade Mark could have achieved in Computer Science?

    ◯ 84 ◯ 80 ◯ 78 ◯ 66 ◯ 53

Questions 12–14 refer to the following table.

Quiz #	Score
1	7
2	9
3	4
4	7
5	9
6	3
7	6
8	6

Note: Kenny took 10 math quizzes last semester.
Possible scores on each quiz were whole numbers that ranged from 0 to 10 inclusive.
The table above shows Kenny's scores on his first 8 quizzes.
His overall mean score on his 10 quizzes last semester was 7.

12. What was Kenny's median score on his first 8 quizzes?

    ◯ 6.0 ◯ 6.25 ◯ 6.375 ◯ 6.5 ◯ 7.0

13. Which of the following could NOT be Kenny's mode score on his 10 quizzes last semester?

Indicate all such values.

☐ 6 ☐ 7 ☐ 9

14. What percent of Kenny's scores on the 10 math quizzes are within one standard deviation of his mean score?

Enter your answer as a percent in the box.

☐ %

15. Miss Palumbo wanted to rent an apartment in Cambridge. She looked at 4 apartments in total, the first 3 of which had the following monthly rents: $1,680, $1,750, and $1,640. The median of the monthly rents of all 4 apartments was $1,715. Which of the following could be the monthly rent of the fourth apartment?

Indicate all such amounts.

☐ $1,705 ☐ $1,740 ☐ $1,750 ☐ $1,790 ☐ $1,815

16. Mrs. Santos invested a certain amount of money in a mutual fund on January 1. Each subsequent month, she made an investment that was $555 more than she had made the previous month. Which of the following statements individually provide(s) sufficient additional information to determine the total amount of money Mrs. Santos invested in the mutual fund by the end of the year?

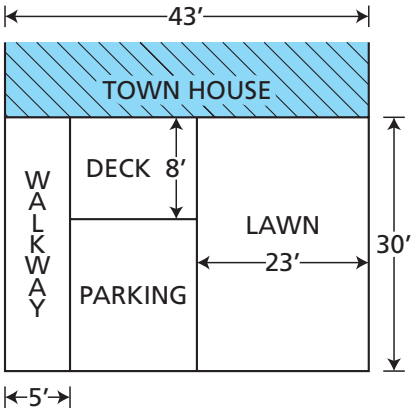
Indicate all such statements.

☐ The total of her investments in September and November exceeded twice her January investment by $9,990.
☐ The ratio of her January investment to her October investment was 1:4.
☐ The average of her investments in April and December was equal to her investment in August.
☐ The difference between her March investment and her February investment was 1/3 of her January investment.

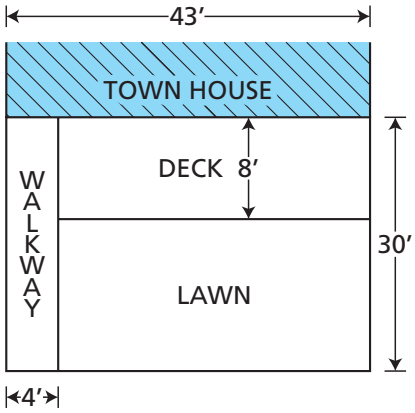
end of **DISC 6** ● *start of* **DISC 7**

Questions 17 and 18 refer to the following diagrams.

Current Layout



Architect's Proposed Layout



Note: The diagram above shows the property in front of Mr. and Mrs. Smith's townhouse in its current layout and in a revised layout that an architect has proposed.

17. Relative to the current layout, to the nearest whole percent, by how much would the Smiths' deck area increase if they were to adopt the architect's proposed layout?

    Enter your answer as a percent in the box.

    ☐ %

18. In the Smiths' neighborhood, it always costs $3 per square yard to sod a lawn. How much more would it cost the Smiths to sod their entire lawn in the architect's proposed layout than it would cost them to sod their entire lawn in the current layout?

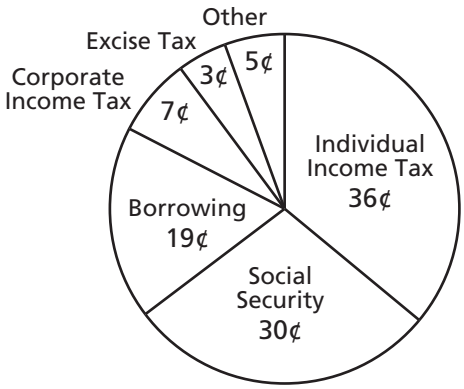
    ◯ $39 ◯ $56 ◯ $168 ◯ $286 ◯ $504

Questions 19 and 20 refer to the following graphs.

Where the Government of Country X Collected Money From (Receipts) and How It Spent the Money (Outlays) in 2007

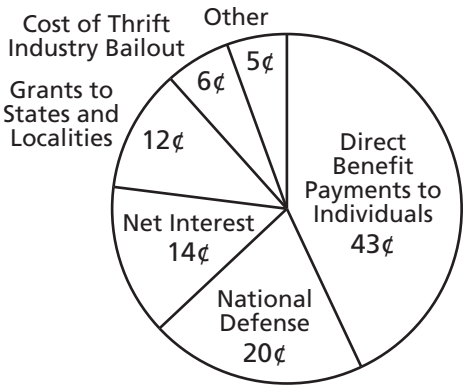
Where the Tax Dollar Came From

Total Receipts: $800 Billion



Where the Tax Dollar Was Spent

Total Outlays: $900 Billion



19. Income from which of the following sources was most nearly equal to Cost of Thrift Industry Bailout?

- ◯ Corporate Income Tax
- ◯ Excise Tax
- ◯ Social Security
- ◯ Other
- ◯ Borrowing

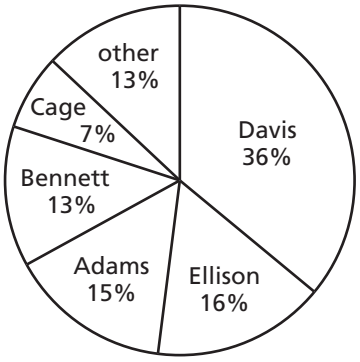
20. Which of the following statements can be inferred from the information given in the graphs? Indicate all such statements.

- ☐ Excluding spending on National Defense, more than half of the remaining outlays went for Direct Benefit Payments to Individuals.
- ☐ The total of the three smallest categories of receipts comprises less than 1/6 of the total receipts.
- ☐ If, for 2008, the outlays for Net Interest went up 10% and the outlays for National Defense went up 20%, while the other outlays remained the same, then the total outlays exceeded $950 billion.

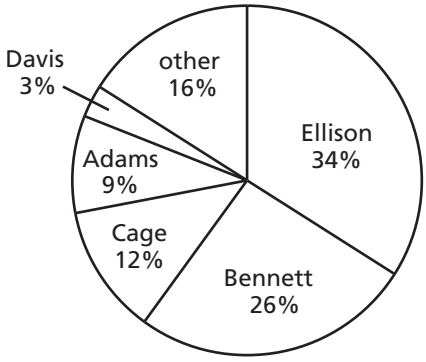
Questions 21 and 22 refer to the following graphs.

Election Results for Mayor of Walker City

Results by Candidate Among All Walker City Voters



Results by Candidate Among Walker City Voters Whose Household Incomes Were At or Above the Top Quintile



21. If exactly 74,325 residents of Walker City voted for Adams, how many more voters whose incomes were at or above the top quintile voted for Ellison than for Cage?

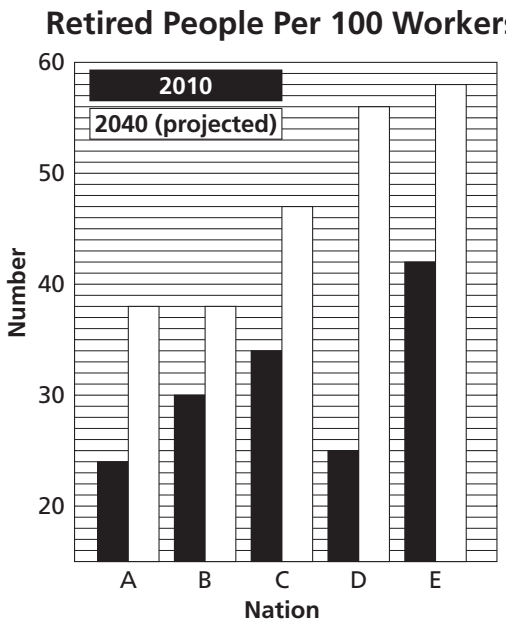
○ 3,270 ○ 10,960 ○ 21,802 ○ 32,847 ○ 37,500

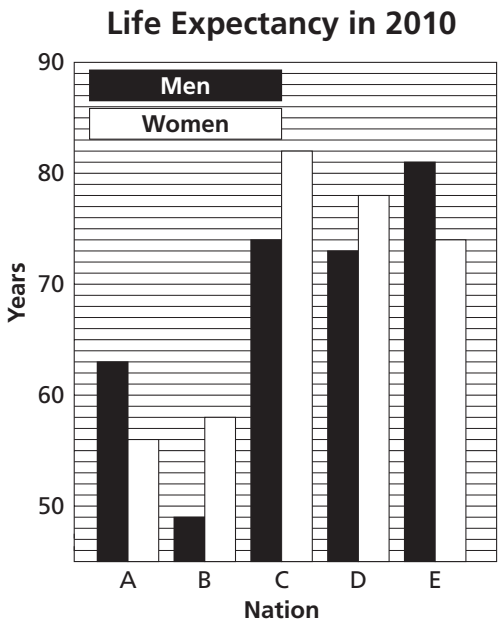
22. After the mayoral election, Walker City discovered a problem with the electronic voting machines they had used: 1/3 of all the votes counted as being for Davis should actually have been counted as being for Bennett. If Walker City later corrected this error and everything else in the graphs remained the same, then which of the following statements about the revised election results would be FALSE?

Indicate all such statements.

☐ Davis is still the winner of the election.
☐ Together, Cage and Ellison actually received more votes than Davis.
☐ If the graph on the left were redrawn to illustrate the revised election results, the central angle of the sector devoted to Bennett would be acute.

Questions 23–25 refer to the following graphs.





23. What is the median number of retirees per 100 workers for the five nations in 2010?

◯ 42 ◯ 34 ◯ 31 ◯ 30 ◯ 25

24. For the nation with the least difference in male-female life expectancy in 2010, which of the following most closely approximates the ratio of projected retirees per 100 workers in 2040 to retirees per 100 workers in 2010?

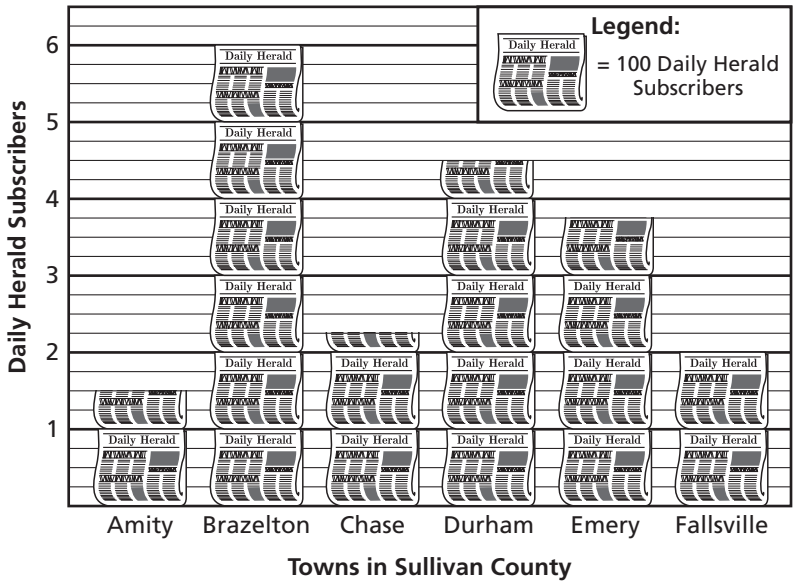
◯ 11:5 ◯ 9:4 ◯ 12:5 ◯ 3:1 ◯ 4:1

25. The number of workers in Nation B is projected to be 300 million in 2040, and Nation B is projected to have 78 million more retired people in 2040 than it had in 2010. If, in 2010, the number of workers was equal in Nation A and Nation B, then which of the following is closest to the number of retired people in Nation A in 2010?

◯ 8 million ◯ 25 million ◯ 30 million ◯ 36 million ◯ 120 million

Questions 26–28 refer to the following graph.

Daily Herald Newspaper Subscriptions in Sullivan County



Note: The Daily Herald plans to conduct a lottery. The newspaper will select two different winners at random from its list of subscribers who reside in Sullivan County.

26. To the nearest percent, what is the probability that the first winner resides in Fallsville and the second winner resides in Brazelton?

    Enter your answer as a percent in the box.

    ☐ %

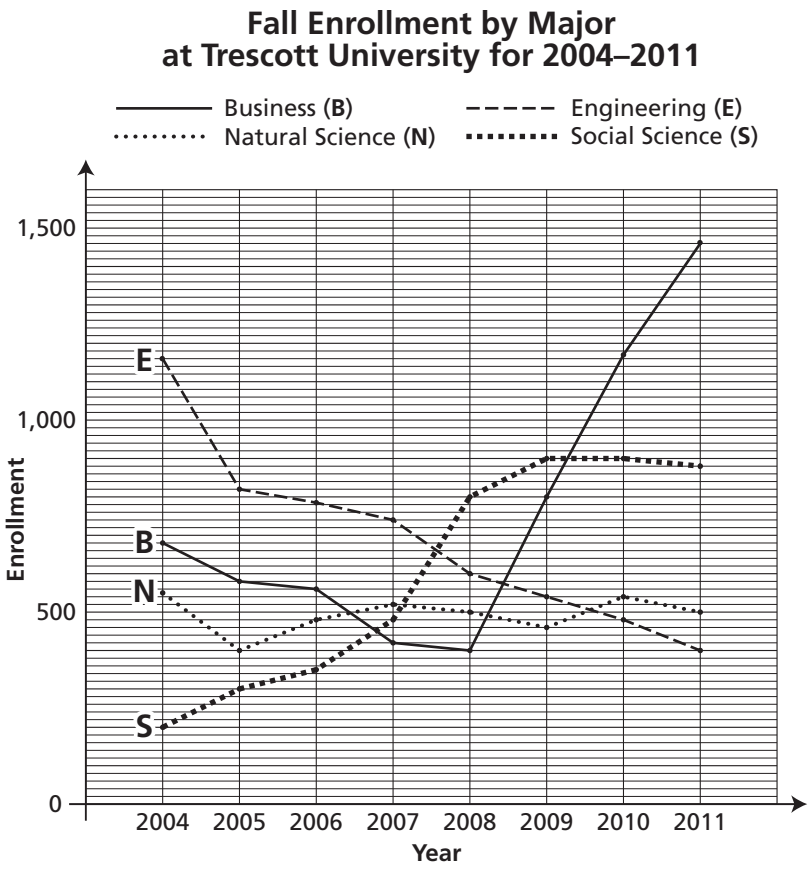
27. Which of the following is closest to the probability that both winners reside in Fallsville?

    ◯ 0% ◯ 1% ◯ 2% ◯ 5% ◯ 10%

28. Last month, a local restaurant from Sullivan County placed an advertisement in the Daily Herald. From among the five towns which have the largest number of subscribers according to the pictograph above, the restaurant randomly chose two towns in which to advertise. What are the chances that the towns the restaurant selected were Durham and Emery?

    ◯ 10% ◯ 15% ◯ 20% ◯ 40% ◯ 45%

Questions 29–31 refer to the following graph.



29. Which of the following is closest to the percent decrease in Engineering enrollment from 2004 to 2009?

◯ 45% ◯ 50% ◯ 55% ◯ 60% ◯ 120%

30. In fall 2008, the total enrollment at Trescott University included 4,560 students. The total enrollment in fall 2009 was 5% less than it had been in fall 2008. In fall 2009, approximately how many students enrolled at Trescott University did NOT major in any of the 4 majors shown in the graph?

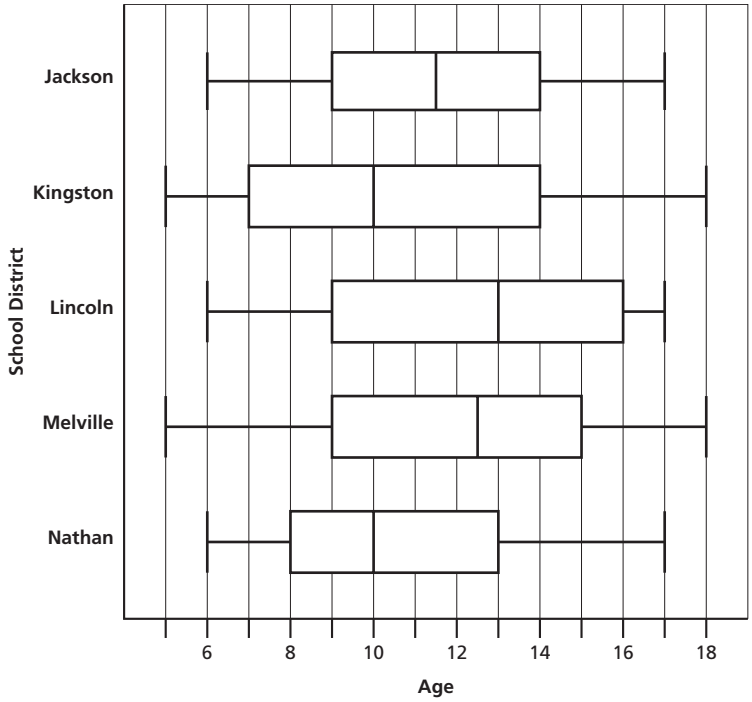
◯ 2,110 ◯ 1,880 ◯ 1,780 ◯ 1,630 ◯ 1,420

31. The average change in Business enrollment between 2006 and 2009 inclusive was

◯ an decrease of approximately 133 students per year
◯ an decrease of approximately 53 students per year
◯ an increase of approximately 60 students per year
◯ an increase of approximately 80 students per year
◯ an increase of approximately 240 students per year

Questions 32 and 33 refer to the following graph.

Distribution of Ages Among Students Enrolled in Five School Districts



Note: All student ages have been rounded down to the closest whole year.

32. Which of the following could NOT be true regarding the five school districts?

Indicate all such statements.

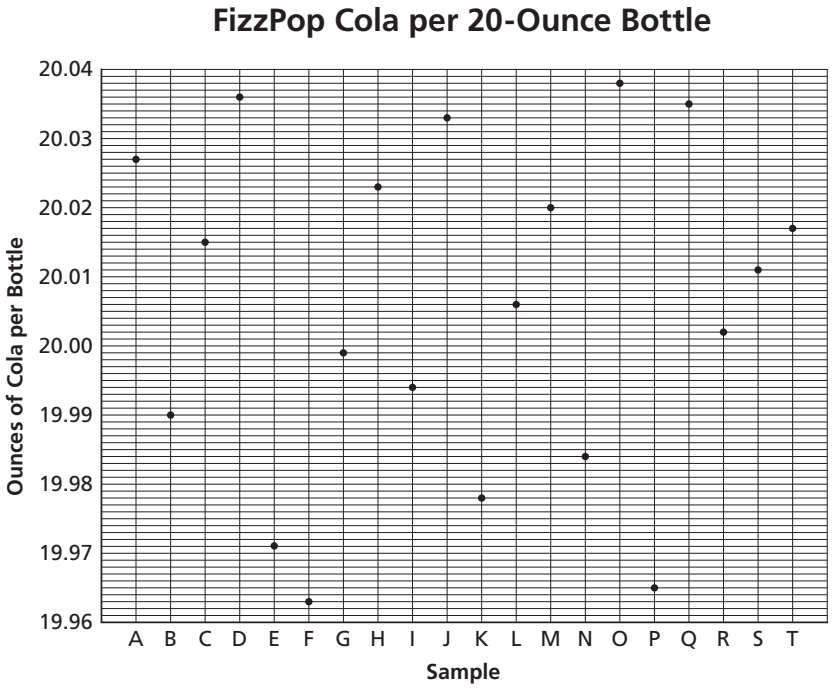
- ☐ The total number of students enrolled in the Melville school district is 7,625.
- ☐ In the Nathan school district, students who are 14, 15, and 16 years old constitute exactly 30% of the total number of students in the district.
- ☐ In both the Jackson and Kingston school districts, the number of students whose ages are between the third quartile and the median is equal.
- ☐ In each of the five school districts, the average student age is 11.

33. If the number of students in the Lincoln school district whose ages are below the 75th percentile in the graph is equal to the number of students in the Kingston school district whose ages are between the first and third quartiles in the graph, then which of the following could be the total number of students enrolled in the Kingston school district?

Indicate all such values.

☐ 5,935 ☐ 5,778 ☐ 5,565 ☐ 5,373 ☐ 5,189

Questions 34 and 35 refer to the following graph.



Note: FizzPop Beverage Company's factory equipment is designed to dispense 20 ounces of cola per bottle. Last year, FizzPop randomly sampled 100,000 of their bottles to determine how much cola each bottle actually contained. The 20 amounts shown above were selected from the data.

34. If the 100,000 recorded amounts had a mean of 20.003 ounces and a standard deviation of 0.018 of an ounce, what percentage of the 20 sample amounts shown above are within 1.5 standard deviations of the mean?

    Enter your answer as a percent in the box.

    ☐ %

35. Last year, the FizzPop Beverage Company sold exactly 430 million bottles of FizzPop cola. The actual cost of producing each ounce of cola was $0.00314, and the mean amount of cola dispensed per bottle was 20.003 ounces. If this year, the mean amount of cola FizzPop dispenses into a bottle will be lowered to 20.001 ounces, but the number of bottles sold and cost per ounce remain the same, then which of the following is closest to the total amount of money FizzPop can expect to save this year by dispensing less cola on average per bottle?

    ◯ $270 ◯ $2,700 ◯ $2.7 million ◯ $27 million ◯ $270 million

PART 3 – Tackling the Quantitative Comparison Questions

Directions: The following questions consist of two quantities, one labeled Quantity A and one labeled Quantity B. Compare the two quantities and select the appropriate answer choice:

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

Notes:

- In some questions, information is given about one or both of the quantities to be compared. In such cases, the given information is centered above the two quantities.
- In a given question, any symbol that appears in both Quantity A and Quantity B stands for the same thing in both quantities.

Topic 1: Arithmetic

	Quantity A	Quantity B
1.	$2^4 + 11 \times 13$	$4^2 + 9 \times 13$

	Quantity A	Quantity B
2.	$\frac{1}{14} + \frac{1}{13} + \frac{1}{12} + \frac{1}{11} + \frac{1}{10}$	$\sqrt[3]{\frac{1}{7}}$

	Quantity A	Quantity B
3.	$\frac{9\frac{5}{12}}{40\frac{1}{12}}$	$\frac{1}{4}$

	Quantity A	Quantity B
4.	$\frac{\frac{3}{4} - \frac{2}{3}}{3\frac{2}{3} - 2\frac{3}{4}}$	$0.\overline{1}$

	Quantity A	Quantity B
5.	$(250)(12{,}758.4)(613.29)$	$\frac{(127{,}584)(61{,}329)}{4}$

	Quantity A	Quantity B
6.	$32\frac{4}{11}\%$ of 240	$21\frac{5}{18}\%$ of 400

	Quantity A	Quantity B
7.	The total cost to the nearest dollar of a \$48,925 car after a 10% off sale and then $8\frac{7}{8}\%$ sales tax	The total cost to the nearest dollar of a \$50,094 car after a 12% off sale and then $8\frac{3}{4}\%$ sales tax

A washing machine costs twice as much as a dryer.

	Quantity A	Quantity B
8.	The cost of the washing machine after a 25% discount	The cost of the dryer after a 50% increase

	Quantity A	Quantity B
9.	The cost in U.S. dollars of a € 1149 computer after an 11% discount when 1 U.S. dollar = € 0.7198	The cost in U.S. dollars of a € 961 computer after an 11% increase when 1 € = 1.3307 U.S. dollars

Last year, Paula's company earned 5% of its income from interest, 10% from royalties, 35% from goods, and 40% from services. In total, the company earned \$8 million last year from interest and goods.

	Quantity A	Quantity B
10.	The total amount of money the company earned last year from royalties and services	Half the total amount of money the company earned last year from interest, royalties, goods, and services

In a certain household cleaning solution, the ratio by volume of detergent to ammonia to water is 1:2:9. The solution will be adjusted so that the ratio of detergent to water is doubled while the ratio of detergent to ammonia is halved.

	Quantity A	Quantity B
11.	The total volume of detergent and ammonia in the adjusted solution	The total volume of water in the adjusted solution

Today, Alyson is 3 years younger than Jessica was 4 years ago,
and Martin is 2 years older than Alyson is today.

	Quantity A	Quantity B
12.	Martin's age today	Jessica's age 3 years ago

	Quantity A	Quantity B
13.	The number of distinct prime divisors of 60	The largest prime divisor of 24

	Quantity A	Quantity B
14.	The least common multiple of 3, 4, 10	The greatest common factor of 24 and 36

Each book on a given shelf is either green, blue, red, or white.
On the shelf, the ratio of green books to white books is 10:9
and the ratio of green books to blue books is 12:13.
There is at least one book of each color on the shelf.

	Quantity A	Quantity B
15.	The smallest possible number of books on the shelf	180

Topic 2: Algebra

	Quantity A	Quantity B
1.	x	$2x$

$x > 0$

	Quantity A	Quantity B
2.	x	$\frac{1}{x}$

	Quantity A	Quantity B
3.	$a^3 - a$	$a^3 + a$

$a > 0$

	Quantity A	Quantity B
4.	$a^2 + a$	$a + \sqrt{a}$

$x > 0$

	Quantity A	Quantity B
5.	$3x^2 + 1000$	x^3

$0 < a + b < 1$

	Quantity A	Quantity B
6.	a	1

end of **DISC 7** ● *start of* **DISC 8**

a and b are integers.
$a + b > 2$
$a < 5$

	Quantity A	Quantity B
7.	The minimum possible value of b	-1

$ac > 0$
$abc < 0$

	Quantity A	Quantity B
8.	b^5	b^4

$pq = -2$
$sq = 1$

	Quantity A	Quantity B
9.	0	ps

$d > 2e > f > g > 0$
$e \neq g$

	Quantity A	Quantity B
10.	$\frac{0.5\% \text{ of } 10e}{d\% \text{ of } 3f}$	$\frac{2.5\% \text{ of } 2g}{f\% \text{ of } 3d}$

	Quantity A	Quantity B
11.	$\frac{x-5}{5}$	$\frac{x}{5}-5$

$x < 0$

	Quantity A	Quantity B
12.	$(2x-7)^2$	$4x^2+49$

	Quantity A	Quantity B
13.	$\frac{\sqrt[3]{-24}}{2}$	$\frac{27^{\frac{1}{2}}}{-3}$

	Quantity A	Quantity B
14.	$\frac{\sqrt{65}-\sqrt[3]{63}}{\sqrt{15}}$	1

	Quantity A	Quantity B
15.	$\left(\sqrt{19}-1\right)\left(\sqrt{19}+1\right)$	$\left(\sqrt{2}+\sqrt{2}+\sqrt{2}\right)^2$

	Quantity A	Quantity B
16.	12^9	40^6

	Quantity A	Quantity B
17.	$5^7+5^7+5^7+5^7+5^7$	5^8

	Quantity A	Quantity B
18.	6^{23}	$6^{24}-6^{22}$

	Quantity A	Quantity B
19.	$\left(\frac{1}{0.5}\right)^{10}-(0.5)^9$	$\left(\frac{1}{0.5}\right)^{9}+(0.5)^{10}$

$$n^2-3n=4$$

	Quantity A	Quantity B
20.	The maximum possible value of n	2

$(x-3)^4 = 81$

	Quantity A	Quantity B
21.	x	6

n is a positive integer.
$n(n+2)(n+4) = 105$

	Quantity A	Quantity B
22.	$n-1$	2

$|k^2 - 1| = 1$

	Quantity A	Quantity B
23.	The minimum possible value of k	$-\frac{3}{2}$

$a \odot b = ab - 2$

	Quantity A	Quantity B
24.	0	$\frac{1}{2} \odot (3 \odot 2)$

$2r - t = 5$
$2s - t = 9$

	Quantity A	Quantity B
25.	$s - r$	4

$$\frac{x+2y+3z}{3} = z + y$$

	Quantity A	Quantity B
26.	x	y

p, q, and r are positive integers.
The ratio of p to q is 1:2.
The ratio of q to r is 3:1.

	Quantity A	Quantity B
27.	p	$2r$

When x is divided by 7, the remainder is 1.

	Quantity A	Quantity B
28.	The remainder when $5x$ is divided by 7	4

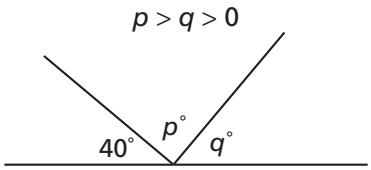
Points A $(-2, 0)$, B (s, t), and C $(4, 0)$ form triangle ABC whose area is 6.
Point B lies in Quadrant I.

	Quantity A	Quantity B
29.	s	t

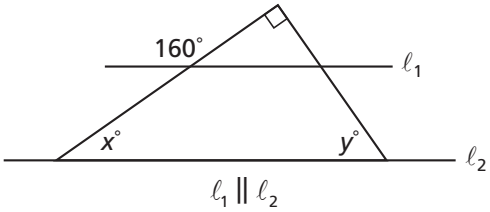
The points $(0, 1)$, $(k, 2)$, and $(6, k)$ lie on the same straight line.

	Quantity A	Quantity B
30.	3	k

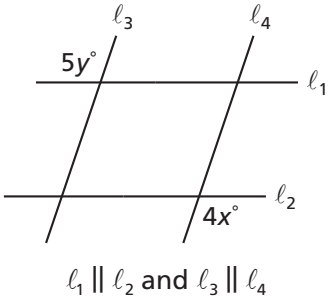
Topic 3: Geometry



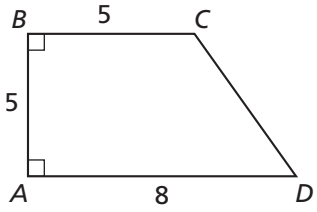
	Quantity A	Quantity B
1.	q	70



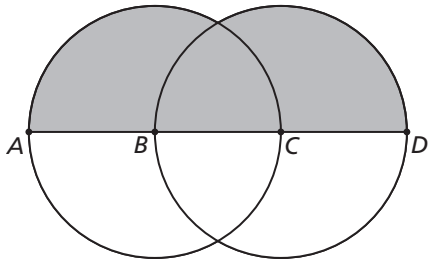
	Quantity A	Quantity B
2.	$3x$	y



	Quantity A	Quantity B
3.	x	y

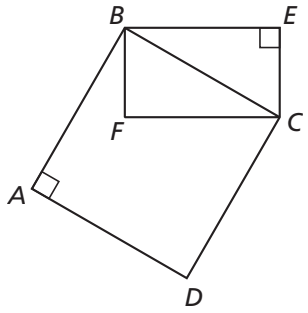


	Quantity A	Quantity B
4.	The perimeter of $ABCD$	23



The two intersecting circles have centers at B and C.
$AD = 6$.

	Quantity A	Quantity B
5.	The area of the shaded region	4π

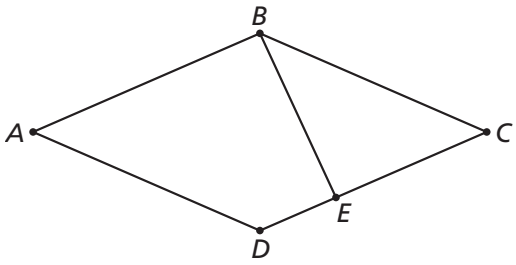


$ABCD$ is a square with perimeter 40.
$BECF$ is a rectangle. $\angle ECD$ measures 150°.

	Quantity A	Quantity B
6.	The area of triangle BFC	$13\sqrt{3}$

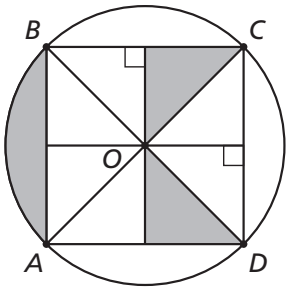
	Quantity A	Quantity B
7.	The perimeter of a square whose area is 36	The perimeter of a rectangle whose area is 10

	Quantity A	Quantity B
8.	The volume of a cylinder whose height is 6 cm and base radius is 2 cm	The volume of a cube whose surface area is 96 cm^2



ABCD is a rhombus.
$\overline{DE}$ is one-third of $\overline{DC}$.

	Quantity A	Quantity B
9.	Half the area of trapezoid *ABED*	The area of triangle *BCE*



Square *ABCD* is circumscribed by a circle with center *O*.
The area of the circle is 36π cm^2.

	Quantity A	Quantity B
10.	The total area of the shaded regions	27 cm^2

Topic 4: Data Analysis

Using the calendar from a certain year,
one day is chosen at random from the 30 days in April.

	Quantity A	Quantity B
1.	The probability that the chosen day is a Saturday or Sunday	$\frac{1}{3}$

A fair coin is tossed 5 times.

	Quantity A	Quantity B
2.	The chance of getting exactly 3 heads	The chance of getting exactly 2 heads

The average of three consecutive even integers is zero.

	Quantity A	Quantity B
3.	The square of the smallest integer	The square of the largest integer

The average of three even integers is zero.

	Quantity A	Quantity B
4.	The square of the smallest integer	The square of the largest integer

Critics' Ratings of the Five Pizza Restaurants in Brookville

Restaurant	Rating
Al's Bistro	★★★★
Ben's Diner	★★★
Carlo's Pizzeria	★★★★★
Dante's Ristorante	★★★
Eddie's Grill	★★

Note: Among all five restaurants shown, the average price of a pepperoni pizza is $10. Among Al's, Carlo's, and Eddie's, the average price of a pepperoni pizza is $12.

	Quantity A	Quantity B
5.	The average price of a pepperoni pizza among the three-star pizza restaurants in Brookville	$8

Set A contains 4 different values chosen from the prime numbers between 20 and 60.
Set B contains 5 different values chosen from the multiples of 5 between 36 and 81.

	Quantity A	Quantity B
6.	The largest possible median of the values in set A	The smallest possible median of the values in set B

Interest Rates for Deposit Accounts at Apogee Bank

Savings Account Type	Annual Interest Rate	Computation Method
Premium	3%	simple interest
Elite	4%	compound interest

Note: The interest for Elite accounts is compounded semi-annually.

	Quantity A	Quantity B
7.	The interest earned in a Premium account after 4 years when the initial deposit was $1,000	The interest earned in an Elite account after 3 years when the initial deposit was $1,000

Mrs. Collins sold her house and deposited her profits in a bank where she received an annual interest rate of 8% compounded semi-annually. The total value of her investment at the end of 18 months was $360,000.

	Quantity A	Quantity B
8.	The amount of Mrs. Collins' initial investment	$320,000

PINNACLE CHEMICAL SUPPLY COMPANY

Packing List

Chemical	*Units Sold*	*Price per Unit*
sodium hydroxide (NaOH)	x	$\$x$
calcium chloride ($CaCl_2$)	2.5	$5.60
potassium chloride (KCl)	x	$2.50

Note: A package delivered to a college chemistry lab contained three different chemicals and the packing list shown above. The total amount due for the three chemicals listed in this packing list was $20.00.

	Quantity A	Quantity B
9.	x	1.45

Last year, the GPAs of students at Trescott University were normally distributed. Joey's GPA of 2.30 was one standard deviation below the university mean. Kendra's GPA of 4.13 placed her in the 98th percentile of all students at the university.

	Quantity A	Quantity B
10.	The mean GPA among students at Trescott University last year	2.95

QUANTITATIVE REASONING QUICK TIPS

For every question:

- Read each question very carefully!
- Pay careful attention to words like "NOT," "EXCEPT," "LEAST," "MOST," "COULD," and "MUST."
- Try to organize the information you've been given in a visual way: use tables, Venn diagrams, etc.
- Consider estimating to help you narrow down your potential answers.
- In multiple-choice questions, consider working backwards from the answer choices.
- Consider converting fractions, decimals, and percents into each other.
- Use the calculator to do your tedious arithmetic.
- Consider substituting convenient numbers for unknown values or variables.
- When considering each potential answer, ask yourself:
    - Does this answer the question perfectly?
    - Does this answer satisfy all of the conditions given in the problem?
    - Does this answer make sense? (Is it too large, small, etc.?)
- Use the process of elimination to improve your chances of guessing correctly.
- Answer every question, even if you have to guess at random. Don't leave any questions blank!

For questions involving ***Arithmetic***:

- Be sure you know which values do (and do not) belong to the following categories of numbers:
    - non-zero, non-negative, positive, counting, whole, integral, rational, etc. numbers
    - repeating, non-repeating, terminating, and non-terminating decimals
    - odd, even, prime, and non-prime numbers
- Be sure you know:
    - the basic rules for divisibility
    - common fraction, decimal, and percent equivalents
    - common perfect squares, cubes, and fourth powers
- Be sure you know how to determine:
    - multiples, factors, divisors, and remainders
    - least common denominators (multiples) and greatest common factors
- Be sure you know how to handle:
    - negative, fractional, and zero exponents
    - scientific notation
    - absolute value
    - arithmetic and geometric sequences
- Remember:
    - Follow the order of operations!
    - Division by 0 is meaningless and undefined.
    - The only even prime number is 2.
    - If the numerators of two positive fractions are equal, the fraction with the larger value is the fraction with the smaller denominator.
    - When comparing two negative numbers, the larger value is the one closer to 0.
    - If the numerators of two positive fractions are equal, the fraction with the larger value is the fraction with the smaller denominator.
    - When setting up a proportion, both numerators must be in the same units and both denominators must be in the same units.
    - When a problem involves finding a maximum or minimum possible value of something, that value often has to be a whole number!

For questions involving ***Algebra***:

- Be sure you know how to:
  - handle operations with exponents
  - factor and simplify algebraic expressions
  - solve linear and quadratic equations and inequalities
  - solve quadratic equations using the quadratic formula
  - solve systems of equations and inequalities
  - write the equation of a line in both point-slope and *y*-intercept forms
  - graph lines, functions, equations, and inequalities
  - determine values like slope, *x*-intercept, *y*-intercept, distance, and midpoint
  - handle transformations (translations, reflections, rotations, etc.)
- Remember:
  - You can multiply any quantity by 1 in the form of x/x (as long as $x \neq 0$).
  - If the product of two or more factors is equal to 0, then one or more of the factors themselves is equal to 0. If a fraction is equal to 0, then its numerator is equal to 0.
  - When substituting numbers for variables, consider 0, 1, –1, values between 0 and 1, values between –1 and 0, and values to the extreme left and right on the number line.
  - The average rate is the total distance (or work) divided by the total time.
  - In coordinate geometry problems, if you're not given a graph, draw one!
  - If two non-vertical lines are perpendicular, their slopes are negative reciprocals.

For questions involving ***Geometry***:

- Be sure you know the properties of:
  - parallel and perpendicular lines
  - angles (including acute, right, obtuse, straight, complementary, supplementary, etc.)
  - triangles (including scalene, equilateral, isosceles, acute, right, 30°-60°-90°, 45°-45°-90°, obtuse, etc.)
  - circles (including radii, diameters, tangents, secants, chords, arcs, sectors, segments, etc.)
  - quadrilaterals (trapezoids, parallelograms, rhombuses, rectangles, squares, etc.)
  - three-dimensional figures (cubes, cones, rectangular solids, spheres, etc.)
- Be sure you know the meanings of the following terms:
  - similar, congruent, equal, equilateral, equiangular
  - remote, adjacent, interior, exterior, included
  - bases, heights, altitudes, perpendiculars
  - diagonals, bisectors
  - circumscribe, inscribe
- Be sure you know how to calculate:
  - perimeter, circumference, and arc length
  - area and surface area
  - volume
- Remember:
  - If you're not given a diagram, draw one!
  - Don't make assumptions based on misleading diagrams you may be given: many geometry figures aren't drawn to scale.
  - Redraw and mark up every diagram. Draw missing lines, drop altitudes, and draw perpendiculars. Fill in missing angle measurements and lengths as you determine them.
  - The length of any one side of a triangle must be greater than the difference of the other two sides, and less than the sum of the other two sides.
  - Memorize the common Pythagorean triples and their multiples.
  - In a figure, the total area of the shaded regions is equal to the total area of the whole figure minus the total area of the unshaded regions.
  - You can typically use 3.14 as an approximation for π. (It's also sometimes helpful to use 22/7 or 355/113).

For questions involving ***Data Analysis***:

- Be sure you know how to calculate:
  - permutations and combinations
  - probabilities of events, including compound and independent events
  - range, mean, median, and mode
  - quartiles, interquartile range, percentiles, and standard deviation
  - simple and compound interest
- Be sure you know how to interpret the various visual presentations of data:
  - diagrams and figures
  - tables and forms
  - line graphs, bar graphs, pictographs, and scatterplots
  - pie charts (circle graphs)
  - boxplots, histograms, and frequency distributions
- Remember:
  - Pay special attention to titles, headers, labels, units, and legends.
  - For tables, determine exactly what the rows and columns represent, and note any missing values in empty fields.
  - For graphs, determine exactly what the axes represent, and note the values at the origin.
  - Know the approximate probability percentages within the subdivisions of the normal distribution.

For ***Multiple-Choice*** questions with only one correct answer choice (*ovals*):

- Again, use the process of elimination to improve your chances of guessing correctly:
  - If all of the answer choices are definitely incorrect, then the remaining answer choice must be correct!

For ***Multiple-Choice*** questions with one or more correct answer choices (*checkboxes*):

- Again, use the process of elimination to improve your chances of guessing correctly:
  - For these kinds of questions, you must choose all the correct answer choices, and none of the incorrect ones. There's no credit for an answer that is partially correct.
  - Be sure you follow any instructions that indicate the number of correct answer choices (e.g., "Indicate both such values" means you must select exactly two answer choices).

For ***Numeric Entry*** questions:

- Be sure your entries answer the questions precisely! Verify that:
  - Your entries are the exact values that have been requested.
  - Your entries are in the proper units.
  - Any fractional entries have been entered into the appropriate numerator and denominator boxes.
- Remember:
  - To make an entry negative, type a hyphen (-).

For ***Quantitative Comparison*** questions:

- Treat the columns as if they were sides of an equation or inequality. You can:
  - Add or subtract like terms on each side.
  - Multiply or divide by common *positive* factors on each side.
- Remember:
  - Exact values aren't usually necessary! You just have to compare the two quantities.
  - Sometimes simply determining the sign and/or range of each quantity is enough.
  - If the relationship between the two quantities can vary, then the answer must be the fourth choice (i.e., the relationship cannot be determined from the information given).