

Practice Verbal Reasoning

6

Questions

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Number of Items: 40
Time Allowed: 60 minutes

DIRECTIONS: There are seven passages in the Verbal Reasoning test. Each passage is followed by several questions. After reading a passage, select the one best answer to each question. If you are not certain of an answer, eliminate the alternatives that you know to be incorrect then select an answer from the remaining alternatives. Indicate your selection by clicking on the answer bubble next to it.

Passage I

In Britain, where political reform (as opposed to revolution) had often been successful in meeting abuses, both major political parties—the Whigs and the Tories—had become increasingly conservative during the long years Britain had fought the French Revolution and Napoleon. Reforms projected in the later eighteenth century had consequently been shelved. Thus, after 1815, when the nation began to suffer from the dislocations produced by the change from wartime to a peacetime economy, the prior failure to reform left the political system peculiarly unresponsive to the economic crisis. The parliamentary system in particular revealed two major constitutional flaws: First, constituencies had not been revised to reflect the dramatic shift in population from rural to urban areas which came with the Industrial Revolution, leaving some rural constituencies as grossly overrepresented as the new towns were underrepresented. Second, since land alone had been traditionally regarded as real property, the property qualification for the right to vote and to hold public office had the effect of disenfranchising many of those who owned the commercial or industrial property that was becoming the economic backbone of the nation.

Though the Whigs had historically been more liberal than the Tories, both parties necessarily represented the landed interests. After 1815, a new breed of radical (or democratic) politicians emerged who saw that the new conditions of life in the nineteenth century would require the democratization of British institutions. A journalist with great credit among British workers, William Cobbett, argued that if parliamentary constituencies should be revised so that representation in the House of Commons would once again reflect the nation rather than the few, the necessary social and economic reforms would follow. Jeremy Bentham formulated a political philosophy called “utilitarianism,” which advocated political democracy as the most practical political form. Wanting a system that would provide men with what they need and desire—which would bring “the greatest good for the greatest number”—Bentham also wanted to secure the greatest happiness for the greatest number. Political democracy seemed to satisfy these requirements: If each individual best knows his own interest, then it follows that the general interest can best be judged by the majority. The system reconciled individual egotism with the general welfare. Another radical, James Mill, saw popular education as a necessary concomitant of democracy and a free press as necessary to check arbitrary government.

In the 1820’s, a bizarre reformist alliance appeared. The aristocratic Whigs, desperate for office after nearly a half century of Tory rule, were finally ready for the reform of Parliament even at the expense of the landed interests, making possible an alliance with the unrepresented manufacturers and with the Radicals. Their opportunity came when the Whigs won the elections of 1830. The subsequent Reform Bill of 1832 reformed the constituencies, redistributing the seats in Commons to reflect the shift in population from country to town, while the property qualifications for the vote were modernized. In fact, the bill did not greatly enlarge the electorate, since the property qualifications remained high; but the bill gave the middle class a greater participation in politics and reinforced the liberal, if not the democratic, climate.

What followed was reformist legislation by a liberal regime which, like its contemporary in France, practiced *laissez-faire* to the distress of those Radicals who had expected social and economic reforms. In the matter of slavery, the Whigs and Radicals did see eye to eye and

cooperated to end slavery throughout the Empire in 1833. But when Parliament then took up the reform of poor relief, by then an archaic dole system by which public funds were given to parishes to make up the difference between a worker's wage and a minimum living wage, the Liberals and Radicals parted company. If the old system was both morally and economically outrageous, the new Poor Law of 1834 held no charm for workers. No relief could now be given to the able-bodied unless they resided in a poorhouse, where conditions were kept deliberately wretched to encourage a man to accept any work at any wage to stay out of them. The reform provided a large supply of laborers eager for work, while taxes for poor relief diminished. It also revealed that the liberal principle of laissez-faire could be a guarantee of inhumanity. Europe was ready for new doctrines that would reduce the exploitation of human beings.

1. In 1815, Britain was
 - A) in a state of political reform.
 - B) undergoing a revolution.
 - C) entering a period of economic hardship.
 - D) under Whig control

2. Which of the following was not a result of the Whig victory of 1830?
 - A) abolition of slavery
 - B) reform of Parliament
 - C) the practice of laissez-faire
 - D) sweeping social and economic reforms

3. The best title for this passage would be
 - A) Radicalism in 19th Century Britain
 - B) The Reform Bill of 1832
 - C) The Rise and Fall of the British Radicals
 - D) The Defeat of the Tories

4. According to the passage, all of the following are false, EXCEPT
 - A) The policy of laissez-faire tends to yield needed social reform.
 - B) The Tories tend to be more liberal than the Whigs.
 - C) The Poor Law of 1834 satisfied the working class by drastically improving working conditions.
 - D) The French government practiced laissez-faire in the 1830's.

5. Which of the following statements about Jeremy Bentham is (are) true?
 - I. He advocated political democracy.
 - II. He was a Whig.
 - III. He formulated the philosophy of "utilitarianism."
 - A) I only
 - B) II only
 - C) I and II
 - D) I and III

6. Which of the following is implied in the passage?
- A) William Cobbett and James Mill were political allies.
 - B) The Reform Bill of 1832 eliminated property qualification for voters.
 - C) Seats in the House of Commons were automatically redistributed every 10 years.
 - D) The Whigs held power throughout the late 18th century.

Passage II

In the course of the fifteenth century, Renaissance painters mastered perspective with sufficient success that it became second nature to the artists of the High Renaissance (the generation around 1500). The supreme figures of this period—Leonardo da Vinci (1452-1519), Raphael (1483-1520), and Michelangelo (1475-1564) applied the new perspective techniques effortlessly in the creation of deeply moving artistic interpretations of man and his natural and spiritual environments. The vanishing point of Leonardo's *Adoration of the Magi* leads to infinity. Uniform space had become the common property of artists and would continue to typify European art until the twentieth century. There is deep pathos, too, in Leonardo's *Adoration*, and a blurring of forms whose shapes are merely suggested in the shadows. This clever manipulation of light and shade is called *chiaroscuro*—and there is no sculptural or architectural equivalent to it. In Leonardo's *Mona Lisa* there are two distinct horizons to heighten the mystery of the face. All this shows that by the High Renaissance the artist's use of dimensions had become highly self-conscious, complex, and articulate.

Whereas in the *Adoration*, Leonardo used triangles to give unity to his groupings, Raphael, in *The Dispute*, used different geometric constructions, noticeably the semicircle after the semidomes common in Renaissance architecture. In this work Raphael placed the wafer (representing Christ's body) precisely on the vanishing point, so everything converged there. By this device Raphael could subtly announce his faith in the Catholic doctrine of transubstantiation. To him, there was no dispute, and his art was a testimony to his orthodox theology. Vasari called Raphael a "mortal god." Yet he was not all pure spirit and undiluted light. His portraits were supremely realistic, and he was quick to take advantage of the new possibilities of the printing press by selling prints of his own paintings for profit.

The Renaissance ideal of the many-sided artist was fulfilled by Raphael (who not only painted but was also an architect, sculptor, and designer of tapestries, engravings, and small ceramic pieces), and more completely still by Leonardo da Vinci (painter, sculptor, architect, musician, scientist, engineer, and natural philosopher). But the ideal achieved its fullest expression in Michelangelo, whose architecture, sculpture, and painting equally embody a spirit of monumental grandeur. In stone, in fresco, and on canvas his figures are heroes and demigods. Adam in *The Creation of Adam*, on the ceiling of the Sistine Chapel, is a dynamo of controlled power languidly at rest. His *Captive Slaves* writhe in their stone. The hesitant steps of earlier Renaissance artists in the direction of tactile reality and sense of movement culminate with Michelangelo, whose prestige in the Western world was rivaled only by Raphael.

Michelangelo personified the "cult of genius." All through the fifteenth century the independence and authority of the artist was coming to be increasingly recognized. Architects

no longer had to supervise their buildings, but merely drafted the plans. Patrons became tolerant of artistic temperament, for as Cosimo de Medici remarked, “One must treat these people of extraordinary genius as if they were celestial spirits, and not like beasts of burden.” The material rewards of excellence were immense, and a talented artist could amass a considerable fortune. The greatest became “superstars” whose art provided an avenue of rapid social advancement. Often of petty bourgeois or lower social origin, they were now accepted on terms of equality by the highest nobility. Late Renaissance grandiosity may reflect this “arrival” of the artist, and it may also display the increasing affluence and power of their upper-class patrons.

7. Chiaroscuro is a technique of
 - I. sculpture.
 - II. painting.
 - III. architecture.
 - A) I only
 - B) II only
 - C) I and II
 - D) I and III
8. Which of the following is true?
 - A) During the High Renaissance, daVinci was the most prestigious artist in the Western world.
 - B) The vanishing point of *The Dispute* leads to infinity.
 - C) The *Mona Lisa* has two separate horizons.
 - D) DaVinci was the first to use semicircular geometric constructions.
9. The best title for this passage would be
 - A) High Renaissance Art
 - B) Superstar Artists of the 16th Century
 - C) Michelangelo and the Cult of Genius
 - D) Art
10. Which of the following is false?
 - A) Some High Renaissance artists became quite wealthy.
 - B) Leonardo daVinci was a musician as well as an artist.
 - C) Raphael held orthodox religious beliefs.
 - D) Most High Renaissance artists were born members of the nobility.
11. It can be inferred from the passage that pre-Renaissance art
 - A) was vastly inferior to Renaissance art.
 - B) did not concentrate as heavily on religion as did Renaissance art.
 - C) lacked tactile reality.
 - D) did not generally survive the Renaissance.

12. It can be inferred that Cosimo de Medici was
- A) an artist.
 - B) an art critic.
 - C) a historian.
 - D) a wealthy man.

Passage III

In spite of Okinawa's subtropical geographic position, it has distinct seasonal differences demanding appropriate adjustments in living routine and clothing. Temperatures in the Taira region may reach a minimum of 38 degrees in January and February and a maximum of 96 degrees in July or August. The average daily mean temperature, however, shows much less variation. From the low 50's in early winter it rises to the low 80's in midsummer. The relative humidities, having daily means of 70% in January and February and 82% in July and August, may often reach an uncomfortable 96% preceding or following one of the many rain squalls in the hot season.

From January through March, winds blowing from the northwest to north carry cold, damp air from the Asian continent across the East China Sea. Although many houses in Taira are somewhat protected by bushes separating them from the open valley behind, nevertheless, house doors are often kept shut during this coldest part of the year.

March and April offer a pleasant, balanced climate. Winds are east to southeast, rainfall is low, and temperatures reach the high 60's. The rainy season begins in late May and lasts until late June. During these four weeks it sometimes rains steadily for one or two days, and adults are forced to give up working.

Children take shelter during the worst downpours, but they reappear outside even before the rains are over to play in puddles or little streams running down the streets. During this time, floods and landslides occur.

Midsummer is often so hot and humid that villagers frequently comment on their discomfort. This is one of the busiest agricultural seasons, but exhaustion causes many people to take naps during noon hours. Work efficiency decreases, and fewer daily trips are made to the mountains. Children also stay at home in the afternoon. It is believed that the heat causes severe headaches. The hot season gradually gives way to a few weeks in late October, November, and early December which corresponds in climate to an early fall in northeastern United States.

Typhoons are known to have hit Okinawa at almost any time of the year. The most dangerous season for these violent storms, however, with wind velocities of over 50 miles per hour, is from late June until October. An extensive warning system exists, and Taira, though remote, is notified immediately of storm warnings, sometimes days in advance. Taira people hardly need such warnings. They can sense the oncoming storm and often predict one correctly before the official forecasts confirm that a storm is approaching the island. The damage is always considerable, not only to crops and trees but also to houses and other property.

13. Floods and landslides are most likely to occur during
- A) January
 - B) April
 - C) June
 - D) July
14. According to the author, the weather is most likely to cause physical discomfort in
- A) January
 - B) July
 - C) September
 - D) November
15. Just after the rainy season comes
- A) a period corresponding to early fall in northeastern United States.
 - B) a period of northwest to north winds, carrying cold, dry air.
 - C) a period of pleasant, balanced climate.
 - D) a period when typhoons are most likely to occur.
16. The average daily mean temperature during the year in Taira is about
- A) 50°
 - B) 65°
 - C) 67°
 - D) Impossible to determine from the passage
17. The best title for this passage would be
- A) The Climate of Taira
 - B) The Climate of Okinawa
 - C) Subtropical Climates in the Pacific
 - D) The Effects of Asian Continental Weather on the Okinawa Region

Passage IV

For Muslims themselves Islam has always been a civilization and an orientation to the world. It is not merely a religion in the usual, limited, modern sense (whatever religion may mean). In the Muslim view, ideally, there are few or no aspects of individual and social life that may not be considered as immediate expressions of Islam or the working out of its implications. Since the Muslim vision of the world—at least for most people and until fairly recent times—has always been integral and whole, with the religious commitment seen as the central point from which all else flows, it is all but impossible to draw the line between those facets of Islamic experience that are religious and those that are not. Indeed, many Muslim thinkers would insist that it is illegitimate even to try to do so. The closer such people stand to the traditional culture of the Islamic world, the more likely they are to be firm in this insistence. A great deal of covert secularism and also some over espousal of a secularist view has been evident in the Muslim mentality in recent times, to be sure, but the majority of Muslims are uneasy with them. Muslim

thinkers adopt a number of devices to escape secularism's more radical implications. There is a deeply ingrained impulse among Muslims to think and to try to live in terms of an Islamic world view. Such an impulse persists along with conscious efforts to change aspects of social life, even when these amount to a veritable transformation of traditional Islamic society. Means are sought, though not always as a conscious process, to bring the changes desired under the perspective of a traditional Islamic outlook. Historically, when one generation of Muslims has departed from modes of behavior or ways of thinking already established in the community (and therefore, because of the Islamic view of history, correct and righteous ways), succeeding generations have usually found the means to extend the cloak of legitimacy over the acceptable parts of these innovations. Among Sunni Muslims what was innovative, and perhaps therefore questionable, for one generation has become authoritative for those who follow by being considered part of the ongoing tradition of the righteously guided community. For Shi'i Muslims, the agent of this accommodation to change has been the authority of the living Imam as exercised by the mujtahidin of the community. Whatever the mechanism at work, Muslims have been enabled through the ages to sustain a lively faith in the integrity of their world view and the rightness of their social forms by the continued expansion of a religiously based understanding of life to include the emergent aspects of Islamic experience.

In more recent times when the Islamic world has faced the painful dilemma posed by its relations with the dominant force of modernity and its own failure of dynamic means have been pursued to enable the borrowing that is essential to survival, means that would at the same time not compromise the Muslim sense of identity, of special destiny, and of living under the law of God. Characteristically the device chosen, in von Grunebaum's words, is to consider the heterogenetic to be orthogenetic (von Grunebaum, 1962). The possibly disruptive effects of the profound impulse to change have in large part been blunted by giving an Islamic coloring to the processes at work. Thus one witnesses the phenomenon among our Muslim contemporaries of radical changes in social life being pursued on the ground that such changes truly represent Islamic values.

18. According to the passage, which of the following statements is most accurate?
- A) Islam is a religion.
 - B) Islam is an integrated way of life.
 - C) Islam is a set of secular principles.
 - D) Islam is easily adapted to changes in society.
19. The author's attitude toward Muslims is best characterized as
- A) approval.
 - B) highly critical.
 - C) neutral.
 - D) tolerant.
20. When their society changes as a result of secular influences, Muslims are most likely to
- A) reject the changes.
 - B) incorporate the change into their religion.
 - C) define the change in terms of a secular counterculture.
 - D) attempt to hide the change.

21. An Imam is probably
- A) a deity.
 - B) a book.
 - C) a school of Islamic thought.
 - D) a priest.
22. The best title for this passage would be
- A) Islamic Religious Tradition
 - B) The Modernization of Islam
 - C) The Adaptability of Islamic Culture
 - D) Change among the Shi'i Muslims
23. It can be inferred that a difference between Sunni and Shi'i Muslims is
- A) the mechanism by which they integrate changes in their society.
 - B) that Sunni Muslims are more innovative.
 - C) that Shi'i Muslims are more innovative.
 - D) that Sunni Muslims do not have Imams.

Passage V

It was the plight of Harry Haller, the brooding protagonist in Hermann Hess's novel *Steppenwolf*, to live through an age of chaotic change. Surely Haller's predicament is not unfamiliar to Americans living in the postwar era. America's rapid transition from a nineteenth-century rural agrarian state to an urbanized technetronic leviathan has astonished, mesmerized, and numbed recent generations. Our environment alters more each decade than it has in centuries. The accelerating velocity of this change, especially during the last 25 years, has produced a widespread cultural malady that one writer has aptly termed "future shock." At one time or another most thoughtful people can lament with Harry Haller that there seems to be "no standard, no security, no simple acquiescence."

This was not always the case. There was a time in our nation's not too distant past when change seemed gradual and society's norms and institutions meshed rather smoothly with the slowly advancing state of technology. If it can be said that America's traditional norms and institutions were the product of any dominant ethical system it would be that adopted by our seventeenth-century Puritan forefathers. The Puritan ethic was clearly defined and somewhat rigid in matters concerning work, leisure, sexual conduct, child rearing, and the treatment of elders. Although these standards of human conduct led in some instances to blatant repression and hypocrisy, there was little confusion about what constituted deviant behavior. There was a pervading certainty and orderliness about life that seemed natural and assuring. As Calvinist theology went bankrupt during the eighteenth and nineteenth centuries, the Puritan ethic was secularized into what became known as the "gospel of success" and "Victorian morality." Nevertheless, the basic Puritan values of a receding agrarian age remained intact and were carried into the twentieth century with the rising tide of moralistic, middle-class Progressivism.

Disillusionment among the “Lost Generation” intellectuals of the 1920s led to a bitter assault on Puritan morality, but the diatribes of Malcolm Cowley and H. L. Mencken were not so damaging to the old moral verities as the emerging mass culture. America’s early modern culture, the Jazz Age, was diffused throughout the country by commercial radio, photographs, motion pictures, telephones, and automobiles. By the 1920s American technology had spawned a consumption-oriented society with an insatiable appetite for labor-saving appliances and commercial entertainment. This was a watershed decade that repudiated the values of rural, farm-oriented, Protestant America. The exigencies of depression and war provided impetus for a shift in the national mood. Concern for the country’s precarious morale gradually began to eclipse the debate over morality. During the postwar years new technological advances in electrification and biological chemistry raised agonizing questions about the relevance of America’s old values. The traditional Puritan ethic, which President Nixon trumpeted before a conference of Republican governors at Colonial Williamsburg, has encountered automation and the new morality, and Americans are faced with a crucial moral dilemma.

24. Which of the following is not mentioned as incorporating, at least to some degree, the Puritan ethic?
- A) Calvinist theology
 - B) The “gospel of success”
 - C) Victorian morality
 - D) None of the above
25. The best title for this passage would be
- A) President Nixon and the Puritan Ethic
 - B) The Puritan Ethic in a Changing America
 - C) Postwar Puritan Ethic
 - D) The Puritan Ethic
26. The passage probably goes on to discuss
- A) the origin and nature of America’s ethical predicament.
 - B) President Nixon’s views on the Puritan Ethic.
 - C) how Steppenwolf relates to modern America.
 - D) how the Puritan ethic relates to the new technological advances.
27. Malcolm Cowley probably would have found himself most in agreement with
- I. H. L. Mencken.
 - II. the author of the passage.
 - III. the “Lost Generation” intellectuals.
 - IV. President Nixon.
- A) I only
 - B) I and II
 - C) I and III
 - D) I, II, and III

28. The Puritan Ethic was not designed to deal with
- A) business conduct.
 - B) sexual conduct.
 - C) how to bring up children.
 - D) technological advances.

Passage VI

In some conditions with a familial tendency, the risk of the disorder is greater than the population incidence, but substantially less than that for single-factor inheritance. These conditions are termed *multifactorial* and probably result from the action of multiple genes (hence polygenic) of small effect, in contrast to the unifactorial disorders in which a single gene has a large effect. The term multifactorial inheritance properly includes the influence of the environment also, but the genetic component of the condition and that which is due to external forces are so intertwined as to be inseparable. The greater the genetic contribution to the cause of disease, the greater the heritability of the condition, a figure usually calculated from the incidence of the condition in relatives when compared to members of the general population. Normal traits, such as intelligence, stature, and skin color, are felt to be multifactorial since they depend on both a person's genetic background and his environment.

There are pathologic conditions in man, of which the commonest are probably the usual nonspecific congenital malformations, such as congenital heart disease, cleft lip and palate, and club foot that follow a multifactorial mode of familial transmission. It is assumed that for some disease a person possesses a certain genetic liability that will be expressed only if environmental circumstances are appropriate. The environment may raise or lower the threshold of expression. If one plots the liability to a given disease (or for that matter a normal trait) in the population, the resultant curve is normally distributed. One tail of the curve represents the population incidence of the condition in question. If one plots the same liability among relatives, a normal curve is also generated, but the curve is shifted so that more relatives exceed the threshold and thus develop disease. Such curves can be generated for liability (or risk) of disease in first or second generations or in relatives of more distant consanguinity. Genetic consultation is usually sought because the marital couple either has had a child with a multi-factorial trait, or one of the prospective parents has the condition. For practical purposes, for conditions showing no sex predilection, the risk of recurrence for a subsequent affected child, given either an affected parent or a previously affected child, is roughly 1/20, or 5%. This risk figure must be compared to the risk for the birth of an affected child, given a negative antecedent family history, i.e., the population incidence of the disease in question.

If we assume, e.g., that the incidence of congenital heart disease in the general population is about 1/1000, then this is the risk that any person with a negative familial history will have a child with congenital heart disease. If a first-degree relative is affected (parent or previous child), the risk becomes about 50 times greater for a subsequent pregnancy ($1/1000 \times 50 = 1/20$, or 5%). It is important to remember that the absolute risk remains low in comparison to unifactorial disorders which 25-50% recurrence risks are encountered. Unfortunately unlike the situation in single-gene disorders wherein the risk of recurrence remains the same with each

succeeding birth, with multifactorial disorders the risk increases with each affected child. Thus, if both a parent and a child, or two children, were affected, the risk to a third individual in the immediate family would be roughly 15%, or three times what it would be if one person were affected.

The greater the number affected, the greater the subsequent risk. In rare families with great liability for a given disease, the recurrence of risk may approach that found in Mendelian disorders. In this situation one must beware of a misdiagnosis and be certain that the condition is truly multifactorial and not a single-gene disorder, the clinical features of which may be similar. The effect of affected second degree and more distant relations on risk of recurrence is finite but small and for practical purposes can probably be ignored. Computer programs have been generated to facilitate the calculations resulting from this additional information.

For disorders in which the affected individual tends to be more often of the same sex, the risk of recurrence is modified, depending on the sex of the proband. Pyloric stenosis is five times commoner in males. The risk that an affected father will have an affected son is about 5% and that he will have an affected daughter about one-half this figure. If the index case is female, however, the risk to her sons is nearly 20% and to her daughters about 8%. The usual explanation for this discrepancy is that the less frequently affected sex is more extreme from a genetic point of view (has more "risk" genes) when they are affected, compared to normal members of their sex; hence the recurrence risk to their offspring is greater. This so-called explanation begs the question; nonetheless the phenomenon is real and must be taken into account when counseling.

29. Which of the following is not influenced by environment?
- A) Intelligence
 - B) Skin color
 - C) None of the above
 - D) All of the above
30. Recurrence risks of multifactorial disorders are
- A) greater than the risks of unifactorial disorders.
 - B) the same as the risks of unifactorial disorders.
 - C) less than the risks of unifactorial disorders.
 - D) the same as the risks of Mendelian disorders.
31. The emphasis of this passage is primarily on
- A) polygenic inheritance.
 - B) unifactorial disorders.
 - C) congenital disorders.
 - D) Mendelian disorders.

32. It can be inferred from the passage that Mendelian disorders are
- A) more serious than other congenital disorders.
 - B) less serious than most multifactorial disorders.
 - C) completely unpredictable.
 - D) very heritable.
33. It can be inferred that the author does not believe that
- A) polygenic disorders result from the action of multiple genes.
 - B) in disorders showing sex predilection, the less frequently affected sex, when affected, is affected more severely.
 - C) genetic counselling can have constructive results.
 - D) the probability of risk of various disorders can be analyzed statistically.
34. The author would probably recommend genetic consultation
- A) to no one.
 - B) only in the most extreme cases.
 - C) to any couples planning to have a child.
 - D) to a couple in which one member suffers from congenital heart disease.

Passage VII

A number of deficiencies in pre-Hellenic mathematics are quite obvious. Extant papyri and tablets contain specific cases and problems only, with no general formulations, and one may question whether these early civilizations really appreciated the unifying principles that are at the core of mathematics. Further study is somewhat reassuring, for the hundreds of problems of similar types in cuneiform tablets seem to be exercises that schoolboys were expected to work out in accordance with certain recognized methods or rules. That there are no surviving statements of these rules does not necessarily mean that the generality of the rules or principles was missing in ancient thought. Were a rule not there in essence, the similarity of the problems would be difficult to explain. Such large collections of similar problems could not have been the result of chance.

More serious, perhaps, than the lack of explicit statements of rules is the absence of clear-cut distinctions between exact and approximate results. The omission in the tables of cases involving irregular sexagesimals seems to imply some recognition of such distinctions, but neither the Egyptians nor the Babylonians seem to have raised the question of when the area of a quadrilateral (or of a circle) is found exactly and when only approximately. Questions about the solvability or unsolvability of a problem do not seem to have been raised; nor was there any investigation into the nature of proof. The word “proof” means various things at different levels and ages; hence, it is hazardous to assert categorically that pre-Hellenic peoples had no concept of proof, nor any feeling of the need for proof. There are hints that these people occasionally were aware that certain area and volume methods could be justified through a reduction to simpler area and volume problems. Moreover, pre-Hellenic scribes not infrequently checked or “proved” their divisions by multiplication; occasionally they verified the procedure in a problem through a substitution that verified the correctness of the answer. Nevertheless, there are no

explicit statements from the pre-Hellenic period that would indicate a felt need for proofs or a concern for questions of logical principles. The lack of such statements often has led to judgments that pre-Hellenic civilizations had no true mathematics, despite the obviously high level of technical facility.

Critics also point to what they regard as an absence of abstraction in Egyptian and Babylonian mathematics. The language of the documents does seem always to remain close to concrete cases, as we have seen; but this, too, can be misleading. In Mesopotamian problems the words “length” and “width” should perhaps be interpreted much as we interpret the letters x and y , for the writers of cuneiform tablets may well have moved on from specific instances to general abstractions. How else does one explain the addition of a length to an area? In Egypt also, the use of the word for quantity is not incompatible with an abstract interpretation such as we read into it today.

Evaluations of pre-Hellenic civilizations frequently point to the fact that there was no clearly discernible intellectual activity of a characteristically unified sort comparable to that which later carried the label “mathematics”; but here, too, it is easy to be excessively dogmatic. It may be true that geometry had not yet been crystallized out of a crude matrix of space experience that included all sorts of things that could be measured: but it is difficult not to see in Babylonian and Egyptian concern with number and its applications something very close to what usually, in ages since, has been known as algebra.

35. With which of the following statements would the author most likely agree?
- A) Pre-Hellenic mathematicians did not arrive at general formulation.
 - B) Written records prove that pre-Hellenic mathematicians did arrive at some general formulations.
 - C) Solving individual problems is the essence of mathematics.
 - D) Pre-Hellenic mathematicians probably did develop some general rules and principles.
36. A cuneiform tablet was probably
- A) a medicine.
 - B) a book.
 - C) something to write with.
 - D) something to write on.
37. Which of the following would the author probably consider “true mathematics?”
- I. The ability to do arithmetic operations.
 - II. The ability to prove a geometric theorem.
 - III. The ability to approximate the area of a circle.
- A) I only
 - B) II only
 - C) I and II
 - D) I and III

38. Which of the following can be inferred from the passage?
- I. The Babylonians formulated a rudimentary geometry.
 - II. The Egyptians formulated a rudimentary algebra.
 - III. The Babylonians were more sophisticated mathematically than the Egyptians.
- A) I only
 - B) II only
 - C) I and II
 - D) I, II, and III
39. The evidence offered by the author that the Mesopotamians had reached the level of general mathematical abstraction is primarily
- A) empirical.
 - B) interpretive.
 - C) documentary.
 - D) hearsay.
40. The author's main purpose in writing this passage appears to be to
- A) point out the deficiencies of pre-Hellenic mathematics.
 - B) compare the mathematics of various pre-Hellenic cultures.
 - C) correct some misapprehension about pre-Hellenic mathematics.
 - D) expound on the importance of abstractions.

STOP. IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK. YOU MAY GO BACK TO ANY QUESTION IN THE VERBAL REASONING TEST BOOKLET.