



CLT SAMPLE TEST

Classic Learning Test



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Each section will have a corresponding time limit. Do not begin the next section until told to do so.
The times for each section are:

Verbal Reasoning: 40 minutes
Grammar/Writing: 35 minutes
Quantitative Reasoning: 45 minutes

If you finish a section early, you may use the remaining time to check your work, but only on that section. If you have any questions, raise your hand and ask your test proctor.

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Verbal Reasoning

There are 40 questions in this section. You have 40 minutes to complete the section. Read each passage and carefully answer the corresponding questions. The final two questions for each passage are analogy-based. Use your understanding of the passage and the relationships demonstrated within it to arrive at your answers.

Answers are based on the evidence given in a passage; no outside knowledge is required.

Literature

This passage is adapted from “The Story of the Flood” from The Epic of Gilgamesh, written around the 21st century BC, translated here in 1960 by N.K. Sandars.

You know the city Shurruk, it stands on the banks of Euphrates? That city grew old and the gods that were in it were old. There was Anu, lord of the firmament, their father, and warrior Enlil their counselor, Ninurta the helper, and Ennugi watcher over canals; and with them also was Ea. In those days the world teemed, the people multiplied, the world bellowed like a wild bull, and the great god was aroused by the clamor. Enlil heard the clamor and he said to the gods in council, “The uproar of mankind is intolerable and sleep is no longer possible by reason of the babel.” So the gods agreed to exterminate mankind. Enlil did this, but Ea because of his oath warned me in a dream. He whispered their words to my house of reeds, “Reed-house, reed-house! Wall, O wall, hearken reed-house, wall reflect; O man of Shurruk, son of Ebara-Tutu; tear down your house and build a boat, abandon possessions and look for life, despise worldly goods and save your soul alive. Tear down your house, I say, and build a boat. These are the measurements of the barque as you shall build her: let her beam equal her length, let her deck be roofed like the vault that coves the abyss; then take up into the boat the seed of all living creatures”

Then was the launching full of difficulty; there was shifting of ballast above and below till two-thirds was submerged. I loaded into her all that I had of gold and of living things, my family, my kin, the beast of the field both wild and tame, and all the craftsmen I looked out at the weather and it was terrible, so I too boarded the boat and battened her down. All was complete, the battening and the caulking; so I handed the tiller to Puzur-Amurri the steersman, with the navigation and the care of the whole boat.

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1. Based on the passage, the clamor that caused the gods to flood the land was most likely

- A) the wail of grief-stricken goddesses.
- B) the uproar of mankind.
- C) the tumult of destructive wars.
- D) the lamentations of the diseased and starved.

2. Which lines in the passage best support the answer to the previous question?

- A) Paragraph 1, Sentence 5 (“Enlil heard . . . babel”)
- B) Paragraph 2, Sentence 2 (“I loaded . . . down”)
- C) Paragraph 3, Sentence 5 (“I commanded . . . forth”)
- D) Paragraph 4, Sentence 3 (“Then I . . . water”)

3. Ebara-Tutu is the father of

- A) Shurruk.
- B) the narrator.
- C) Ea.
- D) Enlil.

4. Which of the following did the narrator NOT bring on the boat with him?

- A) His animals
- B) His wealth
- C) His family
- D) His friends

5. The narrator’s primary aim throughout the passage is to

- A) warn Gilgamesh of an impending flood.
- B) chronicle a disagreement between the gods.
- C) honor the gods’ wisdom.
- D) relate how the land had been flooded.

One whole day the tempest raged, gathering fury as it went. It poured over the people like the tides of battle; an imam could not see his brother nor the people be seen from heaven. Even the gods were terrified at the flood, they fled to the highest heaven, the firmament of Ann; they crouched against the walls, cowering like dogs. Then Ishtar, the sweet-voiced Queen of Heaven, cried out like a woman in travail: "Alas the days of old are turned to dust because I commanded evil; why did I command thus evil in the council of all the gods? I commanded wars to destroy the people, but are they not my people, for I brought them forth? Now like the spawn of fish they float in the ocean." The great gods of heaven and of hell wept, they covered their mouths.

For six days and six nights the winds blew, torrent and tempest and flood overwhelmed the world, tempest and flood raged together like warring hosts. When the seventh day dawned the storm from the south subsided, the sea grew calm, the flood was stilled; I looked at the face of the world and there was silence; all mankind was turned to clay I opened a hatch and the light fell on my face. Then I bowed low, I sat down and I wept, the tears streamed down my face, for on every side was the waste of water.

This passage has been excerpted and adapted from the original, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

6. In Paragraph 4, Sentence 3, the word "waste" most closely means

- A) an expanse of empty terrain.
- B) to dispose of casually.
- C) a heap of garbage.
- D) a misuse of skills.

7. Based on the passage, it is clear the narrator believes

- A) the flooding of the land was tragic.
- B) mankind deserved to be destroyed.
- C) he should have died along with everyone else.
- D) the gods are infallible in their rulings.

8. From the narrator's perspective, this passage would best be considered

- A) a collection of maxims.
- B) a persuasive argument.
- C) an entertaining legend.
- D) a historical account.

9. Puzur-Amurri : helmsman ::

- A) Enlil : goddess
- B) Shurruapak : city
- C) river : Euphrates
- D) Anu : Enlil

10. Ishtar : regret ::

- A) the narrator : persistence
- B) Puzur-Amurri : rebellion
- C) Enlil : irritation
- D) Ninurta : vengeance

Science

This passage is adapted from Caleb Everett's "Anumeric people: What happens when a language has no word for numbers?" first published in 2017 on The Conversation.

Numbers do not exist in all cultures. Numberless hunter-gatherers live deep in Amazonia. Instead of using words for precise quantities, these people rely exclusively on terms similar to "a few" or "some."

In contrast, numbers govern our own lives. As you read this, you are likely aware of what time it is, how old you are, your height, and more. But, in a historical sense, numerically fixated people like us are the unusual ones. For most of our species' approximately 200,000-year lifespan, we had no means of precisely representing quantities. What's more, the 7,000 or so languages that exist today vary greatly in how they use numbers.

Speakers of anumeric, or numberless, languages offer a window into how the invention of numbers reshaped the human experience. Cultures without numbers, or with only one or two precise numbers, include the Mundurucu and Pirahã in Amazonia. Researchers have also studied some adults in Nicaragua who were never taught number words.

Without numbers, healthy human adults struggle to precisely differentiate and recall quantities as low as four. In an experiment, a researcher will place nuts into a can one at a time, then remove them one by one. The person watching is asked to signal when all the nuts have been removed. Responses suggest that anumeric people have some trouble keeping track of how many nuts remain in the can, even if there are only four or five in total. This and many other experiments have led to a simple conclusion: when people do not have number words, they struggle to make quantitative distinctions that probably seem natural to someone like you or me.

It is worth stressing that these anumeric people are cognitively normal and are well-adapted to the environments they have dominated for centuries. Yet numberless people struggle with tasks that require precise discrimination between quantities. Seemingly straightforward distinctions become blurry through numberless eyes.

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11. Overall, the passage argues that

- A) most humans are unable to understand basic numerical distinctions.
- B) our use of language is predominantly dependent upon numbers.
- C) humans are not born with an innate comprehension of numbers.
- D) numbers are first processed in the brain as letters and then recoded.

12. Which lines in the passage provide the best evidence in support of the answer to the previous question?

- A) Paragraph 2, Sentence 3 ("But . . . ones")
- B) Paragraph 6, Sentence 1 ("This conclusion . . . societies")
- C) Paragraph 7, Sentence 3 ("They recognize . . . means")
- D) Paragraph 8, Sentence 2 ("We are . . . numbers")

13. The author does which of the following in the third paragraph?

- A) He provides evidence for his claim in the second paragraph about cultures that differ in their use of numbers.
- B) He discusses the effects of anumeric languages on human understanding and cognition.
- C) He preempts arguments from those who will disagree with his thesis about anumeric languages.
- D) He pivots from discussing a specific anecdote to presenting a few core principles that can be drawn from it.

14. According to the passage, one experiment evaluating quantitative distinction involves

- A) spoon-feeding number words to children.
- B) adding nuts to a can and then removing them.
- C) teaching students numbers out of sequence.
- D) training students to link numbers and letters.

15. Based on the fifth paragraph, it can be inferred that anumeric people

- A) have never encountered numbers and instead rely only on letters to communicate.
- B) are worse off for lacking numbers compared to cultures that are numerically fixated.
- C) are often forced to form separate societies due to alienation from a parent culture.
- D) live in cultures where precise numerical distinctions are less crucial than in numeric cultures.

This conclusion is echoed by work with anumeric children in industrialized societies. Prior to being spoon-fed number words, children can only approximately discriminate quantities beyond three. We must be handed the cognitive tools of numbers before we can consistently and easily recognize higher quantities.

In fact, understanding the exact meaning of number words is a process that takes children years. At first, kids learn numbers much like they learn letters. They recognize that numbers are organized sequentially, but they don't know what each individual number means. With time, they start to understand that a given number represents a quantity greater by one than the preceding number. This "successor principle" is part of the foundation of our numerical cognition, but requires a lot of practice to understand.

Thus, none of us is really a "numbers person." We are not born understanding differences between numbers. Without the cultural traditions that expose us to numbers from infancy, we would all struggle with even basic quantitative distinctions. Number words and written numerals transform our quantitative reasoning as they are coaxed into our cognitive experience by our parents, peers, and school teachers.

If we are to truly understand how much our cognitive lives differ cross-culturally, we must continually explore our species' linguistic diversity.

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Culture	Estimated Population in 2018	Projected Population in 2020
Pirahã	850	890
Munduruku	12,500	12,550

A scientist compiles a table of estimated populations of some anumeric cultures, shown above.

CLI 2017

16. In Paragraph 8, Sentence 4, the phrase "coaxed into" most closely means

- A) sternly forced to develop into.
- B) encouraged to take root in.
- C) reverently bequeathed to.
- D) quickly shifted internally beyond.

17. The author of the passage would likely agree with which of the following statements?

- A) Language can give insight into cognition.
- B) Anumeric people are not as intelligent as numeric people.
- C) Quantitative language is natural to humans.
- D) Children must learn numbers to function properly in society.

18. Based on the table, which of the following conclusions can be drawn?

- A) The Pirahã culture is projected to experience a higher rate of population growth than the Munduruku culture.
- B) The populations of anumeric people grow more slowly on average than the populations of numeric people.
- C) The Munduruku people have greater commerce and connection to numeric cultures than the Pirahã people.
- D) Both the Pirahã and Munduruku cultures will experience unprecedented growth in the next two years.

19. some : quantity ::

- A) number : quantitative
- B) numerical : qualitative
- C) healthy : quality
- D) letters : quality

20. successor principle : children ::

- A) science : the law of gravity
- B) breathing : adults
- C) speaking : anumeric people
- D) spelling : humans

Philosophy / Religion

This passage is adapted from Chapter 2 of St. Teresa of Avila's The Way of Perfection, first published in 1577 and translated here by the Rev. John Dalton in 1852.

Think not, my sisters, that because you must not seek to please secular persons you shall therefore want support. I assure you this will not be the case. Never strive, by human artifices, to maintain yourselves, for then you will die of hunger. And as you have given up revenues, give up also all care about food—otherwise all is lost. Let those whom our Lord wishes to receive revenues attend to such cares in good time, since it is very proper—because it is their vocation.

But for us, sisters, it is improper. To be solicitous about an income from others seems to me to be thinking on what others enjoy. In spite of all your care, another does not alter his mind, nor does he intend the more to bestow an alms. This care leave to Him, who knows how to move all men, who is the Lord of revenues and of their possessors. By His command we have come here: His words are true; they cannot fail; let us not forsake Him, and we shall have no reason to fear.

Mind this, sisters, for it will concern you much when I am dead, and therefore I leave it to you in writing. When I have least, I am the most free from care. And our Lord knows that, to the best of my opinion, our superabundance afflicts me more than our wanting necessities.

What do I care for kings and lords, if I desire none of their estates, nor strive to please them, and if I am obliged ever so little to offend God on their account? What care I for their honors, if I understand in what a poor man's chief honor consists? True poverty has with it a certain dignity, so that none suffer by it (I speak of poverty undertaken only for God's sake). It need not please anyone but Him: it is very certain that one acquires many friends by not being dependent on anyone.

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21. Over the course of the passage, the author primarily emphasizes the

- A) difference between piety in laypeople and in nuns, and why nuns are essential to people's spiritual guidance.
- B) necessity for her and fellow nuns to keep to their vow of poverty and not worry over material concerns.
- C) great need for additional almsgiving in the kingdom, and ways that nuns can help encourage it.
- D) problem of poverty as it relates to the church, including its evil effects on those with few means.

22. The author of the passage notes that an abundance of wealth

- A) makes her uneasy.
- B) gives her joy.
- C) corrupts her soul.
- D) soothes her concerns.

23. Which lines in the passage best support the answer to the previous question?

- A) Paragraph 2, Sentence 4 ("This care . . . possessors")
- B) Paragraph 3, Sentence 3 ("And our . . . necessities")
- C) Paragraph 4, Sentence 2 ("What care . . . consists")
- D) Paragraph 5, Sentence 3 ("I am . . . guard")

24. Based on the passage, the author would likely agree with which of the following?

- A) Both too few funds and too many funds can be dangerous, and have the potential to corrupt people's hearts.
- B) People decide to bestow alms on a place after both personal prayer and gentle solicitation from local churches.
- C) Even if the nuns never solicited any more money, they eventually would find themselves provided with the necessities of life.
- D) It would be better for all of the nuns if their poverty led to the disbandment of their group, giving them the ability to travel and share their faith.

25. To make her point, the author uses which of the following in the passage?

- A) Authoritative quotes
- B) Rhetorical questions
- C) Personal anecdotes
- D) Historical narratives

These are the arms that must be inscribed on our banners: these things must we faithfully observe in the house, in apparel, in words, and much more in our thoughts. As long as these points are observed, have no fear about the decay of the discipline of this house, through the divine assistance. I am confident that if this be truly observed, both chastity and everything else will be much better fortified, than by very sumptuous buildings, against which I beseech you to be on your guard.

It looks very bad, my daughters, to erect stately houses out of the property of the poor. God forbid this should be done; let our houses be poor and mean in every way. As for those who build large houses, they have their reasons and other pious intentions. But any little corner is large enough for thirteen poor women. I tell you (since strict enclosure is necessary, and also conduces to prayer and devotion), that if they possess a piece of ground, with some small hermitages, to retire to prayer, well and good; but from stately buildings, large houses, and everything fine and beautiful, may God deliver us.

This passage has been excerpted and adapted from the original, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

26. According to the passage, what is one way that a person can secure new friendships?

- A) Through the building of homes together
- B) Through habitual and practiced virtue
- C) Through independence of nature
- D) Through daily observance of discipline

27. In Paragraph 5, Sentence 3, the word “fortified” most closely means

- A) rejuvenated.
- B) improved.
- C) vitalized.
- D) protected.

28. The author indicates in the passage that those who build large houses

- A) will be punished eventually for their greed.
- B) are doubly required to give alms to the poor.
- C) require the nuns’ prayers for their souls.
- D) do not necessarily deserve our censure.

29. superabundance : wanting necessities ::

- A) afflicting : wanting
- B) sumptuous buildings : poverty
- C) kings : honors
- D) bestow alms : inscribed on banners

30. nuns : vowing poverty ::

- A) laypeople : giving alms
- B) kings : ceding power
- C) women : inscribing
- D) poor men : practicing frugality

Historical / Founding Documents

Passage 1 is adapted from Plato's Book IX of The Republic, written around 380 BC and translated here by B. Jowett.

Passage 2 is adapted from Federalist No. 63, from The Federalist Papers, generally believed to be written by James Madison and first published in 1788.

Passage 1

How is the tyrannical man formed out of the democratical? And how does he live, in happiness or in misery?

Certain of the unnecessary pleasures and appetites I conceive to be unlawful; every one appears to have them, but in some persons they are controlled by the laws and by reason, and the better desires prevail over them—either they are wholly banished or they become few and weak, while in the case of others they are stronger, and there are more of them.

I mean those appetites that are awake when the reasoning and human and ruling power is asleep. Then the wild beast within us goes forth to satisfy his desires, and there is no conceivable folly or crime that, at such a time, when he has parted company with all shame and sense, a man may not be ready to commit.

But when a man's pulse is healthy and temperate, and when before going to sleep he has awakened his rational powers and fed them on noble thoughts and enquiries, then, as you know, he attains truth most nearly and is least likely to be the sport of fantastic and lawless visions.

The point that I desire to note is that in all of us, even in good men, there is a lawless wild-beast nature, which peers out in sleep.

Passage 2

A Senate may be sometimes necessary as a defense to the people against their own temporary errors and delusions.

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31. Passage 1 primarily focuses on

- A) how a democratic society could be corrupted by tyranny.
- B) the warring parts of the human psyche.
- C) the dangerous pleasures and vices that lead to corruption.
- D) the commonality of lawlessness in all societies.

32. According to Passage 1, a man can minimize the lawless wild-beast nature inside of him by

- A) getting enough sleep.
- B) accepting his own corruption.
- C) practicing his powers of rationality.
- D) fighting against tyranny.

33. Which lines in Passage 1 provide the best evidence in support of the answer to the previous question?

- A) Paragraph 1, Sentence 1 (“How is . . . democratical”)
- B) Paragraph 3, Sentence 1 (“I mean . . . asleep”)
- C) Paragraph 3, Sentence 2 (“Then the . . . commit”)
- D) Paragraph 4, Sentence 1 (“But when . . . visions”)

34. Which lines in Passage 1 provide the best evidence in support of the answer to the previous question?

- A) Paragraph 1, Sentence 1 (“How is . . . democratical”)
- B) Paragraph 3, Sentence 1 (“I mean . . . asleep”)
- C) Paragraph 3, Sentence 2 (“Then the . . . commit”)
- D) Paragraph 4, Sentence 1 (“But when . . . visions”)

35. According to the author of Passage 2, which of the following principles must, in a well-functioning republic, maintain authority over the public mind?

- A) Reason, justice, and truth
- B) Passion, power, and glory
- C) Anguish, tyranny, and violence
- D) Freedom, love, and capitalism

As the cool and deliberate sense of the community ought, in all governments, and actually will, in all free governments, ultimately prevail over the views of its rulers, so there are particular moments in public affairs when the people, stimulated by some irregular passion, or some illicit advantage, or misled by the artful misrepresentations of interested men, may call for measures which they themselves will afterwards be the most ready to lament and condemn.

In these critical moments, how salutary will be the interference of some temperate and respectable body of citizens, in order to check the misguided career and to suspend the blow meditated by the people against themselves, until reason, justice, and truth can regain their authority over the public mind? What bitter anguish would not the people of Athens have often escaped if their government had contained so provident a safeguard against the tyranny of their own passions?

It may be suggested that a people spread over an extensive region cannot, like the crowded inhabitants of a small district, be subject to the infection of violent passions or to the danger of combining in pursuit of unjust measures. I am far from denying that this is a distinction of peculiar importance. I have, on the contrary, endeavored to show that it is one of the principal recommendations of a confederated republic. At the same time, this advantage ought not to be considered as superseding the use of auxiliary precautions. It may even be remarked that the same extended situation, which will exempt the people of America from some of the dangers incident to lesser republics, will expose them to the inconvenience of remaining for a longer time under the influence of those misrepresentations which the combined industry of interested men may succeed in distributing among them.

These passages have been excerpted and adapted from their originals, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

36. In Passage 2, Paragraph 3, Sentence 5, the phrase “incident to” most closely means

- A) exposed by.
- B) created by.
- C) inherent in.
- D) captured in.

37. Based on the information in Passage 1 and Passage 2, the authors of the passages would likely agree that

- A) men’s passions can sometimes lead them astray.
- B) tyranny must be rooted out and replaced with democracy.
- C) government can provide the best check on man’s baser passions.
- D) desire and criminality go hand in hand.

38. The author of Passage 1, unlike the author of Passage 2, uses which of the following to get his point across?

- A) An allusion to a popular novel that explains his point
- B) A reference to an authoritative text on tyranny
- C) An anecdote about the consequences of his own passions
- D) A metaphor about man’s darker nature

39. The following analogy is based on Passage 1: unnecessary appetites : reason ::

- A) desire : crime
- B) folly : sense
- C) acceptance : shame
- D) wakefulness : logic

40. The following analogy is based on Passage 2: temperate and respectable body of citizens : tyranny of the people’s passions ::

- A) people spread over an extensive region : superseding auxiliary precautions
- B) crowded inhabitants of a small district : distinction of peculiar importance
- C) industry of interested men : people of Athens
- D) cool and deliberate sense of the community : views of the community’s rulers

Grammar & Writing

There are 40 questions in this section. You have 35 minutes to complete the section.

Read each passage and carefully answer the corresponding questions. Questions will ask you to either correct an error or suggest an improvement in the passage. If no correction or improvement is necessary, select the option "NO CHANGE."

NOTE: Most questions correspond to a numbered portion of the passage. For these questions, answer choices represent alternatives that could be substituted for the numbered portion. Select the best answer choice.

Philosophy / Religion

This passage is adapted from Booker T. Washington's "The Secret Of Success In Public Speaking," in Up from Slavery: An Autobiography, first published in 1901.

One portion of my address at Chicago seemed to have been misunderstood by the Southern [41] press, and some of the Southern papers criticized me rather strongly. These criticisms continued for several weeks, until I finally received a letter from the editor of the Age-Herald, published in Birmingham, Alabama, asking me if I would say just what I meant by this part of the address. I replied to him in a letter which seemed [42] satisfying my critics. In this letter I said that I had made it a rule never to say before a Northern audience anything that I would not say before an audience in the South. [43] I raged that I thought it wholly necessary for me to go into extended explanations. If my seventeen years of work in the heart of the South had not been explanation enough, I did not see how words could explain.

In meeting crowds of people at public gatherings, there is one type of individual that I [44] despair. I mean the crank. I have become so accustomed to these people [45] because I can pick them out at a distance when I see them elbowing their way up to me. The average crank has a long beard, poorly cared for, a lean, narrow face, and wears a black coat. The front of his vest and coat are slick with grease, and his trousers bag at the knees.

In Chicago, after I had spoken at a meeting, I met one of these fellows. They usually have some process for curing all of the [46] ill's of the world at once.

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41. **press, and some**

- A) NO CHANGE
- B) press; and some
- C) press: and some
- D) press and some

42. **satisfying**

- A) NO CHANGE
- B) satisfy
- C) too satisfying
- D) to satisfy

43. **Which of the following choices best matches the tone of the passage?**

I raged that I thought it wholly necessary for me to go into extended explanations.

- A) NO CHANGE
- B) I said that I did not think it was necessary for me to go into extended explanations.
- C) I mused, laughing, that it wasn't really necessary for me to give extended explanations.
- D) I added apologetically that I did not think it was necessary for me to give extended explanations.

44. **despair**

- A) NO CHANGE
- B) debate
- C) dread
- D) denounce

45. **because**

- A) NO CHANGE
- B) even though
- C) now that
- D) given that

This Chicago specimen had a patent process by which he said Indian corn could be kept through a period of three or four years, and he felt sure that if the Negro race in the South would, as a whole, adopt his process, it would settle the whole race question. It mattered nothing that I tried to convince him that our present problem was to teach the Negroes how to produce enough corn to last them through one year. [47] Another Chicago crank that spoke to me had a scheme by which he wanted me to join him in an effort to close up all the National banks in the country, he said. If that was done, he felt sure it would put the Negro on his feet.

The number of people who stand ready to consume one's time, to no purpose, [48] are almost countless. At one time I spoke before a large audience in Boston in the evening. The next morning I was awakened by having a card brought to my room, and with it a message that someone was anxious to see me. Thinking that it must be something very important, I [49] dressed hastily and went down. [50] When I reached the hotel office I found a blank and innocent-looking individual waiting for me, who coolly remarked: "I heard you talk at a meeting last night. I rather liked your talk, and so I came in this morning to hear you talk some more."

This passage has been excerpted and adapted from the original, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

46. **ill's**

- A) NO CHANGE
- B) ill's'
- C) ill's
- D) ill

47. **Which of the following choices represents the clearest and most concise way to convey all of the information in the sentence?**

Another Chicago crank that spoke to me had a scheme by which he wanted me to join him in an effort to close up all the National banks in the country, he said.

- A) NO CHANGE
- B) Another man, a Chicago crank, had a scheme by which he wanted me to join him in an effort to close up all the National banks in the country.
- C) Another Chicago crank had another scheme for the country.
- D) Another Chicago crank had a scheme by which he wanted me to join him in an effort to close up all the National banks in the country.

48. **are**

- A) NO CHANGE
- B) is
- C) was
- D) being

49. **dressed hastily and went down.**

- A) NO CHANGE
- B) dressed hastily and going down.
- C) dressing hastily and going down.
- D) dressing hastily and went down.

50. **The author is thinking of inserting the following sentence here:**

I was in such a rush that I completely forgot my coat.

Should the author make this insertion?

- A) Yes, because it provides context for how frazzled the narrator was.
- B) Yes, because it references a detail that will become essential later in the narrative.
- C) No, because it is an extraneous detail that slows down the narrative.
- D) No, because the narrator does not mention a coat elsewhere in the passage.

Historical Profile

This passage is adapted from Leo Damrosch's "Friends of Rousseau," first published in the July/August 2012 issue of Humanities Magazine.

When I was finishing a biography of Jean-Jacques Rousseau a few years ago, I was struck by the comment of someone who had known him: "the friends of Rousseau are as though related to each other through his soul, which has joined them across [51] countries, ranks, fortune and, even centuries." Many people who have barely heard of him [52] are indeed friends of Rousseau; because his ideas have had a great influence in our culture. Surprisingly, this Genevan watchmaker's son, [53] whom had no formal education, had deep insights that continue to challenge and inspire. [54] Those insights are not just in one area or field, that might at first seem unconnected, either, but in many fields.

Rousseau's first great work was a Discourse on the Origin and Foundations of Inequality among Men, written in 1749 as an entry in a prize competition (he didn't win—the judges said his submission was too long). The expected answer in those days [55] is that God created us to be unequal, or else that nature did. Either answer would confirm the rightness of social hierarchy and privilege. Rousseau, far more [56] permissive than Marx would later be, accepted the truth that inequality is inseparable from human culture, but he wanted to know why.

The answer was the idea that would be the basis of everything Rousseau ever wrote: man is naturally good, but society has made him wicked. [57] In other words, we are not corrupted by original sin as the churches taught. We are not driven by instinct to dominate each other, as Thomas Hobbes taught. If we are selfish, competitive, and possessive, it is because society has taught us to be this way.

Rousseau imagined a pre-civilized state of nature in which our ancestors did not have a need or the opportunity to exploit each other. As hunter-gatherers, they could be largely self-sufficient. The change came with the invention of metallurgy and agriculture, twin foundations of a developed civilization. Each of these advances has contributed to our material well-being.

(continued on next page)

51. **countries, ranks, fortune and, even**

- A) NO CHANGE
- B) countries, ranks, fortune, and, even
- C) countries, ranks, fortune, and even
- D) countries ranks fortune and even

52. **are indeed friends of Rousseau; because his ideas have had a great influence**

- A) NO CHANGE
- B) are indeed friends of Rousseau; because his ideas, have had a great influence
- C) are, indeed, friends of Rousseau: because his ideas have had a great influence
- D) are indeed friends of Rousseau because his ideas have had a great influence

53. **whom**

- A) NO CHANGE
- B) who
- C) which
- D) what

54. **Which of the following choices represents the clearest and most concise way to convey all of the information in the sentence?**

Those insights are not just in one area or field, that might at first seem unconnected, either, but in many fields.

- A) NO CHANGE
- B) Those insights are not just in one area or field, either, but in many fields that might at first seem unconnected.
- C) Those insights in many fields are not just in one area or field, either, but might at first seem unconnected.
- D) Those insights, in many fields that might at first seem unconnected, are not just in one area or field, either.

55. **is**

- A) NO CHANGE
- B) were
- C) being
- D) would have been

56. **permissive**

- A) NO CHANGE
- B) pessimistic
- C) pervasive
- D) penurious

[58] In fact, they are only possible in an organized society where the many are controlled by the few. What then develops, accordingly, is [59] governments, legal systems, and organized religions that teach people to accept their situation in this troubled world.

Rousseau describes this change well in the Discourse: “Equality disappeared, property was introduced, labor became necessary, and the vast forests changed to smiling fields that had to be watered with the sweat of men, where slavery and poverty were soon seen to germinate and grow along with the crops.” It is a powerful insight: inequality is ethically wrong, but it is also inevitable. The best we can do is to try to minimize it. [60] No wonder, as the Swiss scholar Jean Starobinski has said, the “echo of these words expanded in time and space far beyond what Rousseau could have foreseen.”

This passage has been excerpted and adapted from the original, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

57. Which of the following choices best matches the tone of the passage?

In other words, we are not corrupted by original sin as the churches taught.

- A) NO CHANGE
- B) To be super clear, we’re not corrupted by original sin as the churches taught.
- C) I have to underline their point: we are not corrupted by original sin as the churches taught.
- D) And how about this? We are not corrupted by original sin as the churches taught.

58. In fact

- A) NO CHANGE
- B) Therefore
- C) However
- D) For instance

59. governments, legal systems, and organized religions

- A) Paragraph 2, Sentence 4 (“This care . . . possessors”)
- B) Paragraph 3, Sentence 3 (“And our . . . necessities”)
- C) Paragraph 4, Sentence 2 (“What care . . . consists”)
- D) Paragraph 5, Sentence 3 (“I am . . . guard”)

60. The author is thinking of adding the following sentence here:

Economic oppression is another important topic that philosophers have tackled through the ages.

Should the author make this change?

- A) Yes, because the sentence contextualizes the author’s writing in a larger body of work.
- B) Yes, because the sentence sums up the main point of the passage succinctly.
- C) No, because the sentence repeats a point made earlier in the paragraph.
- D) No, because the sentence disrupts the flow of the paragraph with an irrelevant point.

Science

This passage is adapted from Artemis Spyrou's "Hunting for rare isotopes: The mysterious radioactive atomic nuclei that will be in tomorrow's technology," first published on December 7, 2018 in The Conversation.

When you hear the term “radioactive” you likely think “bad news,” maybe along the [61] line's of fallout from an atomic bomb.

But radioactive materials [62] were actually used in a wide range of beneficial applications. [63] Radiation and irradiation routinely help diagnose disease, treat disease, and foods are kept free from insects and invasive pests by it.

Archaeologists use them to figure out how old an artifact might be. And the list goes on.

[64] Furthermore, what is radioactivity? It's the spontaneous emission of radiation when an atom's dense center – called its nucleus – transforms into a different one. Whether in the form of particles or electromagnetic waves called gamma rays, radiation transfers energy away from the atomic nucleus.

Through experiments, nuclear physicists have seen about 3,000 different kinds of nuclei to date. Current theories, though, predict the existence of about 4,000 more that have never yet been observed. Around the world, thousands of scientists continue to study these tiny constituents of matter, [65] while governments continue to spend billions of dollars on building powerful new machines that will produce more and more exotic nuclei – and maybe eventually more technologies that will further improve modern life.

French physicist Henri Becquerel discovered natural radioactivity in 1896. He was trying to study how uranium salts phosphoresce – that is, emit light – when they're exposed to sunlight. Becquerel placed a uranium sample on a photographic plate covered with opaque paper and left it in direct sunlight. The plate got foggy, which he concluded was due to sun exposure. [66] The plate came from his grandmother's prized collection.

(continued on next page)

61. **line's**

- A) NO CHANGE
- B) lines'
- C) lines
- D) lines's

62. **were**

- A) NO CHANGE
- B) are
- C) were being
- D) will be

63. **Radiation and irradiation routinely help diagnose disease, treat disease, and foods are kept free from insects and invasive pests by it.**

- A) NO CHANGE
- B) Radiation and irradiation routinely help, diagnose disease, treat disease and by it, foods are kept free from insects and invasive pests.
- C) Radiation and irradiation routinely help diagnose disease, treat disease and foods keep free from insects and invasive pests by it.
- D) Radiation and irradiation routinely help diagnose disease, treat disease, and keep our foods free from insects and invasive pests.

64. **Furthermore,**

- A) NO CHANGE
- B) So,
- C) In contrast,
- D) Therefore,

65. **while governments continue to spend billions of dollars on building powerful new machines**

- A) NO CHANGE
- B) while governments have spending billions of dollars on building powerful new machines
- C) while governments spends billions of dollars billions of dollars to build powerful new machines
- D) while the spending of billions of dollars by governments to build powerful new machines

66. **The author was considering adding this sentence here. Should it be added?**

The plate came from his grandmother's prized collection.

- A) Yes, because it is evidence that Becquerel came from a line of physicists.
- B) Yes, because it is evidence that Becquerel valued family.
- C) No, because it disrupts the sequence of events.
- D) No, because it has no role in or impact on the experiment.

Thanks to a few days of cloudy weather, though, Becquerel left his whole setup in a dark drawer. Surprisingly, the photographic plate still fogged up, even in the absence of light. Sunlight had nothing to do with his previous observation. It was the natural radioactivity of the uranium samples that had this [67] affect. As the uranium nuclei decayed – that is, transformed into different nuclei – they spontaneously emitted lightwaves that registered on the photographic plates.

Becquerel's discovery ushered in a new field of physics called nuclear science. [68] And upon such work was he deemed, in the year 1903, as deserving of and thereby honored with the Nobel Prize.

Since then, nuclear scientists have unraveled a lot of the inner workings of the atomic nucleus and have harnessed its amazing energy both for good and unfortunately not so good uses.

The known atomic nuclei belong to 118 different elements, some of them naturally occurring and some of them human-made. For every element on the periodic table there are many different “isotopes,” from a Greek word meaning “same place,” implying the same place on the periodic table of the elements.

To be the same element, two isotopes must have the same number of protons – the positively charged subatomic particle. [69] It's their number of neutrons – subatomic particles with no charge at all – that can vary significantly.

Rare isotopes each have unique properties: [70] They live for different amounts of time, from a fraction of a second to a few billion years, and they release different types of radiation and different amounts of energy.

Current nuclear science research strives to develop new techniques for discovering new isotopes, understanding their properties, and eventually producing and harvesting them efficiently.

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67. **affect**

- A) NO CHANGE
- B) effect
- C) affection
- D) effective

68. **Which of the following choices best matches the tone of the passage?**

And upon such work was he deemed, in the year 1903, as deserving of and thereby honored with the Nobel Prize.

- A) NO CHANGE
- B) For his hard work, he got to get the Nobel Prize in 1903.
- C) Alas, the Nobel Prize was given to him in 1903.
- D) For this work, he won the Nobel Prize in 1903.

69. **It's their number of neutrons – subatomic particles with no charge at all – that can vary significantly.**

- A) NO CHANGE
- B) It's their number of neutrons – subatomic particles with no charge at all that can vary significantly.
- C) It's their number of neutrons: subatomic particles with no charge at all – that can vary significantly.
- D) It's their number of neutrons; subatomic particles with no charge at all that can vary significantly.

70. **Which of the following choices represents the clearest and most concise way to convey all of the information in the sentence?**

They live for different amounts of time, from a fraction of a second to a few billion years, and they release different types of radiation and different amounts of energy.

- A) NO CHANGE
- B) Rare isotopes live for different amounts of time, from a fraction of a second to a few billion years, and they release different types of radiation and different amounts of energy.
- C) They live for different amounts of time. Some live for a fraction of a second. Some live longer – up to a few billion years. Some release different types of radiation, and others release different amounts of energy.
- D) They live for a very long time and release different amounts of energy.

Modern / Influential Thinkers

This passage is adapted from Albert Camus's Nobel Prize Lecture, given on December 10, 1947. Used with permission from Gallimard. © Éditions Gallimard.

Every man, and for stronger reasons, every artist, wants to be recognized. So do I. [71] But I have not been able to learn of your decision without comparing its repercussions to what I really am. A man almost young, rich only in his doubts and with his work still in progress, accustomed to living in the solitude of work or in the retreats of friendship: how would he not feel a kind of panic at hearing the decree that transports him all of a sudden, alone and reduced to himself, to the center of a glaring light?

For myself, I cannot live without my art. But I have never placed it above everything. If, on the other hand, I need it, it is because it cannot be separated from my fellow men, and it allows me to live, such as I am, on one level with them. [72] They are a means of stirring the greatest number of people by offering them a privileged picture of common joys and sufferings. It obliges the artist not to keep himself apart; it subjects him to the most humble and the most universal truth....The artist forges himself to the others, midway between the beauty he cannot do without and the community he cannot tear himself away from. That is why true artists [73] scorn nothing, oblige themselves to understand and judge not. And if they have to take sides in this world, they can perhaps side only with that society in which, according to Nietzsche's great words, not the judge but the creator will rule, whether he [74] be a worker or an intellectual.

None of us is great enough for such a task. [75] Still, some of us are created just for this. But in all circumstances of life, in obscurity or temporary fame, cast in the irons of tyranny or for a time free to express himself, the writer can win the heart of a living community that will justify him, on the one condition that he will accept to the limit of his abilities the two tasks that constitute the greatness of his craft: the service of truth and the service of liberty. Because his task is to unite the greatest possible number of people, his art must not compromise with lies and servitude which, wherever they rule, breed solitude. Whatever our personal weaknesses may be, the nobility of our craft will always be rooted in two commitments, difficult to maintain: the refusal to lie about what one knows and the resistance to oppression.

(continued on next page)

71. **But I have not been able to learn of your decision without comparing its repercussions to what I really am.**

- A) NO CHANGE
- B) But I have not been able to learn of your decision, without comparing its repercussions to what I really am.
- C) But I have not been able to learn of your decision; without comparing its repercussions to what I really am.
- D) But I have not been able to learn of your decision without, comparing its repercussions to what I really am.

72. **They are**

- A) NO CHANGE
- B) These are
- C) Those are
- D) It is

73. **scorn nothing, oblige themselves to understand and judge not.**

- A) NO CHANGE
- B) scorn nothing, obliging themselves to understand, and judge not.
- C) scorn nothing, oblige themselves to understand, and judge not.
- D) scorn nothing, oblige themselves to understand and judging not.

74. **be**

- A) NO CHANGE
- B) is
- C) will be
- D) was

75. **The author is considering adding this sentence here. Should it be added?**

Still, some of us are created just for this.

- A) Yes, because it emphasizes the author's passion on the subject.
- B) Yes, because it supports the opening paragraph sentence.
- C) No, because it does not support the opening paragraph sentence.
- D) No, because it is redundant.

[76] At the same time, after having outlined the nobility of the writer's craft, I should have put him in his proper place....Who after all this can expect from him complete solutions and high morals? Truth is mysterious, elusive, always to be conquered. Liberty is dangerous, as hard to live with as it is elating. We [77] must had marched toward these two goals, painfully but resolutely, certain in advance of our failings on so long a road. [78] What writer would from now on in good conscience dare set himself up as a preacher of virtue? For myself, I must state once more that I am not of this kind. I have never been able to renounce the light, the pleasure of being, and [79] the freedom I got to have. But although this [80] neuralgia explains many of my errors and my faults, it has doubtless helped me toward a better understanding of my craft. It is helping me still to support unquestioningly all those silent men who sustain the life made for them in the world only through memory of the return of brief and free happiness.

This passage has been excerpted and adapted from the original, including minor punctuation changes, spelling changes, and other modifications that have not substantially changed content or intent.

76. **At the same time,**

- A) NO CHANGE
- B) As a result,
- C) For example,
- D) For this reason,

77. **must had marched**

- A) NO CHANGE
- B) must march
- C) are being marched
- D) were marching

78. **Which of the following choices represents the clearest and most concise way to convey all of the information in the sentence?**

What writer would from now on in good conscience dare set himself up as a preacher of virtue?

- A) NO CHANGE
- B) What writer would from now on in good conscience dare set him up as a preacher of virtue?
- C) Dare tell, what writer would from now on set himself up as a preacher in good conscience of virtue?
- D) What writer would dare a preacher of virtue from now on to set himself up in good conscience?

79. **Which of the following choices best matches the tone of the passage?**

the freedom I got to have.

- A) NO CHANGE
- B) the freedom in which I grew up.
- C) the freedom to do what I want when I want.
- D) the freedom of so much stuff.

80. **neuralgia**

- A) NO CHANGE
- B) nuisance
- C) novelty
- D) nostalgia

Quantitative Reasoning

There are 40 questions in this section. You have 45 minutes to complete this section.

Read and answer each question carefully. Calculators are NOT permitted during the math portion of this exam. Figures are NOT necessarily drawn to scale. You may use any of the following formulas to help you in your calculations:

Math Formulas

Area of a circle = πr^2 , where r is the radius of the circle

Circumference of a circle = $2\pi r$, where r is the radius of the circle

There are 360 degrees in a circle.

There are 2π radians in a circle.

Volume of a sphere = $\frac{4}{3}\pi r^3$, where r is the radius of the sphere

Surface area of a sphere = $4\pi r^2$, where r is the radius of the sphere

Area of a rectangle = length \times width

Area of a triangle = $\frac{1}{2}$ (base \times height)

The sum of the measures of the interior angles of a triangle is 180° .

Pythagorean theorem (for a right triangle): If a , b , and c are the side lengths of the triangle, and c is the hypotenuse, then $a^2 + b^2 = c^2$.

Trigonometry:

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

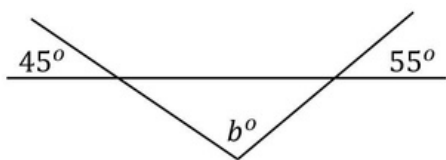
$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

30° – 60° – 90° triangles have side lengths in a ratio of $1 : \sqrt{3} : 2$, corresponding to their opposite angle

45° – 45° – 90° triangles have side lengths in a ratio of $1 : 1 : \sqrt{2}$, corresponding to their opposite angle

81. What is the value of b in the figure below? (Note: The figure is not necessarily drawn to scale.)



- A) 70
- B) 75
- C) 80
- D) 90

82. A scientist is creating a two-chemical solution from the following different chemical substances: Chemical A, Chemical B, Chemical C, and Chemical D. Chemical A can be mixed with any chemical except Chemical C. Chemical C can only be mixed with Chemical D. Which of the following **MUST** be true?

- I. Chemical A and Chemical B can be mixed.
- II. Chemical B and Chemical D can be mixed.
- III. Chemical B and Chemical C can be mixed.

- A) I only
- B) II and III only
- C) I and III only
- D) I, II, and III

83. Which point (x, y) is the solution to the following system of equations?

$$\begin{aligned}y &= -2x + 5 \\ 3x + 2y &= 9\end{aligned}$$

- A) $(-1, 6)$
- B) $(0, 5)$
- C) $(1, 3)$
- D) $(2, 1)$

84. If $\#$ is defined such that $x \# y = 2x - 3y$, which of the following is equivalent to $(-2) \# 2$?

- A) -12
- B) -10
- C) -2
- D) 2

85. A wedding reception has 16 round tables and is set up for 126 guests. After the guests are all seated, every table is filled except for one, which has two open spaces. How many chairs are at each table? (Note: each table has the same number of chairs.)

- A) 7 chairs
- B) 8 chairs
- C) 9 chairs
- D) 10 chairs

86. A student goes to a job fair. At the job fair, 27 of the companies are offering summer internships, while 42 of the companies are offering part-time jobs. (No company is offering both summer internships and part-time jobs.) If, by the time the student shows up, 3 of the companies offering summer internships have filled all their positions, what is the ratio of companies still offering summer internships to companies offering part-time jobs?

- A) 3 : 5
- B) 4 : 7
- C) 5 : 7
- D) 9 : 14

87. What is the third term in the following sequence?

$1, \frac{1}{4}, ?, \frac{1}{16}, \frac{1}{25}, \frac{1}{36}, \dots$

- A) $\frac{1}{9}$
- B) $\frac{1}{10}$
- C) $\frac{1}{12}$
- D) $\frac{1}{14}$

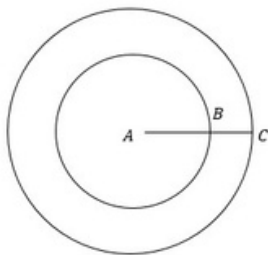
88. Which of the expressions below is equivalent to $12xy^2z^6 + 3x^2y^4z^9$?

- A) $3xyz(4yz^5 + xy^3z^6)$
- B) $3xyz^3(4yz^3 + xy^3z^6)$
- C) $3xyz^3(4yz^3 + y^3z^6)$
- D) $3xyz^3(4z^3 + xy^3z^6)$

89. The line $x = 3$ is reflected over the y -axis. What is the resulting line?

- A) $x = -3$
- B) $x = 3$
- C) $x = \frac{1}{3}$
- D) $y = 3$

90. In the diagram below, both circles have a center at A , and point B is the intersection of \overline{AC} with the smaller circle. If AB is 4 units and BC is 2 units, what is the difference in circumference between the larger circle and smaller circle? (Note: The figure is not necessarily drawn to scale.)



- A) 2π units
- B) 4π units
- C) 8π units
- D) 12π units

91. Alexander claims that he has discovered a law of geometry:

If the side lengths of a square are doubled, then its area must increase by at least 4 square units.

Which of the following is a counterexample that disproves the above statement?

- A) A square with sides of length 10 units.
- B) A square with sides of length 5 units.
- C) A square with sides of length 2 units.
- D) A square with sides of length 1 unit.

92. Which value of x does NOT yield a true statement in the inequality below?

$$|x-5| > 0$$

- A) $x = -5$
- B) $x = 0$
- C) $x = 5$
- D) $x = 6$

93. If a and b are positive integers and a is a factor of b , which of the following MUST be false?

- A) a is greater than b .
- B) $b = ak$ for some integer k
- C) b is a multiple of a .
- D) ba is an integer.

94. Which of the following is NOT a solution of the given equation?

$$x^3 - 9x = 16x$$

- A) 0
- B) 1
- C) 5
- D) All of the above are solutions of the given equation.

95. Two rectangles are similar. Which of the following must be true?

- A) Both rectangles are squares.
- B) The interior angles of each rectangle add up to 360° .
- C) One of the rectangles has a larger area than the other rectangle.
- D) The lengths of the diagonals of the rectangles are equivalent.

96. A math teacher has a “No Homework on Friday” policy. YESTERDAY Chase came home with math homework. Assuming the math teacher kept to her policy, what must be true about TODAY?

- A) Today is Tuesday.
- B) Today is Friday.
- C) Today is not Friday.
- D) Today is not Saturday.

97. A class of 12 has to divide into teams of two. How many different two-person combinations are possible in this group of 12?

- A) 12
- B) 28
- C) 66
- D) 190

98. For biology class, you are calculating how much growth medium it will take to refill the class set of agar plates. Each agar plate is a cylinder with a base that has a radius of 5 cm and a height of 2 cm. There are 30 agar plates in the class set. To refill them, you need enough growth medium to fill each plate halfway. How much growth medium, in cm^3 , will you need?

- A) $50\pi \text{ cm}^3$
- B) $500\pi \text{ cm}^3$
- C) $750\pi \text{ cm}^3$
- D) $1500\pi \text{ cm}^3$

99. For angle θ in the standard position, given that $\tan \theta$ is positive and $\cos \theta$ is negative, in which quadrant does (θ) lie?

- A) Quadrant I
- B) Quadrant II
- C) Quadrant III
- D) Quadrant IV

100. The average of the elements in a set of consecutive integers is 13.5. If the largest element in the set is 15, what is the smallest element in the set?

- A) 10
- B) 11
- C) 12
- D) 13

101. What is the volume of a cube with a surface area of 24 inches²?

- A) 4 inches³
- B) 6 inches³
- C) 8 inches³
- D) 12 inches³

102. Which of the following is NOT equivalent to $\csc \frac{5\pi}{2}$?

A) $\frac{1}{\sqrt{1-\cos^2\left(\frac{5\pi}{2}\right)}}$

B) $\frac{\sin^2\left(\frac{5\pi}{2}\right) + \cos^2\left(\frac{5\pi}{2}\right)}{\sin \frac{5\pi}{2}}$

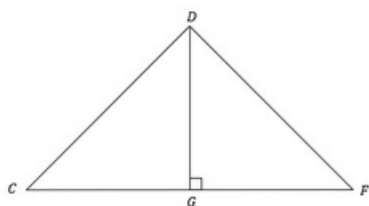
C) $\cot \pi$

D) All of the above are equivalent to $\csc \frac{5\pi}{2}$.

103. Which of the following lines is parallel to the line $x=y$?

- A) $x = 5$
- B) $y = -x$
- C) $y = \frac{1}{2}x$
- D) $y = x-3$

104. $\triangle CGD \cong \triangle FGD$. If the perimeter of $\triangle CGD$ is 12cm, and $DF = 5$ cm, what is the area of $\triangle CGF$? (Note: The figure is not necessarily drawn to scale.)



- A) 6 cm²
- B) 12 cm²
- C) 17.5 cm²
- D) 30 cm²

105. $\angle 1$ and $\angle 2$ are supplementary angles, and $\angle 2$ and $\angle 3$ are complementary angles. Given that $\angle 3$ and $\angle 4$ are vertical angles and $\angle 4$ is 40° , what is the measure of $\angle 1$?

- A) 40°
- B) 50°
- C) 130°
- D) 140°

106. Which function is undefined at $\theta = \frac{\pi}{2}$?

- A) $y = \sin \theta$
- B) $y = \cos \theta$
- C) $y = \tan \theta$
- D) $y = \cot \theta$

107. Rectangle $LMNO$ is graphed in the (x,y) -coordinate plane such that none of its sides are parallel to either axis. If the slopes of all four sides of $LMNO$ were multiplied together, which of the following would be the result?

- A) -1
- B) 0
- C) 1
- D) Undefined

108. How many integers from 1 to 300 (inclusive) satisfy the following two conditions?

1. It is evenly divisible by 15.

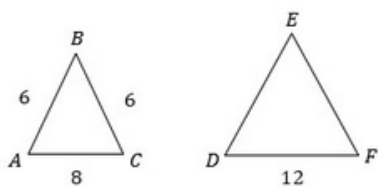
2. None of its digits are odd.

- A) 2
- B) 3
- C) 5
- D) 7

109. A store owner tells his clerk to raise all the prices by 10% each Wednesday, keep Wednesday's prices the same on Thursday, and decrease the prices by 10% each Friday. At the end of the first week, what is the price, ignoring sales tax, of a shirt that was originally \$100?

- A) \$98
- B) \$99
- C) \$100
- D) \$101

110. In the diagram below, $\triangle ABC \sim \triangle DEF$. What is the area of $\triangle DEF$? (Note: The figure is not necessarily drawn to scale.)



- A) $12\sqrt{5}$
- B) $12\sqrt{7}$
- C) $18\sqrt{5}$
- D) 72

111. What is the sum of the solutions of the following equation?

$$0 = -3x^2 + 3x + 126$$

- A) -13
- B) -1
- C) 1
- D) 13

112. If $n > 0$ and $\frac{n^y}{n^{\frac{1}{3}}} = \frac{1}{n^3}$, what is the value of y ?

- A) $-\frac{10}{3}$
- B) $-\frac{8}{3}$
- C) $\frac{8}{3}$
- D) $\frac{10}{3}$

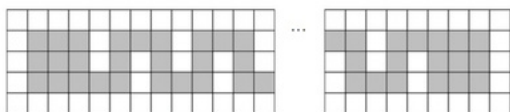
113. A chemist is preparing a solution of chemical A. She has a beaker filled with 22 liters of a solution which has 10% chemical A by volume. How much undiluted chemical A does she need to add to this beaker to reach her desired solution, which has 20% of chemical A by volume?

- A) 0.10 L
- B) 0.20 L
- C) 0.25 L
- D) 0.50 L

114. A team of researchers is designing a new Mars Rover that will be powered by a hexagonal solar panel. To make the panel more compact in travel, they plan to build six identical panels in the shape of equilateral triangles. Once on Mars, the triangles will be connected to form a regular hexagon. The researchers anticipate that the hexagon will need to have an area of exactly $24\sqrt{3}$ ft² in order to generate enough solar power for the rover to function properly. What will be the perimeter of each of the triangular solar panels they create?

- A) 4 ft
- B) $4\sqrt{3}$ ft
- C) 12 ft
- D) $12\sqrt{3}$ ft

115. A walkway is paved with tiles in the pattern shown below. The dimensions of the walkway are 5 by 75 tiles. How many dark tiles are there in the walkway?



- A) 128
- B) 133
- C) 147
- D) 151

116. How many integers between 200 and 300 (inclusive) meet both of the conditions below?

1. At least one digit is a solution to the equation $x^2 - 7x + 12 = 0$.
2. The integer is a multiple of 6.

- A) 4
- B) 5
- C) 6
- D) 7

117. A positive integer k is the square root of a number whose digits add up to 4. If $k > 5$, what is one possible value of $(k - 1)^2$?

- A) 16
- B) 25
- C) 64
- D) 100

118. A balloon is rising from the ground at a constant rate of five feet per second. An observer's point of view is 75 feet away at ground level. If θ is the angle formed by the ground and the observer's line of sight, and t is the number of seconds after the balloon leaves the ground, which of the following gives θ in terms of t ?

- A) $\theta = \tan\left(\frac{t}{15}\right)$
- B) $\theta = 75 \tan(t)$
- C) $\theta = 75 \tan^{-1}(t)$
- D) $\theta = \tan^{-1}\left(\frac{t}{15}\right)$

119. A company tracks its profits by comparing each year's profits to the previous year's profits. At the end of Year 2, its profits had increased 25% from Year 1's profits. At the end of Year 3, profits decreased by 36% of Year 2's profits. During Year 4, the company sets a goal to increase their profits to be equal to Year 1's profits. By what percent must Year 4's profits increase from Year 3's in order to reach the goal?

- A) 11%
- B) 20%
- C) 25%
- D) 39%

120. How many integers between 500 and 900 (inclusive) meet ONE OR BOTH of the conditions given in the two statements below?

1. The square root of the integer is an even integer.
2. The product of the digits is 0.

- A) 0
- B) 9
- C) 77
- D) 80

You have reached the end of the test.

