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for the SAT[®] Exam

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1 READING TEST	pg. 3
2 WRITING AND LANGUAGE TEST	pg. 20
3 MATH TEST - NO CALCULATOR	pg. 32
4 MATH TEST - CALCULATOR	pg. 40

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Reading Test

65 MINUTES, 52 QUESTIONS

See Section 1 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage or set of passages below is accompanied by several questions. Read each passage or set and choose the best answer to the corresponding questions based on what the passages and accompanying graphics (such as tables or graphs) indicate or imply.

Questions 1-10 are based on the following passage.

This passage is adapted from Jane Austen's Persuasion. Originally published in 1817. Earlier in the story, Anne turned down Captain Wentworth, the suitor she truly loved, because her family felt his social standing wasn't high enough. Eight years later, Captain Wentworth has made his fortune, and Anne realizes she still loves him but is unsure of his feelings for her.

Line Mrs. Croft left them, and Captain Wentworth, having sealed his letter with great rapidity, was indeed ready, and had even a hurried, agitated air, which showed impatience to be gone. Anne knew
5 not how to understand it. She had the kindest "Good morning, God bless you!" from Captain Harville, but from him not a word, nor a look! He had passed out of the room without a look!

She had only time, however, to move closer
10 to the table where he had been writing, when footsteps were heard returning; the door opened, it was himself. He begged their pardon, but he had forgotten his gloves, and instantly crossing the room to the writing table, he drew out a letter from under
15 the scattered paper, placed it before Anne with eyes of glowing entreaty fixed on her for a time, and hastily collecting his gloves, was again out of the room, almost before Mrs. Musgrove was aware of his being in it: the work of an instant!

20 The revolution which one instant had made in Anne, was almost beyond expression. The letter, with a direction hardly legible, to "Miss A. E.—," was evidently the one which he had been folding so hastily. While supposed to be writing only to
25 Captain Benwick, he had been also addressing her! On the contents of that letter depended all which

this world could do for her. Anything was possible, anything might be defied rather than suspense.

Mrs. Musgrove had little arrangements of her own
30 at her own table; to their protection she must trust, and sinking into the chair which he had occupied, succeeding to the very spot where he had leaned and written, her eyes devoured the following words:

"I can listen no longer in silence. I must speak
35 to you by such means as are within my reach. You pierce my soul. I am half agony, half hope. Tell me not that I am too late, that such precious feelings are gone forever. I offer myself to you again with a heart even more your own than when you almost
40 broke it, eight years and a half ago. Dare not say that man forgets sooner than woman, that his love has an earlier death. I have loved none but you. Unjust I may have been, weak and resentful I have been, but never inconstant. You alone have brought
45 me to Bath. For you alone, I think and plan. Have you not seen this? Can you fail to have understood my wishes? I had not waited even these ten days, could I have read your feelings, as I think you must have penetrated mine. I can hardly write. I am every
50 instant hearing something which overpowers me. You sink your voice, but I can distinguish the tones of that voice when they would be lost on others. Too good, too excellent creature! You do us justice, indeed. You do believe that there is true attachment
55 and constancy among men. Believe it to be most fervent, most undeviating."

The letter concluded: "I must go, uncertain of my fate; but I shall return hither, or follow your party, as soon as possible. A word, a look, will be enough
60 to decide whether I enter your father's house this

evening or never.” Such a letter was not to be soon recovered from. Half an hour’s solitude and reflection might have tranquillized her; but the ten minutes only which now passed before she was interrupted, with
 65 all the restraints of her situation, could do nothing towards tranquility. Every moment rather brought fresh agitation. It was overpowering happiness....

Later in the afternoon, Captain Wentworth arrived to walk her to her father’s door. Soon words enough
 70 had passed between them to decide their direction towards the comparatively quiet and retired gravel walk, where the power of conversation would make the present hour a blessing indeed, and prepare it for all the immortality which the happiest recollections
 75 of their own future lives could bestow. There they exchanged again those feelings and those promises which had once before seemed to secure everything, but which had been followed by so many, many years of division and estrangement. There they returned
 80 again into the past, more exquisitely happy, perhaps, in their reunion, than when it had been first projected; more tender, more tried, more fixed in a knowledge of each other’s character, truth, and attachment; more equal to act, more justified in acting.

85 And there, as they slowly paced the gradual ascent, heedless of every group around them, seeing neither sauntering politicians, bustling housekeepers, flirting girls, nor nursery-maids and children, they could indulge in those retrospections
 90 and acknowledgements, and especially in those explanations of what had directly preceded the present moment, which were so poignant and so ceaseless in interest. All the little variations of the last week were gone through; and of yesterday and
 95 today there could scarcely be an end.

1

Throughout the passage, the narrator provides insight into Anne’s character primarily by

- A) comparing Anne’s actions to those of the people she interacts with throughout the day.
- B) juxtaposing Anne’s reflections on Wentworth’s behavior with his words and actions.
- C) presenting other characters’ perspectives on Anne’s words and behavior.
- D) revealing Anne’s past feelings for Captain Wentworth as she ponders their recent conversations.

2

One significant theme of the passage developed through the narrator’s description of Wentworth is that

- A) feelings of love will fade if they are not encouraged over the years.
- B) devoted friendships rarely evolve into long-term romantic relationships.
- C) repeated appeals can persuade others to revive a past relationship.
- D) even long-dormant relationships can be rekindled under the right circumstances.

3

The primary purpose of the contrast between the actions of Captains Wentworth and Harville in the first paragraph is to

- A) demonstrate the differing manners between upper-class and lower-class men of society.
- B) reveal Anne’s theories on the two men through her analysis of their behaviors.
- C) highlight the confusion caused by Captain Wentworth’s unusual lack of manners.
- D) provide an authentic view of men’s behaviors through precise descriptions of their actions.

4

What principal effect do the words “agitated” (line 3) and “scattered” (line 15) have on the passage?

- A) They convey Wentworth’s lack of patience and care.
- B) They signal an unfortunate turn of events for Wentworth.
- C) They expose the chaotic environment of Mrs. Musgrove’s home.
- D) They reflect the impact of Wentworth’s emotions on his actions.

5

As used in line 14, “drew” most closely means

- A) plucked.
- B) gathered.
- C) framed.
- D) dragged.

6

Based on the passage, Wentworth regards his attachment as one that has

- A) been responsible for helping him form strong friendships.
- B) provided the driving force behind his actions.
- C) become more intense than typical relationships.
- D) precipitated his financial and social downfall.

7

Which lines provide the best evidence for the answer to the previous question?

- A) Lines 21–25 (“The letter...her”)
- B) Lines 34–36 (“I can...soul”)
- C) Lines 43–45 (“Unjust...plan”)
- D) Lines 51–53 (“You sink...creature”)

8

According to the passage, after Anne has read the letter, how will Wentworth know her feelings?

- A) The message she writes back to him
- B) Her father’s reaction to his arrival
- C) Her subtle hints when he arrives
- D) How she has behaved in the past

9

Which of the following lines provides the best evidence that the narrator believes Anne and Wentworth’s relationship will be more enduring now rather than if they had married eight years earlier?

- A) Lines 61–66 (“Such...tranquility”)
- B) Lines 66–67 (“Every...happiness”)
- C) Lines 69–75 (“Soon...bestow”)
- D) Lines 79–84 (“There...acting”)

10

According to the passage, Anne judges the interaction with Wentworth during their walk as

- A) promising with regards to their future as revealed by their exchange.
- B) relatively quiet and uneventful because of their lack of communication.
- C) unfair in its emphasis on placing blame for their long estrangement.
- D) difficult to endure because of his unreciprocated feelings for her.

Questions 11-21 are based on the following passage

Passage 1 was adapted from James K. Polk's message to Congress on May 11, 1846. President Polk stationed troops beyond the Nueces River and closer to the Rio Grande, territory that was claimed by both Texas and Mexico, after a failed attempt to purchase California. Months later, Mexico attacked these troops, and the president asked Congress to declare war. Passage 2 was adapted from Henry Clay's speech at the Lexington Mass Meeting on November 13, 1847. Henry Clay was a senator from Kentucky elected after the Army Bill was passed.

Passage 1

Line The strong desire to establish peace with Mexico on liberal and honorable terms, as would lead to permanent relations of the most friendly nature, induced me to seek the reopening of diplomatic
5 relations between the two countries. An envoy of the United States repaired to Mexico with full powers to adjust every existing difference. But though present on the Mexican soil by agreement between the two Governments, bearing evidence of the most friendly
10 dispositions, his mission has been unavailing. The Mexican Government not only refused to receive him, but, after a long-continued series of menaces, has at last invaded our territory and shed the blood of our fellow-citizens on our own soil...

15 Upon the earnest appeal both of the Congress and convention of Texas, I ordered an efficient military force to take a position [in Corpus Christi] "between the Nueces [River] and the [Rio Grande]." This had become necessary to meet a threatened
20 invasion of Texas, an invasion threatened solely because Texas had determined to annex herself to our Union, and it was plainly our duty to extend our protection over her citizens and soil.

The Congress of Texas declared the Rio Grande
25 to be the boundary of that Republic. Its jurisdiction had been extended and exercised beyond the Nueces. Our own Congress recognized the country beyond the Nueces as a part of our territory by including it within our revenue system. It became,
30 therefore, of urgent necessity to provide for the defense of our country. Accordingly, instructions were issued to the general in command of these troops to occupy the left bank of the Rio Grande, our exposed frontier.

35 Upon the pretext that Texas, a nation as independent as herself, thought proper to unite its destinies with our own, [Mexico] has affected to believe that we have severed her rightful territory.

We have tried every effort at reconciliation. But now,
40 Mexico has invaded our territory and shed American blood upon the American soil. She has proclaimed that hostilities have commenced, and that the two nations are now at war.

45 As war exists, and, notwithstanding all our efforts to avoid it, exists by the act of Mexico herself, we are called upon by every consideration of duty and patriotism to vindicate with decision the honor, the rights, and the interests of our country....

Passage 2

The day is dark and gloomy, like the condition
50 of our country, in regard to the unnatural war with Mexico. How did we unhappily get involved in this war? It was predicted as the consequence of the annexation of Texas to the United States. The people were told that if that event happened, war would
55 ensue. They were told that the war between Texas and Mexico had not been terminated by a treaty of peace; that Mexico still claimed Texas as a revolted province; and that, if we received Texas in our Union, we took along with her, the war existing between
60 her and Mexico. And the Minister of Mexico [Juan N. Almonte] formally announced to the Government, that his nation would consider the annexation of Texas to the United States as producing a state
65 of war. But all this was denied by the partisans of annexation. They insisted we should have no war, and even imputed to those who foretold it, sinister motives for their groundless prediction.

But, actual hostilities might have been averted by prudence, moderation, and wise statesmanship.
70 If General Taylor had been permitted to remain, where his own good sense prompted him to believe he ought to remain, at Corpus Christi; and, if a negotiation had been opened with Mexico, in a true spirit of amity and conciliation, war possibly might
75 have been prevented. But, instead of this pacific and moderate course, whilst Mr. Slidell [envoy to Mexico] was bending his way to Mexico, General Taylor was ordered to transport his cannon, and to plant them
80 within the very disputed territory, the adjustment of which was to be the object of Mr. Slidell's mission. What else could have transpired but a conflict of arms?

Thus, the war commenced, and the President
85 appealed to Congress. [The Army Bill] was proposed to raise 50,000 volunteers, and a preamble was

inserted falsely attributing the commencement of the war to the act of Mexico. I have no doubt of the patriotic motives of those who, after struggling to divest the [Army Bill] of that flagrant error, found themselves constrained to vote for it. But I must say that no earthly consideration would have ever tempted or provoked me to vote for a bill, with a palpable falsehood stamped on its face.

95 This is no war of defense, but one unnecessary and of offensive aggression. It is Mexico that is defending her fire-sides, her castles and her altars, not we.

11

The repetition of “friendly” in the first paragraph of Passage 1 has the main effect of creating

- A) an unconcerned tone that shows Polk’s shortsighted perspective toward Mexico.
- B) a reasonable tone that reveals Polk’s apparent motive for finally sending troops.
- C) an optimistic tone that illustrates Polk’s confidence that violence will not occur.
- D) a conversational tone that reflects Polk’s appeal to an unsophisticated audience.

12

One of Polk’s central claims in Passage 1 is that the annexation of Texas had the effect of

- A) disrupting the cordial relationship between the U.S. and Mexico up until that point.
- B) resolving the dispute between Texas and Mexico regarding ownership of territory.
- C) forcing Mexico to acknowledge that Texas was an independent nation.
- D) extending the U.S. boundary beyond the Nueces River into land claimed by Mexico.

13

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 15–18 (“Upon...Grande”)
- B) Lines 24–29 (“The Congress...system”)
- C) Lines 29–31 (“It...country”)
- D) Lines 35–38 (“Upon...territory”)

14

In Passage 2, Clay implies that legislators’ consideration of the proposal to annex Texas had been clouded by the

- A) pre-existing tensions between the United States and Mexico.
- B) moral issues inherent in adding territory to an existing country.
- C) presentation of positions that were fundamentally dishonest.
- D) dismissive language toward Mexico’s claim in the text of the proposal.

15

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 51–55 (“How...ensue”)
- B) Lines 55–60 (“They...Mexico”)
- C) Lines 60–64 (“And...war”)
- D) Lines 64–68 (“But...prediction”)

16

As used in line 85, “proposed” most nearly means

- A) openly pledged.
- B) formally suggested.
- C) generally arranged.
- D) clearly expected.

17

In Passage 2, Clay indicates that under the Army Bill, the national government had managed to

- A) compel new soldiers to join the federal army.
- B) eliminate untruthful language from the legislation.
- C) legalize a claim excusing the U.S. of blame for the war.
- D) confirm the patriotism of the members of Congress.

18

In the context of Clay’s argument, lines 91–94 (“But I...face”) serve primarily to

- A) emphasize that he shares the patriotic values held by other members of Congress.
- B) offer an explanation for his claims about the history of U.S. aggression in Mexico.
- C) restate an opinion on diplomacy that he provided earlier in his speech.
- D) argue that legislators’ patriotism cannot justify their support for dishonesty.

19

Which choice best names a distinction in how Polk and Clay characterize the Mexican-American War?

- A) Polk characterizes it as necessarily protective, while Clay characterizes it as fundamentally offensive.
- B) Polk regards it as essential to defend the United States, while Clay regards it as threatening the safety of American citizens.
- C) Polk characterizes it as aggressive in its nature, while Clay characterizes it as usurping another country’s territory.
- D) Polk views it as personally challenging to his presidential authority, while Clay views it as unwisely exceeding executive power.

20

Clay would most likely fault the “exposed frontier” (line 34) proposed by Polk in Passage 1 for being

- A) insignificant, since the Rio Grande forms a natural barrier to shield the U.S. from invasion.
- B) illegal, since Polk did not seek permission from Congress before annexing Texas.
- C) unethical, since the diplomatic envoy agreed to relinquish the land to Mexico.
- D) misleading, since it is part of the territory whose ownership remains unresolved.

21

Which choice best describes a key difference in how Polk and Clay make use of the concept of patriotism?

- A) Polk uses patriotism to gain support for his diplomatic approach to Mexico, whereas Clay employs it to target the guilt felt by members of Congress over approving the war.
- B) Polk uses patriotism to legitimize the U.S.’s acquisition of disputed territory, whereas Clay supports the appeal to Congress’ patriotism to pass the Army Bill.
- C) Polk uses patriotism to inspire volunteers to join the military, whereas Clay asserts that the volunteers’ patriotism is questionable.
- D) Polk uses patriotism to justify the declaration of war, whereas Clay presents patriotism as a means of manipulation used to gather support for the war.

Questions 22-31 are based on the following passage

This passage is adapted from Jan Hoole, “Why It’s So Hard to Unravel the Mysterious Origins of Domestic Horses,” ©2018 by Jan Hoole.

Line Much is still unknown about how, and where, horses were first domesticated. Experts long thought that all modern horses were probably descended from a group of animals that belonged to the Botai
5 culture, which flourished in Kazakhstan around 5,500 years ago. But now, a new study published in *Science* suggests that the Botai horses were not the ancestors of our modern equine companions — and challenges what we thought we knew about
10 one of the only “wild” horse species left today: the Przewalski’s horse. There are now very few, if any, genuinely wild species of horse. Scientists have known that Przewalski’s horse is not an ancestor of modern domestic horses since studies were carried
15 out on equine mitochondrial DNA in 2002. But now it seems that far from being the last remnants of a truly wild horse species, the Przewalski’s horse is the feral descendant of the domesticated Botai horses.

Led by Charleen Gaunitz from the Natural
20 History Museum of Denmark, the study’s 47 authors sequenced the genomes of 42 ancient horses from Kazakhstan and various sites in Eurasia and compared them with published data from 46 ancient and modern horses. Their genomic analysis showed
25 that Przewalski’s horse and the most ancient horses from Eurasia were not genetically similar, as might be expected. In fact, the Przewalski’s horses were found to be most closely related to the Botai horses, while all modern domesticated horses belong to a
30 separate group. If this is right, well then what we thought we knew about wild and domestic horses is turned on its head.

But one of the difficulties of drawing conclusions from the DNA of a modern Przewalski’s horse is that
35 the species suffered a massive decline in the first half of the 20th century. The last one seen in the wild was spotted back in the 1960s, and it was declared extinct in the wild. A captive breeding program began, and all of today’s Przewalski’s horses trace
40 their ancestry back to 13 individuals, which were in zoos around the world at the time. *Equus ferus przewalskii* was reintroduced to the wild at the end of the 20th century. Gaunitz and her colleagues

suggest that there has been considerable invasion
45 of modern horse genes into the species. But the team was fortunate enough to have DNA from one Przewalski’s horse specimen dating to the 19th century, before the population collapse occurred. This allowed them to show that the Botai horses
50 were direct ancestors of another breed of horse from the early bronze age, called Borly4, and that these Borly4 horses were the direct ancestors of the pre-collapse Przewalski’s horse.

This leaves the origins of modern horses
55 shrouded in mystery. It seems they are descended from a completely different group of horses, but the genomic analysis suggests that they managed to interbreed with the Botai horses to a small degree as the population expanded across the continental
60 landmass. The authors of the study suggest that Hungary, in Eastern Europe, might be one of a considerable number of places where the ancestors of modern horses were first domesticated because the oldest horse remains were recovered from there.
65 Earlier studies have suggested Iberia, North Africa, and Eurasia as possible sites of domestication. It seems likely that horses—like dogs—were independently domesticated in a number of different places and over a long period of time.

70 Scientists—and horse owners—often wonder exactly how horses were domesticated. Researchers have suggested that they were originally prey animals that humans began to protect and breed to ensure a steady supply of meat. Over time,
75 their keepers began to use them for milk, hides, and transport. Alternatively, they may have been deliberately brought under human control to help with the hunting of wild horse herds. Whatever the method, it now seems likely that the very robust
80 horses of the Botai were not the ultimate ancestors of the delicate modern thoroughbred racehorse, or of the heavy draft horses that were the staple workforce of agriculture in many parts of the world until the beginning of the 20th century.

85 The Botai horse genes are preserved only in the small and precarious populations of Przewalski’s horse, which struggle to survive in the areas of the Gobi Desert and the mountain steppe regions of Mongolia where they were reintroduced. So why,
90 then, is it important to continue to ensure the survival of this species? According to Gaunitz, “They are possibly the last repository of ancient horse DNA.”

22

The main purpose of the passage is to

- A) explore the importance of genetic research to establish a connection between modern and ancient horses.
- B) discuss a study concerning the genetic relationship between ancient and modern horses.
- C) explain research into the genetic changes that horses underwent as they became domesticated.
- D) provide empirical evidence contrasting the genetic makeup of Przewalski's horses and Botai horses.

23

According to the passage, the discovery that the Przewalski's horse is the descendant of the Botai horse is important because the Botai horse was

- A) thought to be one of the last truly wild horse species left today.
- B) supposedly domesticated in Eastern Europe where Przewalski's horses are not found.
- C) previously considered the ancestor of modern-day thoroughbreds and agricultural draft horses.
- D) believed to be extinct until its connection to the Przewalski's horse was established.

24

Which choice best describes how Gaunitz's team achieved the results discussed in the second paragraph (lines 19-32)?

- A) The team used a previously published genome sequence of an ancient horse to locate the genes associated with wild horses, compared those genes to the same genes in 42 horses, and identified the genes not present in domestic horses.
- B) The team sequenced the genomes of 42 breeds of horses from around the world, compared those genomes with one another, and identified the genes that appear to have changed as a result of domestication.
- C) The team sequenced the genomes of several geographically diverse horses of ancient origin, compared them to previously researched genome sequences of domestic and ancient horses, and concluded that modern horses are not descended from known ancient horses.
- D) The team sequenced the genomes of several breeds of ancient horses from two locations, compared those genomes to the genomes of domestic horses from the same regions, and identified which genes appear to be geographically specific.

25

The author includes the phrase "well then" (line 30) most likely to

- A) transition to a discussion concerning the evolution and development of modern Przewalski's horses.
- B) promote a tentative theory about the genetic composition of Botai horses.
- C) emphasize that a relationship between ancient and modern horses has been established.
- D) call attention to the unexpected results of research involving ancient and modern horses.

26

As presented in the passage, the researchers' explanation for including only one Przewalski's horse's genes in the study is based on the assumption that

- A) modern Przewalski's horses do not share the same genome sequence as that found in early Przewalski's horses.
- B) Przewalski's horses are very rare, and many of those that remain are the result of inbreeding in the wild in the early 18th century.
- C) only one specimen of the ancient Botai horse that shares the same genome sequence of the modern-day Przewalski's horse has been discovered.
- D) interbreeding with ancient Botai horses resulted in changes to the Przewalski's horse's genome sequence.

27

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 27–30 (“In fact...group”)
- B) Lines 36–38 (“The last...wild”)
- C) Lines 43–45 (“Gaunitz...species”)
- D) Lines 56–60 (“but...landmass”)

28

As used in line 62, “considerable number” most nearly means

- A) significant sum.
- B) substantial amount.
- C) comprehensive measure.
- D) reasonable supply.

29

The passage suggests that scientists would agree with which statement about the domestication of horses?

- A) It developed in response to mankind's survival needs.
- B) It led to the evolution of the modern work horse.
- C) It most likely began in Eastern Europe.
- D) It was the result of horses' docile temperament.

30

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 55–60 (“It seems....landmass”)
- B) Lines 60–64 (“The authors...there”)
- C) Lines 65–69 (“Earlier...time”)
- D) Lines 71–76 (“Researchers...transport”)

31

The author most likely includes the quotation in the last sentence of the passage to

- A) refute previously discussed research results about ancient and modern horses.
- B) indicate a possible reason for the future extinction of the Przewalski's horse.
- C) point out that researching ancient horses will be difficult without access to their genetic material.
- D) illustrate the need for developing programs to preserve endangered animals by creating wildlife sanctuaries.

Questions 32-41 are based on the following passage and supplementary material.

This passage and accompanying figures are adapted from Sydney MacLeod, Michael Reynolds, and Hugo Lehmann, "The Mitigating Effect of Repeated Memory Reactivations on Forgetting." ©2018 by Nature Partner Journals' Science of Learning.

Line Relatively little is understood about how exactly
the human memory works, why some memories
persist while others simply fade. Brain research
suggests that new memories go through a period
5 where the memory is likely to change (a labile
state) before becoming a lasting (consolidated)
memory. Scientists previously believed that—
once consolidated—a memory became resistant
to change, but recent findings have strongly
10 established that a consolidated memory can re-
enter a labile state through a process called memory
reactivation, a deliberate recalling of a long-term
memory. During this state, the memory can be
updated or modified before being reconsolidated.

15 It's unclear, however, to what extent this process can
benefit memory retention or protect an individual
from memory loss due to brain injury or disease.

Dr. Sydney MacLeod and her colleagues from
the Psychology Department at Trent University were
20 interested in how reactivation could help strengthen
memory, so they designed an experiment to test it.
For the study, the team selected 26 images depicting
landscapes, animals, and household objects.

Participants were told they would view a series of
25 these images with the goal of remembering as much
about each one as possible. Each participant was
then randomly assigned to 1 of 4 different groups:
descriptive reactivation, component reactivation,
distractor, and control.

30 The descriptive group received three
reactivations of their memory; in each instance,
participants were asked to describe the images
viewed in as much detail as they could recall. The
component group also received three reactivations
35 by asking participants to recall components, or
parts, of the images, such as how many images
included animals, landscapes, and household
objects. Unlike the descriptive group, this group's
reactivations did not require a detailed description
40 of the images. The distractor group received three
questions related to the experiment, which were

not intended to trigger their memory of the images
but to provide a reference point during the recall
test at the end. This group's participants were
45 asked to specify the date and time they completed
the first part of the experiment; to identify the form
the experimenter went through with them; and to
describe the procedure. The control group did not
receive any questions between viewing the images
50 and completing the recall test; this was intended to
provide the typical rate of forgetting.

Additionally, participants were randomly assigned
to one of three retention intervals: 1 hour, 9 days,
and 28 days. Those in the 1-hour group were given
55 a 10-minute break and were provided reading
materials. After the break, the participants were
asked to respond to three questions with 10-minute
breaks in between each question. The control
group read for 50 minutes before being questioned.
60 Participants in the 9-day group were allowed to leave
the lab after viewing the images and were given
three questions to respond to electronically, evenly
spaced throughout the nine days. On day 9, they
returned to the lab for the recall test. Participants in
65 the control group were not provided with questions,
only the recall test. Participants in the 28-day group
followed the same pattern as the 9-day group, but
with more time in between questions.

When Dr. MacLeod and her colleagues analyzed
70 the results, they found—as predicted—that the
participants in the descriptive and component
groups remembered significantly more images than
the participants in the distractor and control groups.
Because longer time intervals often lead to a higher
75 likelihood of forgetting, researchers also predicted
that reactivation would significantly decrease the
likelihood of forgetting during the 28-day interval.
Notably, they found pronounced memory retention in
both the descriptive and the component groups for
80 this time interval, as well.

The team's findings suggest that reactivation
of memories reduces the likelihood of forgetting
them. Because both descriptive and component
reactivation fairly equally improved memory
85 retention, Dr. MacLeod and her colleagues
concluded that a detailed description of a memory is
not crucial: either technique will strengthen memory,
making someone more likely to correctly remember
details for longer. Although further research is
90 needed to determine how these results might

help individuals with memory issues, Dr. MacLeod believes these findings could prove instrumental in helping anyone to reduce memory loss.

Figure 1

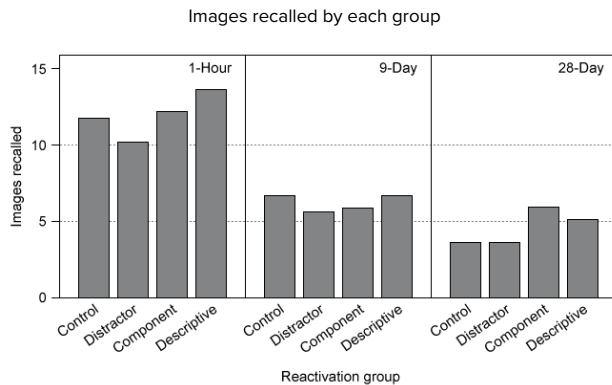
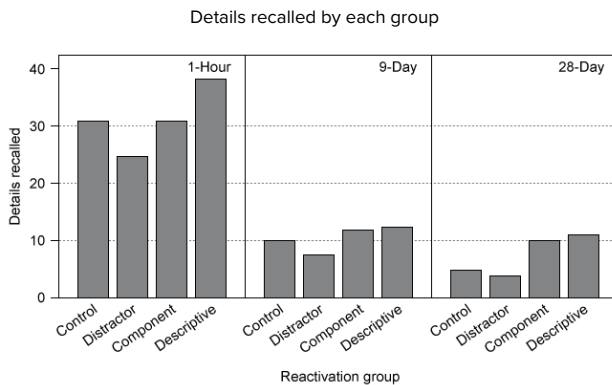


Figure 2



32

The main purpose of the passage is to

- A) compare studies about ways of reactivating people's memories.
- B) present ways that memory reactivation could help those with memory-related illnesses.
- C) examine a study about methods of memory reactivation and retention.
- D) highlight the lack of research into specific memory processes.

33

According to the passage, the brain stores new memories and related information

- A) only after they have become consolidated.
- B) after they have gone through a labile state.
- C) in a way that becomes resistant to alteration.
- D) only once key details have been reconsolidated.

34

As used in line 50, the word "intended" most nearly means

- A) determined.
- B) designed.
- C) reserved.
- D) destined.

35

As used in line 51, "typical" most nearly means

- A) classic.
- B) predictable.
- C) symbolic.
- D) representative.

36

Which choice best supports the claim that there are important similarities between how the human memory responds to detailed descriptions of an image and how it responds to related features of that image?

- A) Lines 30–33 (“The descriptive...recall”)
- B) Lines 33–38 (“The component...objects”)
- C) Lines 69–73 (“When...groups”)
- D) Lines 89–93 (“Although...loss”)

37

It can reasonably be inferred from the passage that the results of MacLeod’s study showed that

- A) both deliberate reactivation and independent recall of memories involve equal amounts of brain activity.
- B) memory retention can benefit from deliberate reactivation on a periodic basis.
- C) independent recall of memories was more likely to be preferred over deliberate reactivation.
- D) no method of reactivation resulted in measurable improvement of recall.

38

The most pronounced memory retention after 28 days would most likely be observed in scenarios where the research subject

- A) is allowed to choose a preferred reactivation method.
- B) experiences reactivation before taking a free-recall test.
- C) participates only in a free-recall test without answering questions.
- D) has answered unrelated questions and then takes the free-recall test.

39

Which lines provide the best evidence for the answer to the previous question?

- A) Lines 38–40 (“Unlike...images”)
- B) Lines 64–66 (“Participants...test”)
- C) Lines 66–68 (“Participants...questions”)
- D) Lines 74–80 (“Because...well”)

40

According to figure 1, the number of images recalled 28 days after answering questions about specific amounts of elements in the images is approximately

- A) 4
- B) 6
- C) 10
- D) 12

41

According to figure 1 and figure 2, the highest number of items recalled by any of the groups was in

- A) day 28 when the component group was given a free-recall test about the number of images remembered.
- B) hour 1 when the descriptive group was given a free-recall test about the number of images remembered.
- C) day 9 when the control group was given a free-recall test about the number of details remembered.
- D) hour 1 when the descriptive group was given a free-recall test about the number of details remembered.

Questions 42-52 are based on the following passage and supplementary material.

This passage is adapted from NASA's "Astronomers Release Most Complete Ultraviolet-Light Survey of Nearby Galaxies." Originally published in 2018 by NASA.

Line Past observations show that galaxies merge in the local universe and that big galaxies accrete their satellites, meaning they accumulate particles into a massive object through their gravitational pull.
 5 This has led scientists to question whether big galaxies form only by successive mergers of smaller building blocks (the hierarchical formation scenario), or through larger galaxies' objects merging together, causing them to become less massive
 10 (downsizing formation scenario). Capitalizing on the unparalleled sharpness and spectral range of NASA's Hubble Space Telescope, an international team of astronomers is conducting further research and releasing the most comprehensive, high-resolution
 15 ultraviolet-light survey of nearby star-forming galaxies to help better understand the intricacies of galaxy formation.

Researchers combined new Hubble observations with archival Hubble images for 50 star-forming
 20 spiral and dwarf galaxies in the local universe. They hoped to provide a large-scale and extensive resource for understanding the complexities of star formation and galaxy evolution. The project, called the Legacy ExtraGalactic UV Survey
 25 (LEGUS), has amassed star catalogs for each of the LEGUS galaxies and star cluster catalogs for 30 of the galaxies, as well as images of the galaxies themselves. According to survey leader Daniela Calzetti of the University of Massachusetts, Amherst,
 30 no star cluster or stellar catalog has previously existed that included observations in ultraviolet light: a major tracer of the youngest and hottest star populations and tool to derive the ages of stars and obtain a complete stellar history.

35 How stars form is still a vexing question in astronomy. Much of the light from the universe originates from stars, and yet little is understood about how stars form, so the research team carefully selected the LEGUS targets from among 500
 40 galaxies, compiled through the results of ground-based surveys, located between 11 million and 58 million light-years from Earth. Team members chose the galaxies based on their mass, star-formation rate, and abundances of elements that are heavier than
 45 hydrogen and helium.

The catalog of ultraviolet objects collected by NASA's Galaxy Evolution Explorer (GALEX) spacecraft also helped lay the path for the Hubble study. The team started with this catalog and then used
 50 Hubble's Wide Field Camera 3 and the Advanced Camera for Surveys to gather additional information over a one-year period. They snapped visible- and ultraviolet-light images of the galaxies and their most massive young stars and star clusters. The
 55 researchers then added archival visible-light images to provide a complete picture. The star cluster catalogs contain approximately 8,000 young clusters that range in age from 1 million to roughly 500 million years old. These stellar groupings are as much as 10
 60 times more massive than the largest clusters seen in our Milky Way galaxy. The star catalogs comprise approximately 39 million stars that are at least five times more massive than our Sun. Stars in the visible-light images are between 1 million and several
 65 billion years old; the youngest stars, those between 1 million and 100 million years old, shine prominently in ultraviolet light.

In addition to this gathered data, researchers provided computer models to help astronomers
 70 interpret the data in the star and cluster catalogs, further enabling them to investigate how star formation occurred in one specific galaxy or a set of galaxies. With such models, they could also correlate the properties of the galaxies with their
 75 star formation and derive the star-formation history of the galaxies; the ultraviolet-light images may even assist astronomers in identifying progenitor stars of supernovas.

Much like sociologists who study specific areas
 80 to better understand the population as a whole, this data could further prove integral in helping astronomers place the universe under a microscope to discover what connects star formations and the major structures, such as spiral arms, that make up
 85 a galaxy. By seeing galaxies in very fine detail—the star clusters—while also showing the connection to the larger structures, researchers are trying to identify the physical parameters underlying this ordering of stellar populations within galaxies.
 90 Getting the final link between gas and star formation is key for understanding galaxy evolution.

Team member Linda Smith of the European Space Agency (ESA) and the Space Telescope Science Institute added that researchers are also
 95 looking at the effects of the environment, particularly

with star clusters, and how their survival is linked to the environment around them. The LEGUS survey will help astronomers interpret views of galaxies in the distant universe, where the ultraviolet glow from young stars is stretched to infrared wavelengths due to the expansion of space. The data in the star and cluster catalogs of these nearby galaxies will help pave the way for what we see with NASA's upcoming

infrared observatory, the James Webb Space Telescope, which will complement the LEGUS views, developed in partnership with ESA and the Canadian Space Agency (CSA). Using both Webb Space Telescope and LEGUS, astronomers anticipate the ability to penetrate dusty stellar cocoons to reveal the infrared glow of infant stars and gain insight into how star formation propagates over a galaxy.

Sampling of Galaxy Data Acquired by LEGUS

LEGUS Target (galaxy)	Location	Distance (Mpc; light years)	Morphology (structure)*	Brightness**
NGC5949	Draco constellation	14.3; 44 million	SA	bc
NGC1566	Dorado constellation	13.2; 40 million	SAB	bc
UGC5340	Leo constellation	12.7; 39 million	Im	n/a
NGC628	Pisces constellation	9.9; 32 million	SA	c
NGC2500	Lynx constellation	10.1; 30 million	SB	d
NGC4485	Canes Venatici constellation	7.6; 24 million	Im	n/a
NGC1705	Pictor constellation	5.1; 17 million	SA0	n/a
NGC5253	Centaurus constellation	3.15; 12 million	Im	n/a

Adapted from LEGUS Team's survey results

Types of spiral galaxies:

SA/SA0 = unbarred; **SAB** = weakly barred; **SB/SB0** = barred; **Im** = highly irregular.

* The Milky Way Galaxy is a barred spiral galaxy.

** Where a is the brightest and d is the least bright .

42

Over the course of the passage, the main focus shifts from

- A) an outline of the data needed to a summary of the data gathered by the LEGUS survey.
- B) a discussion of how scientists gathered data using the LEGUS survey to an overview of how this data could be used.
- C) observations of past galaxies to a debate regarding the LEGUS survey's significance to astronomy.
- D) a description of the LEGUS survey to an analysis of controversial ways to supplement its data.

43

According to the passage, what can reasonably be inferred about the information concerning galaxies that was available before the LEGUS project?

- A) It was made up of imprecise images.
- B) It was ground-based, providing only galaxy mass.
- C) It focused on only targeted older galaxies.
- D) It was limited and scattered.

44

Which lines best support the belief that the LEGUS survey's observations using ultraviolet light will provide a more complete vision of the universe?

- A) Lines 18–23 (“Researchers...evolution”)
- B) Lines 23–28 (“The project...themselves”)
- C) Lines 28–34 (“According...history”)
- D) Lines 35–40 (“How...galaxies”)

45

As used in line 25, “amassed” most nearly means

- A) stockpiled.
- B) hoarded.
- C) compiled.
- D) assimilated

46

In the context of the research discussed in the passage, the GALEX spacecraft is considered particularly instrumental in galaxy research because it allowed researchers to

- A) create the foundation for the LEGUS survey.
- B) select galaxies based on a variety of factors.
- C) catalogue the complexities of galaxy formation and evolution.
- D) begin creating assistive computer models for astronomers.

47

As used in line 41, “surveys” most nearly means

- A) outlines.
- B) analyses.
- C) samples.
- D) inventories.

48

Based on the passage, the authors would most likely indicate that observing galaxies in detail to gain insight about galaxy evolution is

- A) helpful.
- B) impossible.
- C) unimportant.
- D) sociological.

49

Which lines provide the best evidence for the answer to the previous question?

- A) Lines 61–67 (“The star...light”)
- B) Lines 79–89 (“Much like...galaxies”)
- C) Lines 92–97 (“Team...them”)
- D) Lines 97–101 (“The LEGUS...space”)

50

The reference to “dusty stellar cocoons” in line 109 primarily serves to

- A) emphasize how little is known about the evolution of galaxies.
- B) indicate the self-contained and isolated nature of galaxy maturation.
- C) illustrate that the study of astronomy is still in its infancy.
- D) highlight the lack of knowledge about star formation.

51

According to the figure, which of the following choices is most like the Milky Way galaxy?

- A) NGC5949
- B) NGC1566
- C) NGC2500
- D) NGC1705

52

Astronomers estimate that NGC4490 is approximately 25 million light years away from the Earth’s galaxy. Recently, the Hubble provided new pictures of NGC4490 interacting with a nearby galaxy. Based on the figure, in which constellation can NGC4490 be found?

- A) Pisces
- B) Lynx
- C) Cannes Venatici
- D) Pictor

STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.

No Test Material On This Page

Writing and Language Test

35 MINUTES, 44 QUESTIONS

See Section 2 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage below is accompanied by several questions. Consider how the passages might be revised to improve the expression of ideas or how they might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that should be considered as you make revising and editing decisions.

Some questions will direct you to an underlined portion of the passage. Others will direct you to a point in a passage or ask you to think about the whole passage. Choose the answer to each question that most effectively improves the quality of writing or adheres to standard written English conventions. Many questions include a “NO CHANGE” option. Choose that option when the best choice is to leave the relevant underlined portion of the passage as it is.

Questions 1-11 are based on the following passage.

In 1925, after her husband’s death, 45-year-old Georgia Douglas Johnson was able to pursue her writing without facing any objections. During their marriage, Johnson had **1** lacked the support of her husband who wanted her to devote her time to being a homemaker. For the rest of her life, Johnson used her writing as a form of activism, protesting the practice of lynching and **2** subverted the idea of male superiority. In fact, Johnson was a living example of anti-feminist prejudice because, despite being instrumental in founding the Harlem Renaissance Movement, her contemporaries never considered her a key voice in that movement.

1

Which choice best maintains the style and tone of the passage?

- A) NO CHANGE
- B) been blown off by
- C) gotten the cold shoulder from
- D) no backing from

2

- A) NO CHANGE
- B) subverting
- C) to subvert
- D) the subversion of

Johnson lived **3** enclosed by ongoing inequality in the United States in the form of segregation, and throughout her **4** career. She wrote stories that didn't have happy endings because they reflected the reality of pain and suffering she experienced firsthand. In her dramatic works, Johnson wrote about racial violence—a subject many people didn't feel was appropriate for a woman to address. Her plays often created a feeling of hopelessness that **5** discouraged: producers from staging her work. Many of her plays dealt with the theme of lynching, a practice that Johnson wanted to stop.

Along with anti-lynching, Johnson's plays dealt with other themes, including institutionalized racism, Blacks' identity issues, and maternal feelings. Because women writers were often not taken seriously, Johnson used the pen name of John Temple for her one-act play *Blue Blood*, which won first prize in a magazine contest. She also wrote many of her short stories under the name of Paul Tremaine. **6** However, Johnson often used male narratives, possibly because she thought that her writing would be treated with greater respect if the story were told from a man's perspective.

Several of Johnson's plays were recently recognized for their revolutionary content. Johnson used her plays as vehicles for social protest, **7** tools to fight oppression, and ways to explore controversial issues. During Johnson's lifetime, the literary establishment did not recognize the significance of her work, **8** and even her contemporaries seemed more interested in the "Saturday Salons" she hosted. In the early 20th century, issues like

3

- A) NO CHANGE
- B) linked
- C) embraced
- D) surrounded

4

- A) NO CHANGE
- B) career; she
- C) career, she
- D) career—she

5

- A) NO CHANGE
- B) discouraged
- C) discouraged,
- D) discouraged;

6

- A) NO CHANGE
- B) Nevertheless,
- C) Consequently,
- D) DELETE the underlined portion.

7

- A) NO CHANGE
- B) tools, to fight oppression,
- C) tools to fight, oppression;
- D) tools to: fight oppression,

8

Which choice most effectively sets up the information that follows in the paragraph?

- A) NO CHANGE
- B) but today's scholars view her as an activist who protested the unfair treatment of minorities.
- C) questioning the validity, as well as the dominance, of white male supremacy.
- D) but her protests were similar to the works of other writers during the Harlem Renaissance.

lynching were not normally explored in theatrical works. Nevertheless, Johnson wrote about other controversial **9** themes, including interbreeding and Black poverty— and is only now recognized as one of the literary pioneers responsible for the Harlem Renaissance. **10** Johnson described her mother as being “estranged and resentful,” which contributed to Johnson’s difficult childhood and subsequent uncertainty about her identity. Viewed through today’s literary lens, Johnson’s work reveals her understanding of race and gender issues and her hope that **11** she would inspire other Harlem Renaissance writers.

9

- A) NO CHANGE
- B) themes (including
- C) themes; including
- D) themes—including

10

The writer is considering deleting the underlined sentence. Should the sentence be kept or deleted?

- A) Kept, because it contributes to the passage’s description of how Johnson’s family and background influenced her writing.
- B) Kept, because it identifies one of the reasons that Johnson wanted her writing to help others question their roles in society.
- C) Deleted, because it blurs the focus of the paragraph by introducing loosely related information about Johnson’s mother.
- D) Deleted, because it does not offer details about how Johnson’s mother influenced who Johnson became.

11

The writer wants a conclusion that reinforces the main idea of the passage. Which choice most effectively accomplishes this goal?

- A) NO CHANGE
- B) her writing would be finally recognized by literary critics.
- C) she could improve these problems by voicing her views in writing.
- D) the male perspective would no longer dominate her writing.

Questions 12-22 are based on the following passage and supplementary material.

Though children value their friendships with their peers, **12** paradoxically, their social skills may be declining. Due to their increased use of digital media, children have less time for face-to-face interaction. In fact, a UCLA professor of **13** psychology, Patricia Greenfield who believes that people are becoming less sensitive to emotional cues—indicators that **14** will reveal the feelings of others—blames the increasing use of electronics.

[1] In one psychological study, UCLA scientists found that sixth-graders who went five days without even glancing at a smartphone, television, or other digital screen did **15** technically better at reading human emotions than sixth-graders from the same school who continued to spend hours each day looking at their electronic devices. [2] “Many people are looking at the benefits of digital media in education, and not many are looking at the costs,” said Professor Greenfield. [3] “The displacement of in-person social interaction by screen interaction seems to be reducing social skills.” [4] The psychologists studied two sets of sixth-graders from a Southern California public **16** school; 51 who lived together for five days at a nature and science camp and

12

Which choice best sets up the main focus of the passage?

- A) NO CHANGE
- B) it is usually the case that they can improve their relationships by using technology.
- C) the ability to understand emotion can vary from person to person.
- D) camp attendance is directly associated with improving students’ social skills.

13

- A) NO CHANGE
- B) psychology, Patricia Greenfield,
- C) psychology; Patricia Greenfield
- D) psychology Patricia Greenfield

14

- A) NO CHANGE
- B) reveal
- C) would reveal
- D) revealed

15

- A) NO CHANGE
- B) spontaneously
- C) involuntarily
- D) substantially

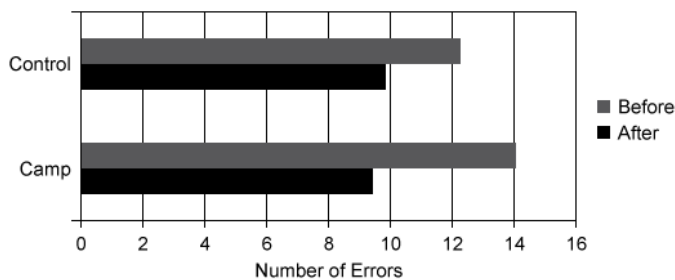
16

- A) NO CHANGE
- B) school—51
- C) school: 51
- D) school, 51:

54 others from the same school. [5] The camp didn't allow **17** student's to use electronic device's. **18**

At the beginning and end of this study conducted in 2012, both groups of students were evaluated for their ability to recognize other people's emotions in photos and videos. As indicated in the graph of the data associated with this 5-day study, the children who had been **19** in the control group had less social interaction. Researchers tracked how many errors the students made. When analyzing the photos, for example, those at the camp made an average of 9.41 errors at the end of the study, down from 14.02 at the beginning. The students who didn't attend the camp recorded **20** a greater change. For the videos, the students who went to camp improved significantly, while the students who did not attend camp showed no change.

2012 Study of Students' Ability to Recognize Emotions in Photos and Videos



"You can't learn nonverbal emotional cues from a screen in the way you can learn them from face-to-face communication," said lead author Yalda Uhls, a senior researcher with UCLA's Children's Digital Media Center, Los Angeles. "If you're not practicing face-to-

17

- A) NO CHANGE
- B) students to use electronic device's.
- C) student's to use electronic devices'.
- D) students to use electronic devices.

18

To make this paragraph most logical, Sentence 5 should be placed

- A) where it is now.
- B) after sentence 1.
- C) after sentence 2.
- D) after sentence 3.

19

Which choice most accurately reflects the information presented in the chart?

- A) NO CHANGE
- B) at school with no devices had better social lives.
- C) in the camp group met more new people.
- D) at camp improved in their ability to identify feelings.

20

Which choice most accurately reflects the information presented in the chart?

- A) NO CHANGE
- B) no
- C) a smaller
- D) a similar

face communication, **21** it could be that you're losing important social skills." The research confirmed **22** the existence of there being a need for people to have more face-to-face interaction. Even when people use digital media for social interaction, they're spending less time developing social skills and learning to read nonverbal cues. Uhls concluded by saying that "we are social creatures who need devicefree time."

21

- A) NO CHANGE
- B) but it could be
- C) while it could be
- D) it being possible

22

- A) NO CHANGE
- B) and showed
- C) the truth of
- D) DELETE the underlined portion

Questions 23-33 are based on the following passage.

Flash floods—sudden heavy rains—cause more deaths than any other weather-related phenomena. Unfortunately, flash flood prediction is an extremely challenging operational forecast problem because of the suddenness of these storms. However, with the completion of its modernization, the National Weather Service (NWS) is in a better position than ever before to address flash **23** floods that also cause millions of dollars in damage. Thanks to improvements in **24** technology! The Flash Flood Monitoring and Prediction (FFMP) system has been created.

[1] FFMP is a coordinated set of tools that enables forecasters **25** in analyzing current precipitation observations. [2] These tools also assist with short-term **26** predictions beforehand of rains that could lead to flash floods, which threaten life and property. [3] Estimated accumulated rainfall for these areas is compared (by ratio or difference) to River Forecast Center—generated flash flood guidance. [4] Every basin and county in a NWS forecast office’s particular area of responsibility is monitored for heavy precipitation. [5] In this way, forecasters can **27** assess the threat, which

23

Which choice most effectively sets up the information conveyed in the remainder of the passage?

- A) NO CHANGE
- B) floods—only one of the many valuable services it offers.
- C) floods and provide technology that benefits many people.
- D) floods by predicting when and where they will occur.

24

- A) NO CHANGE
- B) technology; the
- C) technology, the
- D) technology. The

25

- A) NO CHANGE
- B) for analyzing
- C) to analyze
- D) by analyzing

26

- A) NO CHANGE
- B) predictions as well as estimates
- C) predictions ahead of time
- D) predictions

27

- A) NO CHANGE
- B) recess
- C) compress
- D) digress

can also be determined directly from excessive rain rates. **28**

To assist with these forecasts, a joint software development team came up with an integrated suite of applications they called SCAN that **29** have the ability to detect flash floods and generates automated alerts to warn forecasters about severe weather. The hope is that SCAN will result in longer lead times on warned **30** events and fewer missed dangerous weather situations. Additional benefits of this system include increased forecaster situational awareness, reduced forecaster fatigue during warning situations, and rapid improvement in implemented techniques.

28

To make this paragraph most logical, sentence 4 should be placed

- A) where it is now.
- B) after sentence 1.
- C) after sentence 2.
- D) after sentence 5.

29

- A) NO CHANGE
- B) has
- C) have had
- D) has had

30

The writer is considering revising the underlined portion to the following:

events, such as severe thunderstorms with the potential to cause flash flooding,

Should the writer make this revision here?

- A) Yes, because it clarifies the point being made with a relevant example of a warned event.
- B) Yes, because it provides additional information about how forecasters are able to determine when dangerous rainfall is likely.
- C) No, because it weakens the paragraph's main argument by adding irrelevant information about thunderstorms.
- D) No, because it fails to account for other factors that weather forecasters must consider when making predictions about flash floods.

31 Due to the demand for more people in the field of meteorology, forecasters will be able to select from both tabular and geographic forecast displays and to define a variety of warning thresholds. The FFMP will be providing information regarding checking these warning **32** thresholds. It also will be providing information about exceeding limits to help alert forecasters when there is a problem. In addition, high-resolution graphical warning products issued in common Geographic Information System (GIS) formats will allow emergency managers and others to integrate the flood warning information within their own custom GIS decision-assistance software packages. With its implementation of FFMP, **33** the stage is set for major improvements in official NWS flash flood warnings in the areas of specificity, accuracy, and timeliness.

31

Which choice provides the most effective transition from the previous paragraph to this paragraph?

- A) NO CHANGE
- B) Having access to these modern technological developments,
- C) Although FFMP has many options for viewing data,
- D) With recent upgrades replacing outdated forecasting methods,

32

Which choice most effectively combines the sentences at the underlined portion?

- A) thresholds after
- B) thresholds and
- C) thresholds: there will even be information about
- D) thresholds; while providing the same information about

33

- A) NO CHANGE
- B) major improvements have set the stage for improved NWS official flash flood warnings with more specificity, accuracy, and timeliness.
- C) NWS flash flood predictions have set the stage for major improvements in the specificity, accuracy, and timeliness of these warnings.
- D) the NWS is setting the stage for major improvements in the specificity, accuracy, and timeliness of its official warnings.

Questions 34-44 are based on the following passage and supplementary material.

As the human population increases, mining asteroids may be one way to obtain scarce and needed resources. Hundreds of thousands of asteroids exist in the solar system, ranging in size from a few yards to hundreds of miles across. But even a small asteroid could contain materials worth lots of money. For example, 1986 DA is an asteroid **34** valued at 484.66 billion U.S. dollars. However, certain financial and technological obstacles must be overcome before asteroid mining **35** became feasible.

Types of Cost-Effective Asteroids to Mine

Name	Type	Projected value (U.S. dollars)	Estimated profit (U.S. dollars)
Bennu	B	669.96 million	185.00 million
1991 DB	C	168.20 billion	6.146 billion
Seleucus	K	33.52 trillion	5.02 trillion
Atlantis	L	48.69 trillion	5.23 trillion
1986 DA	M	4.25 trillion	484.66 billion
1989 ML	X	13.94 billion	4.38 billion

Adapted from <http://www.asterank.com/>

36 Many NASA scientists are researching the technology that will be required in order to make asteroid mining successful. For example, dark, “C-type” asteroids, so called because of their carbon-rich **37** materials have lots of water. According to Dante Lauretta of the University of Arizona, Tucson, water is “a critical life-support item for a spacefaring civilization.” In fact, “with launch costs currently thousands of dollars per pound,

34

Which choice provides an accurate interpretation of the table?

- A) NO CHANGE
- B) with a potential profit of 13.94 billion dollars.
- C) of the M-type with metals less valuable than those of L-type asteroids.
- D) that has a projected value of 4.25 trillion U.S. dollars.

35

- A) NO CHANGE
- B) has become
- C) becomes
- D) had become

36

Which choice provides the most effective transition from P1 to P2?

- A) NO CHANGE
- B) The greatest number of C-type asteroids can be found in the asteroid belt between the orbits of Mars and Jupiter.
- C) To better understand what valuable resources could be mined, it’s helpful to know that asteroids are typed based on their features.
- D) Many profitable materials, such as gold and platinum, may be excavated from a variety of types of asteroids.

37

- A) NO CHANGE
- B) materials;
- C) materials—
- D) materials,

you want to use water already available in space to reduce mission costs,” says Laretta. Water can also be used to make rocket fuel. In addition, C-type asteroids contain lots of important organic materials like carbon and phosphorus. **38** These key elements have an important use, specifically one as fertilizer, which would allow people to grow food.

Another class of asteroid is the “S-type,” which has a stony composition. Even though they have very little water, these asteroids are currently more relevant **39** in terms of money economically, since a significant fraction of **40** its contents consists of iron, nickel, and cobalt. Also, with trace elements like gold, platinum, and rhodium **41** comes a greater value. According to Laretta, “a small, 32-foot (10-meter) S-type asteroid contains about 1,433,000 lb (650,000 kg) of metal, with about 110 lb (50 kg) in the form of rare metals.” Even more rare are the metallic or “M-type” asteroids, which have about ten times more metal in them than the S-type asteroids.

Unfortunately, it currently costs from hundreds of millions to billions of dollars for a space mission, so innovations to make these costs fall dramatically will be needed before it is **42** in turn profitable to mine these asteroids. Another obstacle is our lack of experience with extracting materials from asteroids. The question

38

Which choice provides the most effective expression of the underlined portion?

- A) NO CHANGE
- B) One important use of these key elements is
- C) There is one important use of these key elements, and it is
- D) An important use of these key elements includes one that is

39

- A) NO CHANGE
- B) economically,
- C) economically and financially,
- D) in a financial, economic way

40

- A) NO CHANGE
- B) its own
- C) their
- D) one’s

41

- A) NO CHANGE
- B) do come
- C) came
- D) come

42

- A) NO CHANGE
- B) nevertheless
- C) for one thing
- D) furthermore

is **43** does it become economically feasible to retrieve an asteroid and bring it back to Earth where its valuable materials could be mined? Right now, it would take about half the money that could be made from a given asteroid to mine its resources. **44** But given the potential payoff, additional research should be done to see if asteroid mining could be a viable source of needed materials in the future.

43

- A) NO CHANGE
- B) does it become economically feasible to retrieve an asteroid and bring it back to Earth where its valuable materials could be mined.
- C) whether it's economically feasible to retrieve an asteroid and bring it back to Earth where its valuable materials could be mined.
- D) if it is economically feasible to retrieve an asteroid and bring it back to Earth where its valuable materials could be mined?

44

At this point, the writer is considering adding the following sentence:

Currently, the top priorities for the U.S. government are improving the economy and reducing the national debt, not exploring space.

Should the writer make this addition here?

- A) Yes, because it provides an additional example that supports a claim made in the paragraph.
- B) Yes, because it serves as a conclusion that restates the main idea of the passage.
- C) No, because it includes information that contradicts a claim made earlier in the passage.
- D) No, because it introduces an idea that is not relevant to the focus of the paragraph.

STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

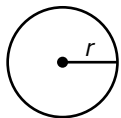
DIRECTIONS

For the questions below, solve each problem and choose the best answer from the available choices. For questions on which multiple choices are not provided, solve the problem and write your answer into the answer sheet according to the instructions provided after the last multiple choice question in the section.

NOTES

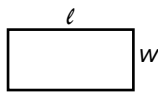
- Calculators **are not allowed**.
- All expressions represent real numbers unless otherwise indicated.
- Figures are not drawn to scale unless otherwise indicated.
- The domain of any given function is the set of all real numbers unless otherwise indicated.

REFERENCE

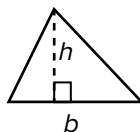


$$A = \pi r^2$$

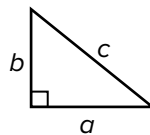
$$C = 2\pi r$$



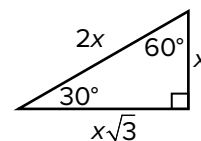
$$A = \ell w$$



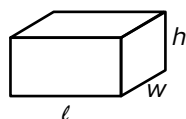
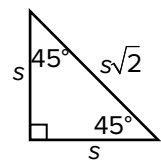
$$A = \frac{1}{2}bh$$



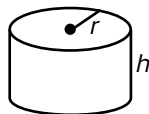
$$c^2 = a^2 + b^2$$



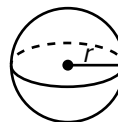
Special Right Triangles



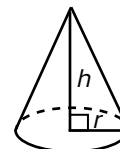
$$V = \ell wh$$



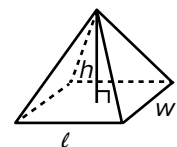
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measure in degrees of the angles of a triangle is 180.



1

What value of t satisfies the equation $t = 3 + 2t$?

- A) -3
- B) $-\frac{2}{3}$
- C) $\frac{3}{2}$
- D) 3

2

Tiana wants to sell 200 boxes of cookies for a fundraiser. She makes an initial sale of 30 boxes and then plans to sell 20 boxes daily. Which of the following equations can be used to find the number of days, d , it will take Tiana to sell all the boxes?

- A) $200 = 20d - 30$
- B) $200 = 20d$
- C) $200 = 20d + 30$
- D) $200 = 30d - 20$

3

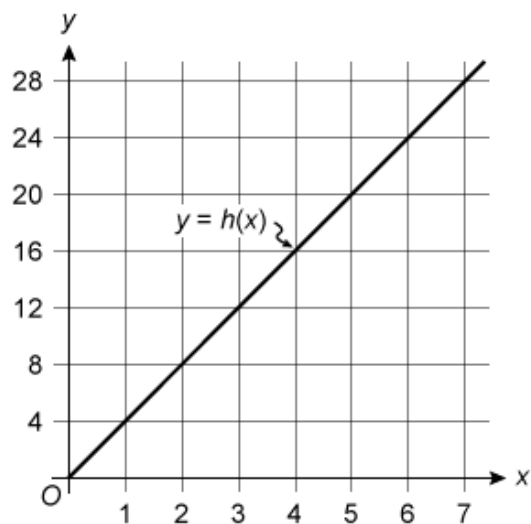
Distance (miles)	Taxi price
5	\$18.16
10	\$23.21
20	\$33.31
40	\$53.51

The table above shows the prices of taking a taxi based on distance in miles. There is a linear relationship between the total price of the taxi and the number of miles traveled. What function can be used to determine the total price $f(x)$, in dollars, of a trip in a taxi with a distance of x miles?

- A) $f(x) = 1.01x$
- B) $f(x) = 1.01x + 13.11$
- C) $f(x) = 3.63x$
- D) $f(x) = 3.63x + 18.16$



4



The line in the xy -plane above represents the relationship between the hip height $h(x)$, in inches, and the footprint length x , in inches, for estimating the size of a dinosaur based on the size of its footprint. How much greater is the hip height of a dinosaur that has a footprint length of 5 inches than the hip height of a dinosaur that has a footprint length of 2 inches?

- A) 4 inches
- B) 8 inches
- C) 12 inches
- D) 14 inches

5

Given that $x > 0$, which of the following is equivalent to $\sqrt{25x^2}$?

- A) $50x^2$
- B) $50x$
- C) $5x^2$
- D) $5x$

6

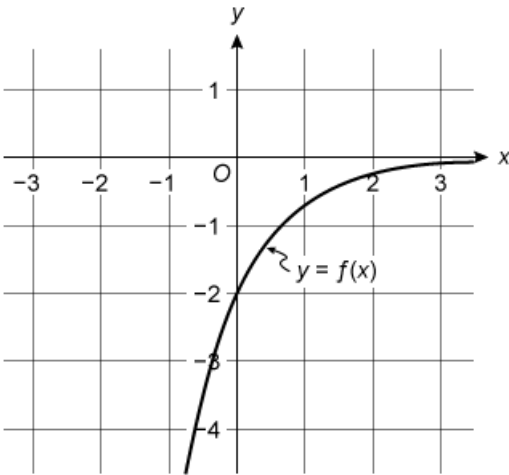
$$\frac{x^2 - 4}{x + 2} = 3$$

Which of the following values of x satisfy the equation above?

- A) -2
- B) 0
- C) 5
- D) 2 and 5



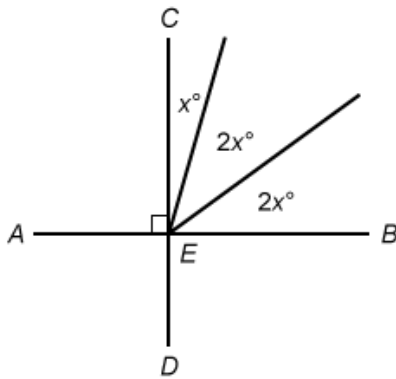
7



The function $y = f(x)$ is graphed in the xy -plane above. What is the value of $f(0)$?

- A) 0
- B) -1
- C) -2
- D) -3

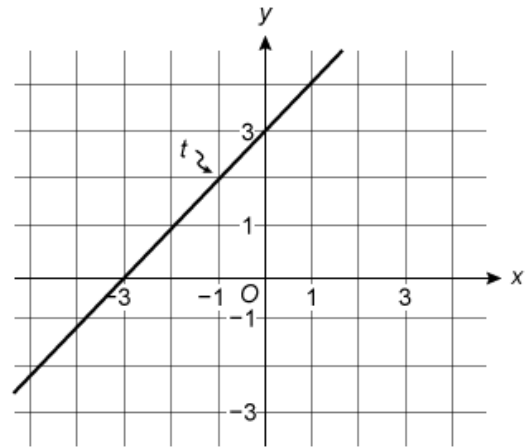
8



In the figure above, \overline{AB} intersects \overline{CD} at point E . What is the value of $3x$?

- A) 72
- B) 54
- C) 36
- D) 18

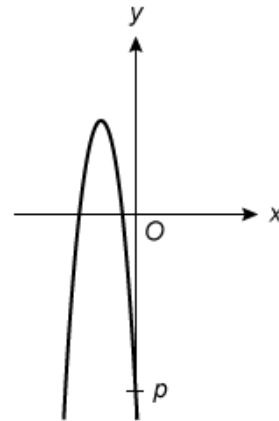
9



Line t is shown in the xy -plane above. Which of the following is an equation of line t ?

- A) $x + y = 3$
- B) $x + y = -3$
- C) $x - y = 3$
- D) $x - y = -3$

10



In the xy -plane above, the graph of $y = -3x^2 - 15x - 12$ crosses the y -axis at the point $(0, p)$. What is the value of p ?

- A) -15
- B) -12
- C) -4
- D) -3

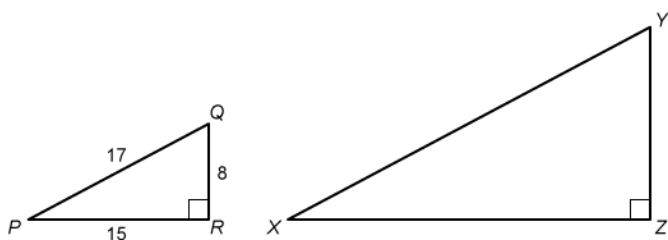


11

Which of the following is an equation of a circle in the xy -plane with center $(7, 4)$ and radius 3?

- A) $(x - 7)^2 + (y - 4)^2 = 3$
 B) $(x + 7)^2 + (y + 4)^2 = 3$
 C) $(x - 7)^2 + (y - 4)^2 = 9$
 D) $(x + 7)^2 + (y + 4)^2 = 9$

12



Triangles PQR and XYZ above are similar. What is the value of $\sin(X)$?

- A) $\frac{15}{8}$
 B) $\frac{15}{17}$
 C) $\frac{8}{15}$
 D) $\frac{8}{17}$

13

The graph of the function $g(x) = x^2 + 9x + 8$ in the xy -plane has two x -intercepts. What is the distance between the x -intercepts?

- A) 1
 B) 4
 C) 7
 D) 8

14

What are all the values of x that satisfy the equation $\sqrt{3x} = x - 6$?

- I. 3
 II. 12
 A) I only
 B) II only
 C) I and II
 D) Neither I nor II

15

If k is a constant, for which value of k does the following system have no solution?

$$\begin{aligned} kx + 5y &= 10 \\ -2x + y &= 8 \end{aligned}$$

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



DIRECTIONS

For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as $2\frac{1}{2}$ must be gridded as 2.5 or $5/2$. (If $\boxed{2\ 1\ /\ 2}$ is entered into the grid, it will be interpreted as $\frac{21}{2}$, not $2\frac{1}{2}$.)
- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer: $\frac{4}{13}$

Write answer in boxes. →

4	/	1	3
•	•	•	•
0	0	0	0
1	1	•	1
2	2	2	2
3	3	3	•
•	4	4	4
5	5	5	5
6	6	6	6
	7	7	7
8	8	8	8
9	9	9	9

 ← Fraction bar

Grid in result. {

Answer: 1.7

	1	.	7
•	•	•	•
0	0	0	0
1	•	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	•
8	8	8	8
9	9	9	9

 ← Decimal point

Answer: 102 — either position is correct

	1	0	2
•	•	•	•
0	0	•	0
1	•	1	1
2	2	2	•
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

	1	0	2
•	•	•	•
0	•	0	0
•	1	1	1
2	2	•	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

Acceptable ways to grid $\frac{2}{3}$ are :

	2	/	3
•	•	•	•
0	0	0	0
1	1	•	1
2	•	2	2
3	3	3	•
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

	.	6	6	6
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	•	•	•	•
7	7	7	7	7

	.	6	6	7
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	•	•	•	6
7	7	7	7	•



16

$$R = 6m + 11j$$

Two different sizes of a certain meal are sold at a restaurant. The equation above gives the revenue R , in dollars, from the sale of m regular meals and j jumbo meals. If the revenue was \$59,000 and 4000 jumbo meals were sold, how many regular meals were sold?

17

If r and s are the solutions to the equation $|2x - 3| = 7$, what is the value of $|r - s|$?

18

Warren purchased a share of stock in a company for a price of \$500 per share. Every year, the price per share is expected to increase 20% over its price from the previous year. The expected price per share of the stock, in dollars, 2 years after Warren's purchase is equal to $500c$, where c is a constant. What is the value of c ?

19

$$5x + 4y = 3200$$

$$4x + 5y = 3100$$

According to the system of equations above, what is the value of $9x + 9y$?

20

If $c + d = 3$ and $c - d = 10$, what is the value of $(c^2 - d^2)(c + d)$?

STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.

No Test Material On This Page



Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

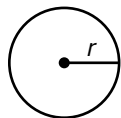
DIRECTIONS

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NOTES

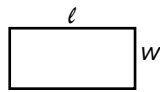
- Calculators are allowed but not required.
- All expressions represent real numbers unless otherwise indicated.
- Figures are not drawn to scale unless otherwise indicated.
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REFERENCE

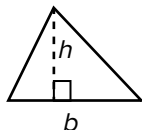


$$A = \pi r^2$$

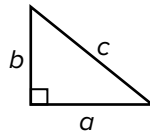
$$C = 2\pi r$$



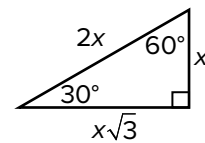
$$A = \ell w$$



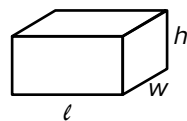
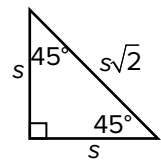
$$A = \frac{1}{2}bh$$



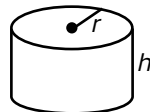
$$c^2 = a^2 + b^2$$



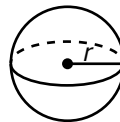
Special Right Triangles



$$V = \ell wh$$



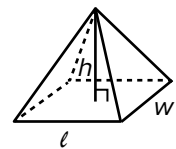
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measure in degrees of the angles of a triangle is 180.



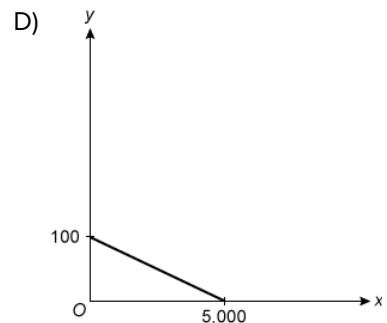
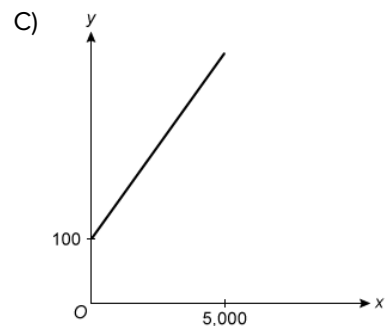
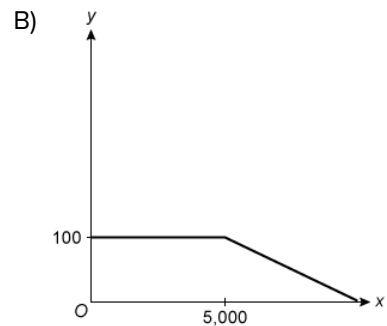
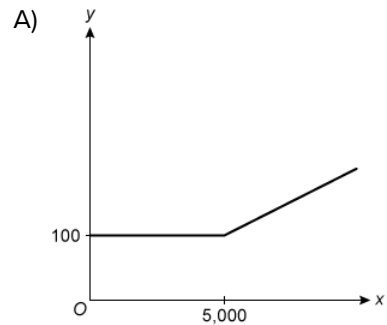
1

A hot air balloon cruising at 60 feet above the ground begins to climb at a rate of 17 feet per second. Which of the following equations represents the balloon's height above the ground d , in feet, t seconds after the balloon begins to climb?

- A) $d = 60 + 17$
- B) $d = 60 + 17t$
- C) $d = 60 - 17t$
- D) $d = 60t + 17$

2

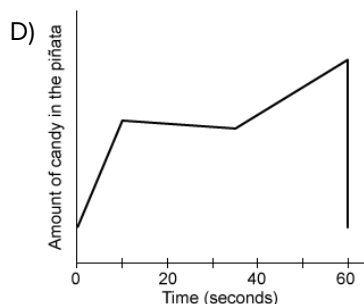
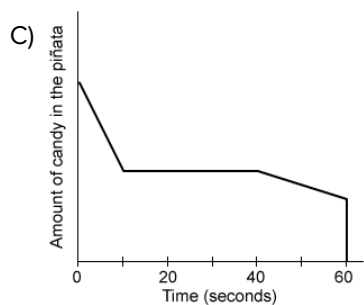
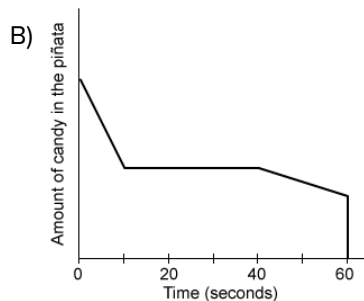
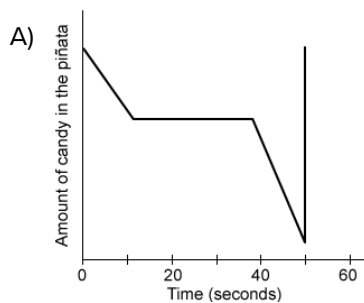
A landscaping company charges a flat fee of \$100 to mow a lot size up to 5,000 square feet plus \$0.01 for each additional square foot. Which of the following graphs represents the amount, y , the company charges for mowing a lot with a size of x square feet?





3

Lucas has a birthday party featuring a piñata filled with candy. He hits the piñata, and half of the candy falls out over the next 10 seconds. For the next 30 seconds, the candy stops falling out while none of the party guests hit the piñata. Then Lucas's best friend hits the piñata, and candy gradually falls out until Lucas breaks open the piñata, releasing all of the remaining candy. Which of the following graphs could represent this situation?



4

$$24 = 30 - k$$

According to the equation above, what is the value of $4k$?

- A) 6
- B) 18
- C) 24
- D) 54

5

The function g is defined by $g(x) = \frac{9-x}{2}$. Which of the following is the value of $g(-3)$?

- A) -6
- B) -3
- C) 3
- D) 6

6

$$3n(n^2 - 4n)$$

Which of the following is equivalent to the expression above?

- A) $-9n^2$
- B) $3n^3 - 12n^2$
- C) $3n^3 - 4n$
- D) $4n^3 - n^2$

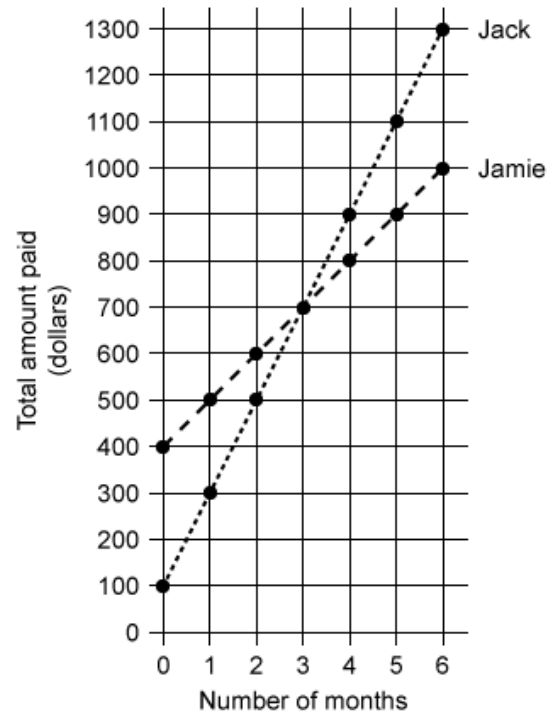


7

A computer repair company has 200 stores nationwide. Customer ratings are important to the company, and it is believed they vary greatly from store to store. A researcher is hired to design a survey to study this issue. Which of the following sampling methods is most likely to lead to an accurate conclusion about the company's customer ratings?

- A) Selecting one of the 200 stores at random and then surveying all of their customers on a given day
- B) Selecting 30 customers at random from each store and then surveying each customer selected
- C) Surveying a random sample of customers from the 10 stores with the greatest number of repairs and the 10 stores with the least number of repairs
- D) Sending an email to customers with a link to the survey and then using the first 150 responses

8



The two graphs above show the total amounts of money that Jack and Jamie each have paid on their car loans for the first six months after taking out their loans. After they made their initial down payments, how much more did Jack pay each month than Jamie?

- A) \$50
- B) \$100
- C) \$200
- D) \$300



9

If the function f is defined by $f(x) = 4^x$, what is the value of $f(3) - f(2)$?

- A) 1
- B) 4
- C) 48
- D) 60

10

The mayor of a large city conducted a survey using a random sample of its residents. The residents were asked about how often they visit the city's parks. From the results of the survey, it is estimated that 19% of residents in the city visit a park at least once per week, with a margin of error of 6%. Based on the given estimate and margin of error, which of the following is the most appropriate conclusion about all residents of the city?

- A) It is unlikely that less than 19% of residents visit a park at least once per week.
- B) At least 19% and no more than 22% of residents visit a park at least once per week.
- C) The mayor is between 13% and 25% sure that a resident visits a park at least once per week.
- D) It is plausible that the percentage of residents who visit a park at least once per week is between 13% and 25%.

11

Set X	3, 4, 5, 6, 7, 8
Set Y	4, 5, 5, 6, 6, 7

The table above shows two data sets. Which of the following statements about the two data sets is true?

- A) The means are different, and the standard deviations are different.
- B) The means are different, and the standard deviations are the same.
- C) The means are the same, and the standard deviations are different.
- D) The means are the same, and the standard deviations are the same.

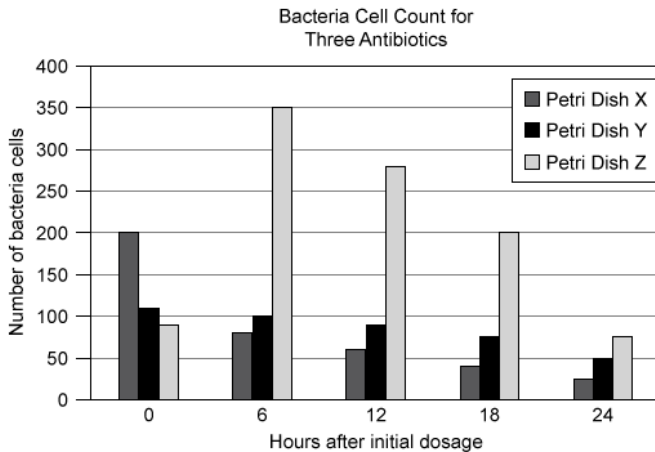
12

The price of a discounted one-way plane ticket is \$42.00. The discounted price is 30% less than the original price of the plane ticket. What was the original price of the plane ticket? (Assume there is no sales tax.)

- A) \$12.60
- B) \$29.40
- C) \$60.00
- D) \$140.00



Questions 13 and 14 refer to the following information.



Three petri dishes containing bacteria cells were each given a dosage of a different antibiotic over the course of 24 hours. Petri dishes X, Y, and Z were given a dosage of Antibiotic X, Y, and Z, respectively. A dosage of each antibiotic was administered every 6 hours to each of the three petri dishes over the 24-hour period. The bar graph above shows the bacteria cell count for each of the three petri dishes 0, 6, 12, 18, and 24 hours after the initial dosage.

13

Which of the following petri dishes showed a decrease in bacteria every six hours after the initial antibiotic dosage?

- I. Petri dish X
 - II. Petri dish Y
 - III. Petri dish Z
- A) I only
 B) III only
 C) I and II only
 D) I, II, and III

14

Which of the following is closest to the ratio of the total number of bacteria cells in all three petri dishes at hour 24 to the total number of bacteria cells at the time of the initial dosage?

- A) 3 to 8
 B) 1 to 8
 C) 5 to 8
 D) 1 to 4



15

The height of a right circular cone is 5 feet. If the volume of the cone is 15π cubic feet, what is the radius, in feet, of the base of the cone?

- A) $\sqrt{3}$
- B) 3
- C) 6
- D) 9

16

The values of Property A and Property B were equal in 1993. From 1990 to 1993, the value of Property A increased by 25% and the value of Property B decreased by 20%. If the value of Property A was \$160,000 in 1990, what was the value of Property B in 1990?

- A) \$64,000
- B) \$102,400
- C) \$250,000
- D) \$280,000

17

$$A = \frac{1}{4}\pi d^2$$

A formula for the area of a circle is given above, where d is the diameter of the circle. Which of the following gives the diameter of the circle in terms of the area of the circle?

- A) $\frac{4A}{\pi}$
- B) $\frac{\pi}{4A}$
- C) $\sqrt{\frac{4A}{\pi}}$
- D) $\sqrt{\frac{\pi}{4A}}$

18

Rating	Percent
Poor	24.2%
Average	37.6%
Good	14.3%
Excellent	23.9%

The table above shows the results of a survey in which employees of a large company were asked to rate their working conditions. Based on the information given in the table, which of the following is closest to the probability that an employee responded “Excellent,” given that the employee did not respond “Poor”?

- A) 0.24
- B) 0.32
- C) 0.52
- D) 0.76

19

$$y = -2(x - 1)^2 + a$$

In the equation above, a is a constant and the graph of the equation in the xy -plane is a parabola. Which of the following statements is true about the parabola?

- A) Its maximum occurs at $(1, a)$.
- B) Its maximum occurs at $(-1, a)$.
- C) Its minimum occurs at $(1, a)$.
- D) Its minimum occurs at $(-1, a)$.



20

The maximum value in a list of 15 positive integers is 42. A new list consisting of 16 positive integers is generated by using the original list and the value 56. What measure must be 14 greater for the new list than for the original list?

- A) Mean
- B) Median
- C) Range
- D) Standard deviation

21

For a park design project, Neha combines x cubic feet of soil containing 30% organic matter and y cubic feet of soil containing 10% organic matter to create a soil mixture containing 22% organic matter. This situation is modeled by the equation below. If Neha uses 100 cubic feet of the soil containing 10% organic matter, how many cubic feet of the soil containing 30% organic matter will she need?

$$0.30x + 0.10y = 0.22(x + y)$$

- A) 15
- B) 100
- C) 150
- D) 300

22

James and Maria coordinate donations to various local charities. The first year, they coordinated donations in the amount of \$4,000. Every year for the next 3 years, the amount of the donations doubled from the previous year. If $g(n)$ represents the amount of the donations n years after they began coordinating the donations, which of the following statements best describes the function g ?

- A) The function g is an increasing linear function.
- B) The function g is a decreasing linear function.
- C) The function g is an increasing exponential function.
- D) The function g is a decreasing exponential function.

23

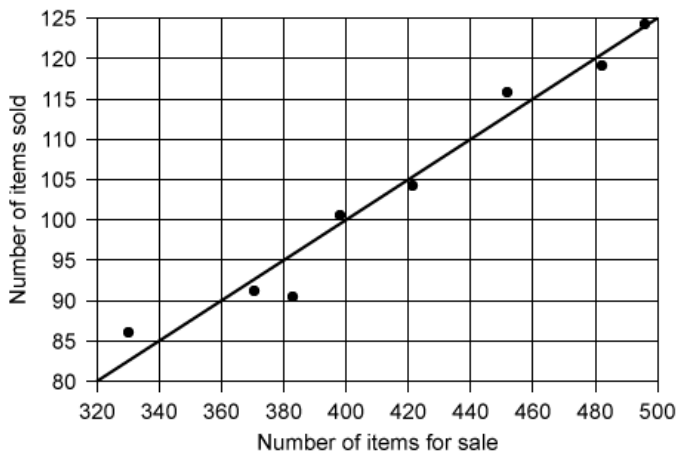
x	n	$4n$	$7n$
y	0	$-n$	$-2n$

The table above shows some values of x and their corresponding values of y , where n is a constant. If the relationship between x and y is linear, which of the following equations represents the relationship?

- A) $x + 3y = n$
- B) $x + 3y = 7n$
- C) $3x - y = -7n$
- D) $3x - y = 9n$



24



The scatterplot above shows the number of available items for sale, x , and the number of items sold last week, y , for eight retail websites. A line of best fit for the data is also shown. Which of the following could be the equation of the line of best fit?

- A) $y = -4x$
- B) $y = -0.25x$
- C) $y = 0.25x$
- D) $y = 4x$

25

$$\begin{aligned} 1.6x + 0.8y &= 1.2 \\ -0.4x + 0.6y &= -0.5 \end{aligned}$$

In the xy -plane, the lines that correspond to the system of equations above intersect at the point (x, y) . What is the y -coordinate of the intersection point of the system?

- A) -0.25
- B) -0.2
- C) 0.5
- D) 2

26

Tracy modeled the population growth in a school district over the previous decade by estimating the number of people per square kilometer that lived within the district each year. He estimated that there were 140 people per square kilometer the first year of his study, with a 2% annual increase in the number of people per square kilometer each of the following years. Which of the following functions models $D(t)$, the number of people per square kilometer in the district t years after the first year of Tracy's study?

- A) $D(t) = 140(1.02)^t$
- B) $D(t) = 140(0.98)^t$
- C) $D(t) = 140^{1.02t}$
- D) $D(t) = 140^t$

27

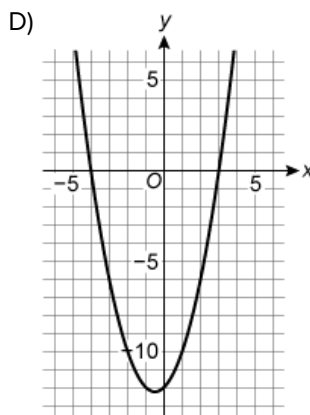
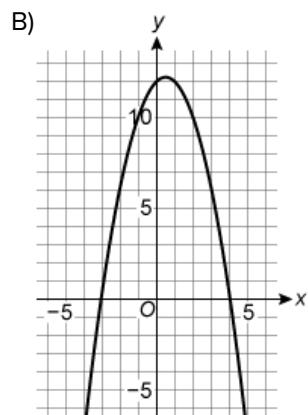
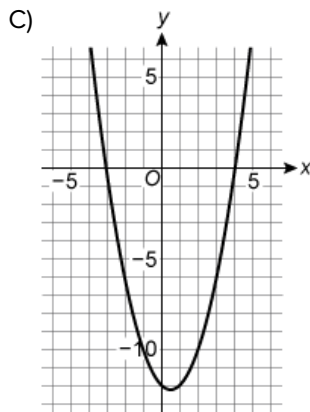
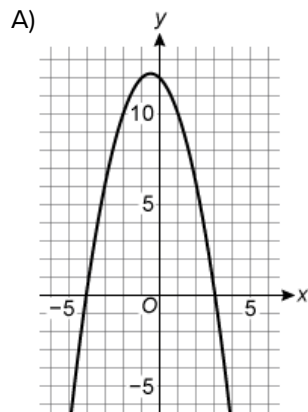
If $\frac{4}{5}(20x - 25) - 6 = 20x - 25$, what is the value of $4x - 5$?

- A) 6
- B) $-\frac{1}{4}$
- C) $-\frac{2}{3}$
- D) -6



28

The function f is defined by $f(x) = (x - t)(x + 4)$, where t is a positive integer. Which of the following could be the graph of $y = f(x)$ in the xy -plane?



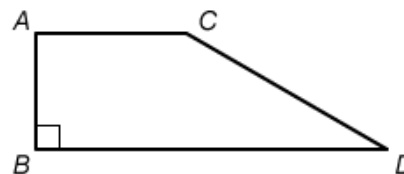
29

$$t = 7.13s + 130.31$$

The formula above can be used to estimate the total length t , in millimeters, of an American alligator based on the length of its skull s , in millimeters. What is the meaning of 7.13 in this context?

- A) The estimated skull length, in millimeters, for an alligator with a total length of 130.31 millimeters
- B) The estimated increase in an alligator's skull length, in millimeters, for each increase of 130.31 millimeters in total length
- C) The estimated increase in an alligator's skull length, in millimeters, for each one-millimeter increase in its total length
- D) The estimated increase in an alligator's total length, in millimeters, for each one-millimeter increase in its skull length

30



In the figure above, \overline{AC} and \overline{BD} are parallel and $CD = 2AB$. What is the measure of angle C ?

- A) 90°
- B) 120°
- C) 135°
- D) 150°


DIRECTIONS

For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.

- Mixed numbers** such as $2\frac{x}{2-x}$ must be gridded as 3.5 or 7/2. (If $\boxed{2\ 1\ /\ 2}$ is entered into the grid, it will be interpreted as $\frac{1}{2-x}$, not $2\frac{1}{2}$.)

- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

 Answer: $\frac{4}{13}$

Write answer in boxes. →

	4	/	1	3
	●	/	●	●
	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

← Fraction bar

Grid in result.

Answer: 1.7

	1	.	7
	●	●	●
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Decimal point

Answer: 102 — either position is correct

	1	0	2
	●	●	●
	0	0	0
1	1	1	1
2	2	2	2

	1	0	2
	●	●	●
	0	0	0
1	1	1	1
2	2	2	2

 Acceptable ways to grid $\frac{2}{3}$ are :

	2	/	3
	●	●	●
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

	.	6	6	6
	●	●	●	●
	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7

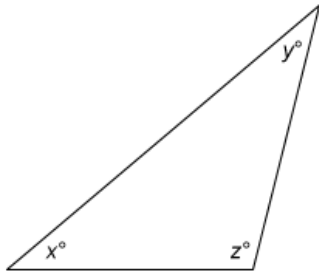
	.	6	6	7
	●	●	●	●
	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7



31

Griffin has \$7.00 to spend on ink stamps and erasers. Ink stamps cost \$0.55 each and erasers cost \$0.45 each, and there is no tax on his purchases. If Griffin buys 8 ink stamps, what is the maximum number of erasers he can buy?

32



Note: Figure not drawn to scale.

If $x = 42$ in the triangle above, what is the value of $y + z$?

33

200, 1100, 1500, 1800, 2100, x

What is the value of x such that the mean of the six numbers shown above is 1500?

34

$$y = kx$$

The equation above is used to model the relationship between x and y , where k is a constant. If $y = 13$ when $x = b$, what is the value of y when $x = 3b$?

35

$$6x + 9 = k(x + p)$$

In the equation above, k and p are constants. For what value of p does the equation have infinitely many solutions?

36

A line and a parabola are graphed in the xy -plane. The line has the equation $y = k$ for some constant k , and the parabola has the equation $y = -x^2 + 3x$. If the line intersects the parabola at exactly one point, what is the value of k ?



Questions 37 and 38 refer to the following information.

The Tohoku earthquake generated ocean waves that traveled through deep water at speeds of up to 500 miles per hour.

37

What was the maximum speed of ocean waves generated by the Tohoku earthquake in feet per second? (Round your answer to the nearest whole number: 1 mile = 5,280 feet.)

38

How many seconds did it take for an ocean wave from the Tohoku earthquake to travel half a mile at its maximum speed? (Round your answer to the nearest tenth of a second.)

STOP

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**

No Test Material On This Page

SAT Practice Test Worksheet: Answer Key

Reading Test Answers

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	B		27	C	
2	D		28	B	
3	C		29	A	
4	D		30	D	
5	A		31	C	
6	B		32	C	
7	C		33	B	
8	C		34	B	
9	D		35	D	
10	A		36	C	
11	B		37	B	
12	D		38	B	
13	B		39	D	
14	C		40	B	
15	D		41	D	
16	B		42	B	
17	C		43	D	
18	D		44	C	
19	A		45	C	
20	D		46	A	
21	D		47	B	
22	B		48	A	
23	C		49	B	
24	C		50	D	
25	D		51	C	
26	A		52	C	

READING TEST RAW SCORE
(Total # of Correct Answers)

Scoring Your SAT Practice Test #10

Writing and Language Test Answers

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	A		23	D	
2	B		24	C	
3	D		25	C	
4	C		26	D	
5	B		27	A	
6	D		28	C	
7	A		29	B	
8	B		30	A	
9	D		31	B	
10	C		32	B	
11	C		33	D	
12	A		34	D	
13	B		35	C	
14	B		36	C	
15	D		37	D	
16	C		38	B	
17	D		39	B	
18	A		40	C	
19	D		41	A	
20	C		42	A	
21	A		43	C	
22	D		44	D	

WRITING AND LANGUAGE TEST RAW SCORE
(Total # of Correct Answers)

Math Test – No Calculator Answers

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	A	
2	C	
3	B	
4	C	
5	D	
6	C	
7	C	
8	B	
9	D	
10	B	
11	C	
12	D	
13	C	
14	B	
15	A	
16	2500	
17	7	
18	1.44	
19	6300	
20	90	

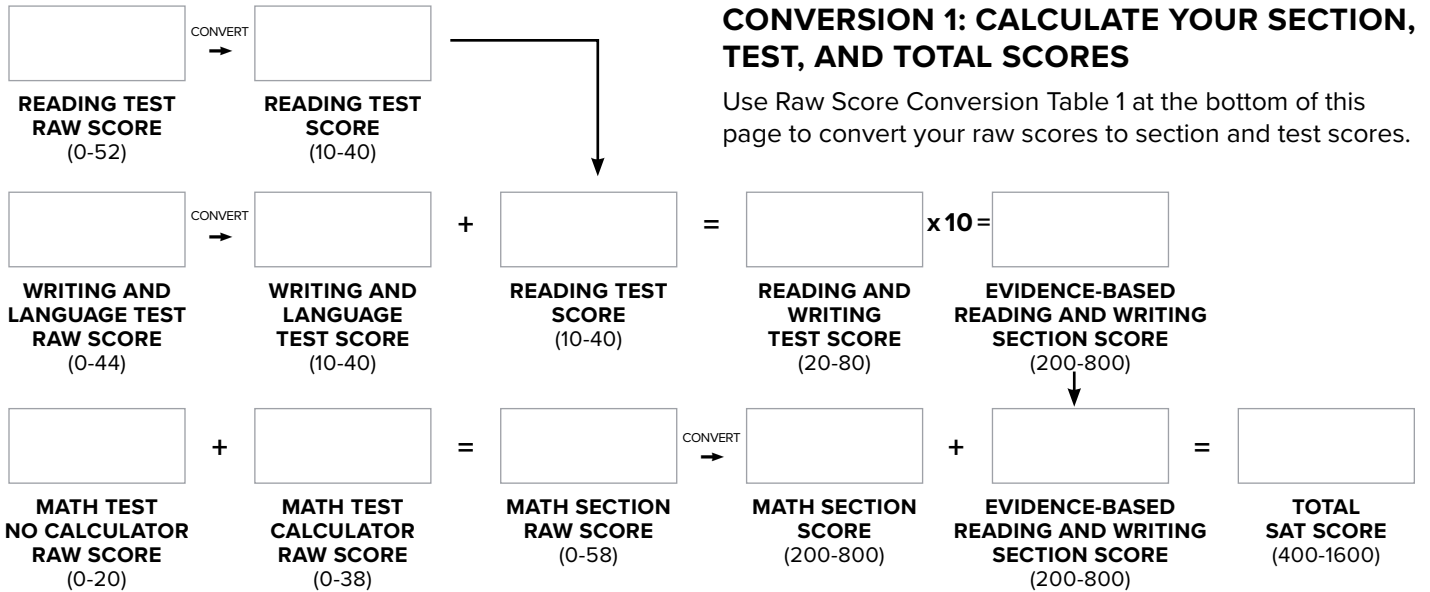
MATH TEST – NO CALCULATOR RAW SCORE
(Total # of Correct Answers)

Math Test – Calculator Answers

QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	B	
2	A	
3	B	
4	C	
5	D	
6	B	
7	B	
8	B	
9	C	
10	D	
11	C	
12	C	
13	C	
14	A	
15	B	
16	C	
17	C	
18	B	
19	A	
20	C	
21	C	
22	C	
23	A	
24	C	
25	A	
26	A	
27	D	
28	D	
29	D	
30	D	
31	5	
32	138	
33	2300	
34	39	
35	$\frac{3}{2}$	
36	$\frac{9}{4}$	
37	733	
38	3.6	

MATH TEST – CALCULATOR RAW SCORE
(Total # of Correct Answers)

SAT Practice Test Worksheet: Section, Test, and Total Scores



Raw Score Conversion Table 1: Section and Test Scores

RAW SCORE (# OF CORRECT ANSWERS)	Reading Test Score	Writing and Language Test Score	Math Section Score
0	10	10	200
1	10	10	200
2	10	10	210
3	10	11	220
4	11	11	230
5	12	12	250
6	13	13	270
7	13	14	280
8	14	14	300
9	15	15	310
10	16	16	320
11	16	16	340
12	17	17	350
13	17	17	360
14	18	18	370
15	18	18	380
16	19	18	390
17	19	19	400
18	20	19	410
19	20	20	420
20	21	20	430
21	21	21	440
22	22	21	450
23	22	22	460
24	23	23	470
25	23	23	480
26	24	24	490
27	24	24	500
28	25	25	500
29	25	25	510

RAW SCORE (# OF CORRECT ANSWERS)	Reading Test Score	Writing and Language Test Score	Math Section Score
30	26	26	520
31	26	27	520
32	27	27	530
33	28	28	540
34	28	29	540
35	29	29	550
36	29	30	560
37	30	31	570
38	30	31	580
39	31	32	580
40	31	33	590
41	31	34	600
42	32	36	610
43	32	38	610
44	33	40	620
45	33		630
46	34		640
47	35		650
48	36		660
49	36		670
50	37		680
51	39		690
52	40		700
53			710
54			730
55			750
56			770
57			790
58			800