PRACTICE TEST

5

Test Reminders

1. A #2 pencil is required.

2. Follow the time restrictions for each section.

3. You are allowed to write on the test.

4. Circle your answers to ensure accuracy when filling in the answer sheet, provided on page 317.

5. Calculate your estimated score by using the conversion chart on page 319.

Reading Test

65 MINUTES, 52 QUESTIONS

1

Directions: Each passage or pair of passages below is followed by several questions. Read each passage or pair, and then choose the best answer to each question based on what is stated or implied in the passage or passages and in any accompanying graphics (such as a table or graph).

Questions 1-11 are based on the following passage.

This passage is adapted from Charles C. Mann, "Renewables Aren't Enough. Clean Coal is the Future." ©2014 by Charles C. Mann.

Because most Americans rarely see coal, they tend to picture it as a relic of the 19th century, black stuff piled up in Victorian alleys. In fact, a
Line lump of coal is a thoroughly ubiquitous 21st-
(5) century artifact, as much an emblem of our time as the iPhone. Today coal produces more than 40 percent of the world's electricity, a foundation of modern life. And that percentage is going up: in the past decade, coal added more to the global
(10) energy supply than any other source.
Nowhere is the preeminence of coal more apparent than in the planet's fastest-growing, most populous region: Asia, especially China. In the past few decades, China has lifted several hundred
(15) million people out of destitution. That advance couldn't have happened without industrialization, and that industrialization couldn't have happened without coal. More than three-quarters of China's electricity comes from coal, including the power
(20) for the giant electronic plants where iPhones are assembled. More coal goes to heating millions of homes, to smelting steel (China produces nearly half the world's steel), and to baking limestone to make cement (China provides almost half the
(25) world's cement). In its frantic quest to develop, China burns almost as much coal as the rest of the world put together—a fact that makes climatologists shudder.
China already emits one-quarter of the world's
(30) greenhouse gases, more than any other country. The International Energy Agency (IEA), a Paris-based think tank sponsored by 28 developed nations, estimates that Beijing will double its ranks of coal-fired power plants by 2040. If that happens,
(35) China's carbon dioxide figures could double or even triple. "Coal is too low-cost, too plentiful, and too available from reliable sources to be replaced," says fuel analyst John Dean. "China is putting in solar and wind power at a tremendous pace, but it
(40) will have to use more and more coal just to keep up with rising demand."
Dependence on coal is not just a Chinese problem, though. Countries around the world—even European nations that tout their environmental track
(45) records—have found themselves unable to wean themselves from coal. Germany, though often celebrated for its embrace of solar and wind energy, not only gets more than half its power from coal but opened more coal-fired power plants in 2013
(50) than in any year in the past two decades. In neighboring Poland, 86 percent of the electricity is generated from coal. South Africa, Israel, Australia, Indonesia—all are ever more dependent on coal. (The U.S. is a partial exception: Coal's share of
(55) American electricity fell from 49 percent in 2007 to 39 percent in 2013, largely because new techniques like fracking have cut the price of natural gas, a competing fuel.) According to the World Resources Institute, an environmental research group, almost
(60) 1,200 big new coal facilities in 59 countries are proposed for construction. Climate scientists warn that the soaring use of coal is leading the world toward "an outcome that can only be described as catastrophic."
(65) One solution may be found in a monolithic facility in Tianjin, China, known as GreenGen. This billion-dollar facility is one of the world's most advanced attempts to develop a technology known as carbon capture and storage (CCS).
(70) Conceptually speaking, CCS is simple: industries burn just as much coal as before but remove all the pollutants. In addition to the standard practice of scrubbing out ash and soot, they separate out the carbon dioxide and pump it underground, where it
(75) can be stored for thousands of years.
Many energy and climate researchers believe that CCS is vital to avoiding a climate catastrophe. Because it could allow the globe to keep burning its most abundant fuel source while drastically
(80) reducing carbon dioxide and soot, it may be more important—though much less publicized—than any renewable-energy technology for decades to come. Nobel-winning physicist Steven Chu has declared CCS essential. "I don't see how we go forward
(85) without it," he says. Unfortunately, taking that step

will be incredibly difficult. Even though most of
the basic concepts are well understood, developing
reliable, large-scale CCS facilities will be time-
consuming, unglamorous, and breathtakingly costly.
(90) Engineers will need to lavish time and money on
painstaking calculations, minor adjustments, and
cautious experiments. Meanwhile, environmentalists
have lobbied hard against the technology, claiming it
represents a concession to the coal industry at the
(95) expense of cleaner alternatives like solar and wind.

Graph 1

GLOBAL ELECTRICITY OUTPUT (GIGAWATT-HOURS)

Graph 2

China:% share of global coal consumption
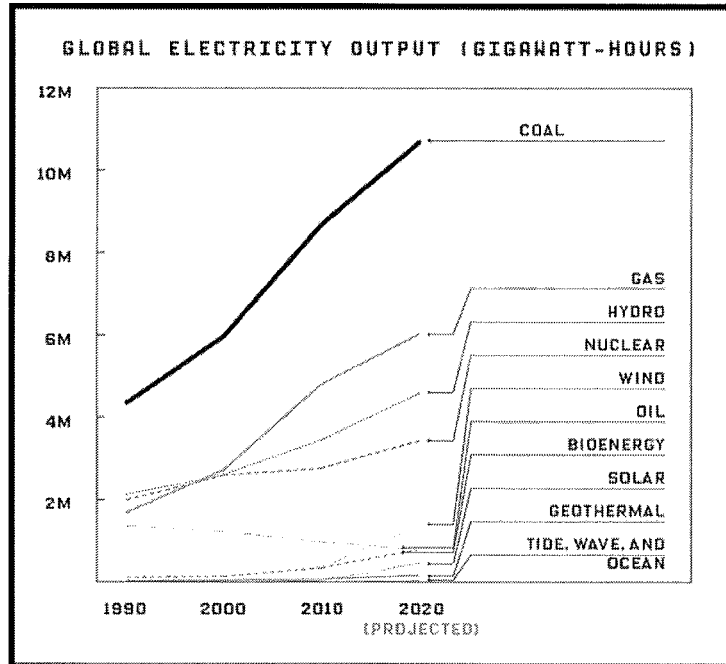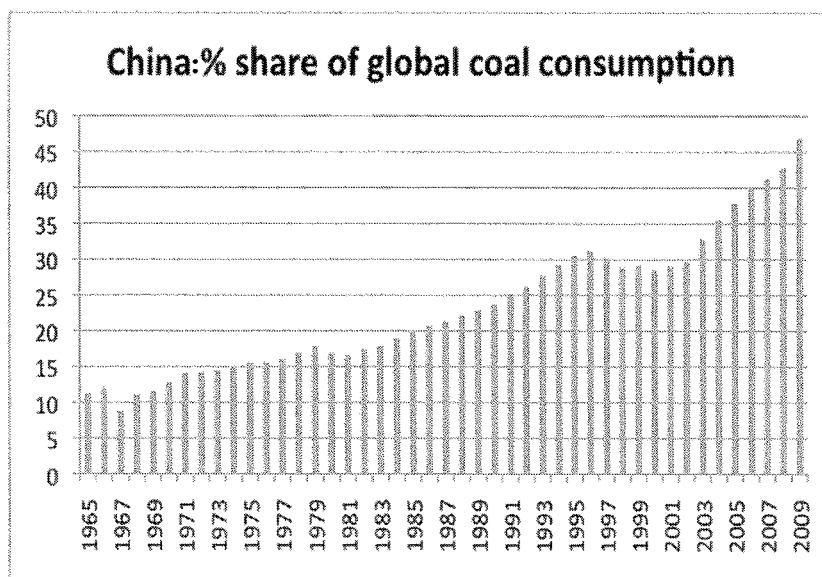
CONTINUE

1

Which of the following best expresses the main point of the passage?

A) China has become the busiest and most productive country in the world, mostly through the use of coal.
B) Money which should be spent on renewable energy sources is instead being wasted on CCS technologies for coal-fired power plants.
C) Increasing use of coal could have dire consequences, but CCS technology may provide a solution.
D) Too many countries rely too heavily on coal and should follow the U.S.'s lead in banning coal production.

2

As used in line 5, "emblem" most nearly means

A) motto.
B) symbol.
C) badge.
D) necessity.

3

Which of the following is the most likely reason that the author mentions iPhones in the first and second paragraphs (line 6, line 20)?

A) To emphasize how important coal is to our modern world
B) To demonstrate what a powerful economic force China has become
C) To contrast a technological advancement like the iPhone with an obsolete relic like coal
D) To argue that iPhone factories are primarily responsible for China's rapid growth

4

Which of the following is the most likely effect of actions like Beijing's "doubl[ing] its ranks of coal-fired power plants" (lines 33-34) ?

A) Less investment in solar and wind power
B) A large-scale climate disaster
C) Exponential growth in China's economy
D) A further reduction in the cost of coal

5

Which authoritative source referred to in the passage provides the best evidence for the answer to the previous question?

A) The International Energy Agency (line 31)
B) Fuel analyst John Dean (line 38)
C) Climate scientists (line 61)
D) Nobel-winning physicist Steven Chu (line 83)

6

As used in line 47, "embrace" most nearly means

A) limited usage.
B) widespread implementation.
C) vocal support.
D) strategic development.

7

Which of the following best describes the point of view of Nobel-winning physicist Steven Chu (line 83) ?

A) He is doubtful of the effectiveness of the CCS technology.
B) He believes CCS technology is absolutely necessary.
C) He thinks that CCS technology may be too difficult to implement, but that it is our best option for the future.
D) He is fearful and uncertain of the chances of survivability for the human race.

8

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

A) Lines 65-66 ("One solution ... GreenGen")
B) Lines 76-77 ("Many energy ... catastrophe")
C) Lines 85-86 ("Unfortunately ... difficult")
D) Lines 92-93 ("Meanwhile ... technology")

CONTINUE

9

All of the following are issues that could block the development of CSS technology EXCEPT

A) the meticulous calculation required.
B) political action by environmental groups.
C) the exorbitant expense.
D) the need to figure out the foundational concepts involved.

10

In Graph 1, according to the projections for 2020, will the total global electricity output of other fuel sources be greater than that of coal?

A) Yes, it will be about 50% more than the global electricity output of coal.
B) No, it will be a little bit less than the global electricity output of coal.
C) Yes, it will be greater than the global electricity output of coal, but only by a small amount.
D) No, it will be considerably less than the global electricity output of coal.

11

Graph 2 provides the best support for which of the following statements?

A) Lines 18-19 ("More than ... coal")
B) Lines 21-24 ("More coal ... cement")
C) Lines 26-27 ("China ... together")
D) Lines 29-30 ("China ... country")

CONTINUE

Questions 12-22 are based on the following passage.

This passage is adapted from John F. Kennedy, "Report to the American People on Civil Rights," presented on June 11, 1963.

Today we are committed to a worldwide struggle to promote and protect the rights of all who wish to be free. And when Americans are sent
Line to Vietnam or West Berlin to perform this task, we
(5) do not ask for whites only. It ought to be possible, therefore, for American students of any color to attend any public institution they select without having to be backed up by troops.
         It ought to be possible for American
(10) consumers of any color to receive equal service in places of public accommodation, such as hotels and restaurants and theaters and retail stores, without being forced to resort to demonstrations in the street, and it ought to be possible for American
(15) citizens of any color to register to vote in a free election without interference or fear of reprisal.
         It ought to be possible, in short, for every American to enjoy the privileges of being American without regard to his race or his color.
(20) In short, every American ought to have the right to be treated as he would wish to be treated, as one would wish his children to be treated. But this is not the case.
         The Negro baby born in America today,
(25) regardless of the section of the Nation in which he is born, has about one-half as much chance of completing high school as a white baby born in the same place on the same day, one-third as much chance of completing college, one-third as much
(30) chance of becoming a professional man, twice as much chance of becoming unemployed, about one-seventh as much chance of earning $10,000 a year, a life expectancy which is seven years shorter, and the prospects of earning only half as much.
(35)   This is not a sectional issue. Difficulties over segregation and discrimination exist in every city, in every state of the Union, producing in many cities a rising tide of discontent that threatens the public safety. Nor is this a partisan issue. In a time
(40) of domestic crisis men of good will and generosity should be able to unite regardless of party or politics. This is not even a legal or legislative issue alone. It is better to settle these matters in the

courts than on the streets, and new laws are needed
(45) at every level, but law alone cannot make men see right.
         We are confronted primarily with a moral issue. It is as old as the scriptures and is as clear as the American Constitution.
(50)   The heart of the question is whether all Americans are to be afforded equal rights and equal opportunities, whether we are going to treat our fellow Americans as we want to be treated. If an American, because his skin is dark, cannot eat lunch
(55) in a restaurant open to the public, if he cannot send his children to the best public school available, if he cannot vote for the public officials who will represent him, if, in short, he cannot enjoy the full and free life which all of us want, then who among
(60) us would be content to have the color of his skin changed and stand in his place? Who among us would then be content with the counsels of patience and delay?
         One hundred years of delay have passed since
(65) President Lincoln freed the slaves, yet their heirs, their grandsons, are not fully free. They are not yet freed from the bonds of injustice. They are not yet freed from social and economic oppression. And this nation, for all its hopes and all its boasts, will
(70) not be fully free until all its citizens are free.
         We preach freedom around the world, and we mean it, and we cherish our freedom here at home, but are we to say to the world, and much more importantly, to each other that this is the land of
(75) the free except for the Negroes; that we have no second-class citizens except Negroes; that we have no class or caste system, no ghettoes, no master race except with respect to Negroes?
         Now the time has come for this Nation to
(80) fulfill its promise. The events in Birmingham and elsewhere have so increased the cries for equality that no city or state or legislative body can prudently choose to ignore them.

12

Which of the following best expresses the main point of the passage?

A) Even though Lincoln freed the slaves, slavery still exists in the United States.
B) African-Americans cannot eat at the same restaurants as their white counterparts.
C) America cannot be a place of true freedom until African-Americans are given equal rights.
D) Equal rights are mandated in both religious scripture and the United States Constitution.

13

In lines 3-5 ("And when Americans ... whites only") Kennedy implies that

A) those who are sent to other countries are treated equally.
B) if non-whites are able to serve in the military and be sent into conflict, they should also be given equal rights.
C) Vietnam and West Berlin welcome travelers of all races.
D) sending non-whites to other countries is a form of discrimination.

14

The main rhetorical effect of the repetition of the word "ought" in the second and third paragraphs (lines 9-23) is to

A) persuade the audience to support racial equality in all forms.
B) list the values of the country as a whole regarding racial equality.
C) argue for an end to segregation in public places like hotels and restaurants.
D) reinforce the claim that African-Americans do not enjoy all of the benefits they are entitled to as American citizens.

15

Which of the following techniques by the author gives the best additional evidence for the answer to the previous question?

A) The list of statistics in the fourth paragraph (lines 24-34)
B) The repetition of the phrase "This is not" in the fifth paragraph (lines 35-46)
C) The metaphorical use of the phrase "rising tide" (line 38)
D) The rhetorical questions in the seventh paragraph (lines 50-63)

16

As used in line 13, "demonstrations" most nearly means

A) protests.
B) presentations.
C) revelations.
D) exhibitions.

17

The sixth paragraph (lines 47-49) represents a shift in Kennedy's argument

A) from a vague Biblical reference to a more direct reference to the U.S. founding documents.
B) from the personal aspects of the issue to the more concrete means of resolving it.
C) from the statistical and legal view of the issue to the ethical perspective.
D) from his own viewpoint to that of all Americans.

CONTINUE

18

Based on the tone and word choice in the seventh paragraph (lines 50-63), which of the following best indicates Kennedy's point of view on the issue of Civil Rights?

A) He believes the law should not be based on religious beliefs.
B) He thinks the U.S. Constitution clearly prohibits Civil Rights.
C) He believes granting Civil Rights is a moral obligation.
D) He thinks religious law and federal law differ in their messages on the issue.

19

Which of the following provides the best evidence for the answer to the previous question?

A) Lines 52-53 ("whether we ... treated")
B) Lines 55-56 ("cannot send ... available")
C) Line 64 ("One hundred ... passed")
D) Lines 69-70 ("will not be ... free")

20

What is the most likely reason Kennedy mentions Lincoln in the eighth paragraph (lines 64-70) ?

A) To compare his own views on slavery to those of Lincoln
B) To emphasize Lincoln's influence on the Civil Rights movement
C) To argue that the end of slavery did not bring an end to social inequality
D) To define freedom in more modern terms

21

The stance Kennedy takes in the passage is best described as that of

A) a skeptic seeking evidence for a claim.
B) a concerned citizen in search of a solution to a problem.
C) a leader calling his people to action.
D) a protester practicing civil disobedience.

22

As used in line 83, "prudently" most nearly means

A) foolishly.
B) discreetly.
C) cleverly.
D) judiciously.

CONTINUE

Questions 23-32 are based on the following passages.

Passage 1 is adapted from a letter written by a U.S. sailor to his sister after the U.S. invasion of Okinawa, 1945. Passage 2 is adapted from the diary of Toshihiro Oura, a platoon leader in the Japanese Imperial Army during WWII.

Passage 1

Well, we are resting quietly after our Okinawa
invasion and getting back to normal. It is Sunday
and it has been a very hot day. The bow doors and
Line   ramp were open in the afternoon and quite a few of
(5)   us went in swimming. I guess you have heard a
little about the type of enemy we have met out
here. They have no regard for their own lives at all.
We had suicide planes, suicide boats, and suicide
swimmers to contend with at Okinawa. We had a
(10)   straight cargo of ammunition for the invasion and
we had to anchor along with five other ships in a
cove about 20 miles from the beachhead till they
could handle us. Suicide planes came in and picked
off four out of the six. Us and a smaller landing
(15)   ship were the only ones that got away. We had a
lot of air attacks after that but that was our worst
time, and some of the boys were broken by the
sheer terror of it. Of course I'm not saying
anything like this in my letters home to Mother.
(20)   Some enlisted that have been out here over a year
haven't seen the action we did in that one invasion.
We have good anti-aircraft and can sure get a lot of
ack-ack in the air if necessary. When we were on
the beach there were so many ships in one bunch
(25)   that a plane didn't have a chance getting us. All the
ships opened up at once and a Japanese rally hit a
buzz saw. Well it is all water under the bridge now
and we have all profited by it.

Passage 2

Battle Situation: Nothing aside from
(30)   annihilation. No cooperation from the navy. If I
were to compare the fighting ability of the enemy,
it would be like the war of a child with an adult.
Our mountain artillery positions were knocked to
pieces by enemy tanks. We are encircled, so they
(35)   say, and about to be overrun. Consequently, all we
can do is to guard our present positions. As things
are now, even if our air and naval forces give
battle, we could not regain the lost ground. Great
numbers of enemy planes are constantly up in the
(40)   sky. In front of the island, camouflaged destroyers
and PT-boats swarm in and out. What in the world

could our forces at Rabaul or the staff of Imperial
headquarters be doing? Where have our air forces
and battleships gone? Are we to lose? Why don't
(45)   they start operations? We are positively fighting
to win, but we have no weapons. We stand with
rifles and bayonets to meet the enemy's aircraft,
battleships, and medium artillery. To be told we
must win is absolutely beyond reason. Yesterday,
(50)   our commander ordered five men to strap
explosives to themselves and charge into the
enemy line. It is a deplorable technique and
one that does nothing for morale.
        Even with such cheap tricks, the Japanese army
(55)   still depends too much on the hand-to-hand fighting
of the Meiji era, while the enemy is using highly
developed scientific weapons. Thinking it over,
however, this poorly armed force of ours has not
been overcome, and we are still guarding this
(60)   island. But this is no time for praise. If our forces
don't move, this island will soon be taken. If we, as
well as the enemy, were to fight to the end with all
available weapons, then I would be willing to give
up, whether we win, lose, be injured or be killed.
(65)   But in a war like this, where we are like a baby's
neck in the hands of an adult, even if I die, it will be
a hateful death. How regretful! My most regretful
thought is my grudge toward the forces in the rear
and my increasing hatred toward the Operational
(70)   Staff, whose choice it is to continue like this. In the
rear, they think that it is all for the benefit of our
country. In short, as present conditions are, it is a
defeat. However, a Japanese officer will always
believe, until the very last, that there will be
(75)   movements of our air and naval forces.

23

How might the author of Passage 2 respond to the
claim made by the author of Passage 1 in line 7
("They ... all") ?

A) By agreeing and claiming that he would
   volunteer for a suicide mission

B) By disagreeing and arguing that it is not their
   choice to fight in such a manner

C) By agreeing and claiming that suicide soldiers
   were highly effective

D) By disagreeing and arguing that suicide
   soldiers are not effective on the battlefield

CONTINUE

24

Which choice from Passage 2 provides the best evidence for the answer to the previous question?

A) Lines 49-53 ("Yesterday ... morale")
B) Lines 54-56 ("Even with ... Meiji era")
C) Lines 61-64 ("If we ... killed")
D) Lines 66-67 ("even ... death")

25

As used in lines 13-14, "picked off" most nearly means

A) plucked.
B) destroyed.
C) spotted.
D) flew.

26

The use of the word "buzz saw" (line 27) in Passage 1 to describe a moment in battle is meant to

A) contrast war with the sounds of home.
B) decry the horrors of war.
C) compare the noise to tedious droning.
D) highlight the violent, sudden defense.

27

In the first paragraph of Passage 2 (lines 29-53), the author's primary purpose is to

A) laud his current defensive position and the ability of the Japanese military.
B) decry the grudges he has against American soldiers.
C) lament his current defensive position and how overmatched the Japanese military is.
D) marvel at the power and majesty of the enemy.

28

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

A) Lines 30-35 ("If I were... overrun")
B) Lines 35-36 ("Consequently ... positions")
C) Lines 36-38 ("As things ... ground")
D) Lines 48-49 ("To be told ... reason")

29

As used in line 45, "operations" most nearly means

A) surgical procedures.
B) strategic planning.
C) peace negotiations.
D) military actions.

30

The author of Passage 2 gives all of the following reasons for his current situation EXCEPT

A) poor military supervisors.
B) lack of weapons.
C) abundance of suicide fighters.
D) inappropriate fighting techniques.

31

In Passage 2, the main metaphorical effect of lines 65-66 ("where ... adult") serves to

A) highlight the mismatch between militaries.
B) compare America to the adults of the whole world.
C) juxtapose the happiness of childhood with the horrors of war.
D) reveal the barbarity each side inflicted upon the other.

32

The authors of Passage 1 and Passage 2 would most likely agree on which of the following statements regarding suicide soldiers?

A) Suicide soldiers are necessary to fight a superior military.
B) Suicide soldiers are largely ineffectual during modern military battles.
C) Suicide soldiers can have a demoralizing effect.
D) Suicide soldiers have little concern for their personal welfare.

CONTINUE

Questions 33-42 are based on the following passage.

This passage is adapted from Kyle Wiens, "Why We Fix: A DIY Manifesto." ©2014 by Kyle Wiens.

There are certain sounds that I feel in my bone marrow: the scraping of metal on metal, the death grind of misaligned gears, the low clanking of an
Line engine on the verge of failure. These are the noises
(5) that have defined my life.

I'm a tinkerer by inclination and a fixer by profession. Ten years ago my college roommate and I founded iFixit, a free online repair manual. We teach people how to repair the stuff they own,
(10) in part because most of them have lost both the skill and the inclination to repair. Fixing things is a dying art. This cultural lapse is reinforced by society's celebration of ending over mending. But here's the thing: broken isn't a permanent state.
(15) It's a challenge, as if entropy were issuing us a personal ultimatum: "Fix this, or it's mine."

Challenge accepted. Just the other day my Ridge air compressor started making an unfriendly racket. A bolt had worked loose and was rattling
(20) around inside. I took the compressor apart, fished out the renegade bolt, and worked it back into position. But I got a little too enthusiastic during reassembly. I over tightened a screw and snapped it in two.
(25) It was only after I broke the air compressor that I bothered to wonder if Ridge provided service manuals or spare parts. My experience in the repair industry has taught me to expect neither. That's because I specialize in repairing electronic
(30) devices—things like smartphones and laptops. Most computer brands have stopped releasing repair information or replacement parts to the public.

It's the same story in the wider market.
(35) Twenty years ago replacement parts for things such as televisions and refrigerators were easy to come by. The corner mom-and-pop repair shop could swap out a capacitor or find the replacement motor you needed. Now those repair stores are
(40) almost all gone. Many manufacturers have stopped supporting repair-minded consumers.

When my air compressor broke, I just assumed that the growing repair black hole had already swallowed up the power-tool industry.
(45) I was wrong. Nearly all the major brands of power tools have diagrams and replacement parts available on their websites. I found the

part I needed and Ridge shipped it to me. My out-of-pocket expense: $13. I popped the piece into
(50) place, flipped the switch, and fired up my air compressor. Good as new.

I live for moments like that. I fought a battle and won. I hear similar victory stories every day from people who used iFixit guides to repair
(55) something they didn't think they could—college students who salvage coffee-soaked laptops, mothers who rescue a busted iPod for their kids, soldiers overseas who patch up their phones and can call home again. Fixing something helps them
(60) reclaim their power—over technology, over consumerism, over helplessness.

Repairing our possessions is starting to make inroads into popular culture again. In 2012, 86 percent of voters in Massachusetts passed a Right to
(65) Repair law that requires automakers to give owners access to the same diagnostic and repair information that authorized repair facilities have. Last year 114,322 Americans signed a petition demanding the White House legalize cellphone unlocking.
(70) Legislation is now creaking through Congress, and if our voices are loud enough, we just might earn the right to tinker with our phones.

Making something whole again expresses what it means to be human: a demonstration of
(75) our capacity to be resourceful, meet challenges, and solve problems. Speaking of problems: That repaired air compressor? My brother loaded it into the back of his truck and took off up a hill. The air compressor rolled down the truck bed, through the
(80) tailgate, and onto the road. It's busted. Challenge accepted.

33

It can be reasonably inferred from the passage that the author believes which one of the following claims about our culture's relationship with technology?

A) We tend to abandon our products before attempting to repair them.
B) We feel technological products are so well-built that there is no need to repair them.
C) Technology was better in the past because we could find parts more easily.
D) Technology bogs down our lives and distracts us from the important things.

34

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

A) Lines 6-7 ("I'm a tinkerer... profession")
B) Lines 11-13 ("Fixing... mending")
C) Lines 13-16 ("But here's... mine")
D) Lines 27-28 ("My experience... neither")

35

As it is used in line 18, "unfriendly" most nearly means

A) hateful.
B) antisocial.
C) incompatible.
D) unfavorable.

36

As it is used in line 21, "renegade" most nearly means

A) submissive.
B) detached.
C) rebellious.
D) devious.

37

The author's attitude toward repairing his possessions could best be described as

A) annoyed.
B) enthusiastic.
C) respectful.
D) thrifty.

38

Based on the author's word choices in the fourth paragraph (lines 25-33), one can reasonably infer that the author views the repair industry in which of the following ways?

A) He holds it in high regard.
B) He is cautious but optimistic about its business practices.
C) He holds it in low regard.
D) He believes it is empowering the consumer.

39

The fifth paragraph (lines 34-41) serves mainly to

A) reminisce about a time when life was simpler.
B) indicate the author's pleasant surprise that the plans were available for his air compressor.
C) lament the demise of mom-and-pop repair stores.
D) describe the changes that have befallen the manufacturing industry's support of repair-minded consumers.

40

Which of the following most accurately describes the author's viewpoint on our cultural relationship with technology?

A) We have given up hope of ever being able to repair our possessions.
B) The more integrated technology becomes, the less we will need to repair our possessions.
C) Many are fighting to regain the ability to repair their possessions.
D) The power-tool industry is the only industry to provide diagrams and replacement parts.

41

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

A) Lines 35-37 ("Twenty years... come by")
B) Lines 42-44 ("When my... industry")
C) Lines 59-61 ("Fixing... helplessness")
D) Lines 62-67 ("Repairing... facilities have")

42

Based on the author's statement on lines 73-76 ("Making ... problems"), what can you infer about the author's opinion of do-it-yourself repair?

A) He finds do-it-yourself repair difficult.
B) He finds do-it-yourself repair exciting.
C) He finds do-it-yourself repair nerve-wracking.
D) He finds do-it-yourself repair empowering.

CONTINUE

Questions 43-52 are based on the following passage.

This passage is adapted from Kurt Vonnegut, *Breakfast of Champions.* ©1973 by Kurt Vonnegut.

Phoebe Hurty hired me to write copy for ads about teenage clothes. I had to wear the clothes I praised. That was part of the job. And I became
Line friends with her two sons, who were my age. I was
(5) over at their house all the time.

She would talk bawdily to me and her sons, and to our girlfriends when we brought them around. She was funny. She was liberating. She taught us to be impolite in conversation... about
(10) American history and famous heroes, about the distribution of wealth, about schools, about everything.

I now make my living by being impolite. I am clumsy at it. I keep trying to imitate the
(15) impoliteness which was graceful in Phoebe Hurty. I think now that grace was easier for her than it is for me because of the mood of the Great Depression. She believed what so many Americans believed then: that the nation would be happy and
(20) just and rational when prosperity came.

I never hear that word anymore: *Prosperity.* It used to be a synonym for *Paradise.* And Phoebe Hurty was able to believe that the impoliteness she recommended would give shape to an American
(25) paradise.

Now her sort of impoliteness is fashionable. But nobody believes anymore in a New American paradise. I sure miss Phoebe Hurty.

As for the suspicion I express in this book,
(30) that human beings are robots, are machines: It should be noted that people, mostly men, suffering from the last stages of the disease syphilis, from *locomotor ataxia,* were common spectacles in downtown Indianapolis and in circus crowds
(35) when I was a boy.

Those people were infested with carnivorous little corkscrews which could be seen only with a microscope. The victims' vertebrae were welded together after the corkscrews got through with
(40) the meat between. The syphilitics seemed tremendously dignified—erect, eyes straight ahead.

I saw one stand on a curb at the corner of Meridian and Washington Streets one time,
(45) underneath an overhanging clock which my father designed. The intersection was known locally as "The Crossroads of America."

This syphilitic man was thinking hard there, at the Crossroads of America, about how to get
(50) his legs to step off the curb and carry him across Washington Street. He shuddered gently, as though he had a small motor which was idling inside. Here was his problem: his brains, where the instructions to his legs originated, were being eaten alive by
(55) corkscrews. The wires which had to carry the instructions weren't insulated anymore, or were being eaten clear through. Switches along the way were welded open or shut.

This man looked like an old, old man, although
(60) he might have been only thirty years old. He thought and thought. And then he kicked two times like a chorus girl.

He certainly looked like a machine to me when I was a boy.
(65)   I tend to think of human beings as huge, rubbery test tubes, too, with chemical reactions seething inside. When I was a boy, I saw a lot of people with goiters. Those unhappy Earthlings had such swollen thyroid glands that they seemed to
(70) have zucchini squash growing from their throats.

All they had to do in order to have ordinary lives, it turned out, was to consume less than one-millionth of an ounce of iodine every day.

My own mother wrecked her brain with
(75) chemicals, which were supposed to make her sleep.

Likewise, when I get depressed, I take a little prescription pill, and I cheer up again.

And so on.

43

Which of the following provides the most reasonable summary of the passage?

A) A writer recalls a mentor and explains how he views humanity.

B) A writer chastises the state of the U.S. and explains the symptoms of syphilis.

C) A writer laments his mother's passing and his addiction to alcohol and pills.

D) A writer explains that all humans are machines, even his beloved mentor.

44

To what does the author attribute the fact that Phoebe Hurty was more "graceful" (line 15) in her impoliteness?

A) She believed in an ideal that people no longer believe in.
B) Unlike the author, she wasn't required to be impolite as part of her job.
C) She was able to provide opportunities to others through her work.
D) She expressed irreverence toward "famous heroes" (line 10).

45

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

A) Lines 13-14 ("I now make ... at it")
B) Lines 14-16 ("I keep ... Phoebe Hurty")
C) Lines 16-20 ("that grace ... came")
D) Line 26 ("Now ... fashionable")

46

As used in line 37, "corkscrews" most likely refers to

A) goiters.
B) poison.
C) bottle-openers.
D) bacteria.

47

All of the following statements are true about the corkscrews EXCEPT

A) They eat flesh.
B) They get between bones in the spine.
C) They make people feel dignified.
D) They can be seen only with a microscope.

48

The main metaphorical effect of the word "switches" in line 57 is to

A) compare structures in the body to mechanical parts.
B) insinuate that the brain can be turned on and off.
C) highlight the difficulties that syphilitics face in day-to-day life.
D) allude to the Crossroads of America and its intricate crosswalk and stoplight system.

49

In lines 71-73 ("All they ... day") the author mentions the cure for goiters to suggest

A) the fact that there is now little fear of suffering from this condition.
B) the prevalence of such diseases among ordinary people.
C) the forethought and knowledge required to combat deadly diseases.
D) the irony of there being such a simple fix for the condition.

50

Based on the author's description of the syphilitic man in the ninth paragraph (lines 48-58), what is the most likely response the author would give if confronted with the death of a human?

A) He would admit that human beings are inherently flawed.
B) He would claim that human beings die, just as machines fall apart.
C) He would claim that machines can live forever and so can humans.
D) He would argue that humans have been on Earth longer than simple machines.

CONTINUE

51

All of the following aspects of the description of the syphilitic man provide evidence for the answer to the previous question EXCEPT

A) the idling motor (line 52)
B) the brains being eaten alive (lines 53-54)
C) the uninsulated wires (lines 55-56)
D) the welded switches (lines 57-58)

52

As used in line 75, "chemicals" most nearly means

A) alcohol.
B) medicines.
C) iodine.
D) reactions.

STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

Writing and Language Test

35 MINUTES, 44 QUESTIONS

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

2

Directions: Each passage below is accompanied by several questions which may ask you to consider revisions to improve expression of ideas or correct grammatical errors. Some questions may ask you to make editing decisions which involve a graphic (a table or chart). For each question, choose the answer that most effectively improves the passage. Select "NO CHANGE" to leave the highlighted portion as it is.

Questions 1-11 are based on the following passage.

In sixteenth-century England, travelers used so-called pocket maps, complete with **1** bright commentary about roads and destinations written by the printer, to get from point A to point B. And today such objects are being used to learn how a burgeoning sense of national identity came to characterize English culture of the time. Simply by representing locations of **2** interest; such as market towns in relationship to each other, these maps lent legitimacy to the subject's point of view.

Richard Helgerson, one of the first scholars to connect the changing English identity with the printed publications of the Elizabethan **3** era, wrote that maps let people "see in a way never before possible the country **4** to which they belonged and at the same time showed royal authority to be a merely ornamental adjunct to that country. **5** Maps opened a conceptual gap between the land and its ruler." People began to believe that being English was an individual trait, applicable to commoners, aristocrats, and the crown as well—encouraged in this view by a bound paper book sized to fit inside a pocket.

1

Which choice best captures the sense of the pocket maps being appealing and full of variety?

A) NO CHANGE
B) colorful
C) multi-hued
D) luminous

2

A) NO CHANGE
B) interest, such as market towns in relationship to each other these
C) interest—such as market towns in relationship to each other, these
D) interest, such as market towns in relationship to each other, these

3

All of the following choices are appropriate EXCEPT

A) NO CHANGE
B) day
C) period
D) time

4

A) NO CHANGE
B) which
C) from which
D) in which

5

Which choice provides the most effective transition?

A) Maps furthermore opened
B) Maps, however, opened
C) Maps thus opened
D) Maps likewise opened

CONTINUE

[1] From the outside, pocket maps look unremarkable. [2] Their interiors surprise the modern reader with the work of multiple engravers, commentary added by printers to make the book more saleable, and **6** there are handwritten notes in the margins made by their owners, known as marginalia. [3] Overview pages show large distances with few details; smaller expanses of land are crowded with roads, towns, trees, and occasionally topography. [4] They also include tables, showing how far the walk is from one town to another. [5] The books are often found at antique shops or auction houses and can fetch high prices. **7**

It may seem a great distance from personally modified maps to political poems, but research **8** showing the influence of pocket maps on the poetry of John Milton, Edmund Spenser, and others already connected by scholars to the English formation of national identity. There is evidence that Milton and Spenser were familiar with pocket maps. Milton was the son of a moneylender; he traveled to collect debts for his father's business. The printer for his political pamphlets also printed a best-selling pocket map titled *A Direction for the English Traveler*. Spenser worked for the crown in **9** Ireland, he traveled to London on business and to present his poetry to the queen.

Spenser's epic poem *The Faerie Queen*, written during the reign of Elizabeth I, also takes its cues from a non-royal perspective as the author relates adventures of knights in the romantic tradition of Arthurian legend. Compared with later epic works, Spenser's poem appears to be **10** pro-monarch since an absent figurehead and a text that glorifies heroic endeavor **11** shows his elevation of aristocracy over crown. Parts of the poem may even show the influence of pocket maps specifically.

6

A) NO CHANGE
B) marginalia handwritten by their owners
C) handwritten notes being made in the margins by their owners—marginalia
D) handwritten by their owners, there are notes known as marginalia

7

To improve focus, which sentence should be deleted from the third paragraph?

A) sentence 1
B) sentence 3
C) sentence 4
D) sentence 5

8

A) NO CHANGE
B) showed
C) shows
D) will show

9

A) NO CHANGE
B) Ireland: he traveled
C) Ireland, however, he traveled
D) Ireland, traveling

10

A) NO CHANGE
B) pro-monarch, but
C) pro-monarch; similarly,
D) pro-monarch;

11

A) NO CHANGE
B) showed
C) show
D) showing

Questions 12-22 are based on the following passage.

Diabetes appears to be a disease written deeply in human genes, a feature millions of years old, which can emerge yet also retreat through the influence of environmental forces such as diet, a new study suggests. Researchers looked at how obesity, in particular, can trigger the onset of Type 2 diabetes in both mice and humans by manipulating how genes are expressed. They found that obesity, in **12** affect, can change the chemical tags associated with DNA, called the epigenome. These epigenetic changes modify how genes behave and can alter the production of proteins necessary for proper metabolism and secretion of insulin, the hormone that controls blood sugar levels.

The good news is that diseases brought on by such epigenetic changes can be reversed, the scientists at Johns Hopkins University in Baltimore said in their study. The study may help explain why Type 2 diabetes, a disease that was hardly seen a few generations ago, **13** once affected more than 300 million adults in North America, with some **14** populations being far more affected than others were—a conspiracy of both genetic and epigenetic factors.

Total Number of People with Type 2 Diabetes Worldwide
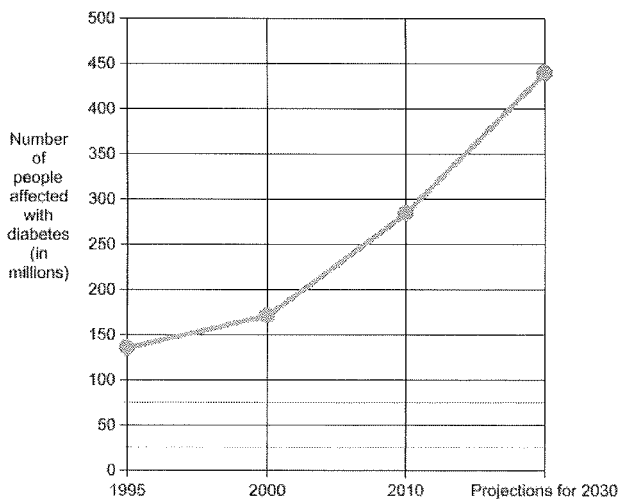
12

A) NO CHANGE
B) effects
C) effect
D) affective

13

Which choice correctly matches the information from the chart?

A) NO CHANGE
B) once affected more than 200 million adults in North America
C) now affects more than 400 million adults worldwide
D) now affects more than 300 million adults worldwide

14

A) NO CHANGE
B) populations that were most affected by far
C) populations far more affected than others
D) populations more affected than other populations by far

CONTINUE

In people with Type 2 diabetes, the body **15** has lost either the ability to produce enough insulin or **16** have a response to the insulin that is produced. Insulin is the hormone that triggers the body's cells to take up sugar from the bloodstream, so in people with Type 2 diabetes, the level of sugar in the blood **17** raises too high.

It is well established that people who are obese are at increased risk of developing Type 2 diabetes, so the Hopkins scientists **18** likewise studied obese mice to understand how obesity is related to the disease. The mice in the study were **19** clones—all had identical genetics. The researchers found that the mice placed

15

A) NO CHANGE
B) losing
C) had lost
D) having lost

16

A) NO CHANGE
B) the ability to respond
C) to respond
D) has lost the ability to respond

17

A) NO CHANGE
B) is raised
C) rises
D) rising

18

A) NO CHANGE
B) first
C) next
D) unfortunately

19

All of the following choices use correct punctuation EXCEPT

A) clones, and so
B) clones, all
C) clones: all
D) clones; all

on a high-fat diet grew obese and diabetic; mice on a regular diet stayed lean and healthy. This much was expected. **20**

A study published in August 2014 found that grizzly bears essentially become diabetic during hibernation, and then "recover" when they awaken. The bears' diabetes is induced by the accumulation of fat in the months **21** proceeding their winter sleep. Once the bears are in a diabetic state, insulin stops working, and, in the absence of more food while hibernating, the insulin resistance allows the bears to effectively break down their fat stores for energy.

This finding points to the idea that diabetes is a feature encoded in our DNA that can have evolutionary advantages in a feast-or-famine world, the researchers said. "It's likely that when food supplies are highly variable, these epigenetic changes help our bodies adapt to temporary surges in calories," said Dr. Andrew Feinberg, leader of the Johns Hopkins study. **22**

20

The writer would like to add a sentence here to serve as an effective conclusion to this paragraph and as a transition to the next. Which choice best accomplishes this goal?

A) It's likely that when food supplies are highly variable, these epigenetic changes help our bodies adapt to temporary surges in calories.
B) Some of the epigenetic changes that the scientists discovered were associated with genes already known to raise diabetes risk.
C) The study also suggests that researchers could develop an epigenetic test to identify people on the path to diabetes much earlier than can now be done.
D) Yet although the mice started life with identical genes, it was clear that the lean and obese mice had radically different gene expression as adults, a process common among mammals.

21

A) NO CHANGE
B) preceding
C) producing
D) precedent

22

If another sentence were added at this point, continuing the quote from Dr. Feinberg, which of the following choices would be most effective?

A) "Since humans don't hibernate, however, the grizzly bear study may have little bearing on our research."
B) "But if the high-calorie diet continues over the long term, the same epigenetic pattern raises the risk for disease."
C) "But when the food supply is steady, we might eat too much, and then we'll get fat, and then we'll have a higher risk of diabetes."
D) "Overall, there are still many factors related to the onset of Type 2 diabetes that we scientists don't yet understand, but we'll keep trying!"

CONTINUE

Questions 23-33 are based on the following passage.

Astrid Roquette is feeling [23] fun, so much so that she pirouettes into two more somersaults that take her from floor to ceiling, and back again, in the cramped quarters of the International Space Station. Astrid takes her daily morning inventory of what she loves about her life as a NASA astronaut in space. The views of Earth are astounding. She can see how fall is moving in on the Northern Hemisphere, where vast swatches of bright green [24] will be fading into brown and gray.

Astrid remembers how elated she was when she was picked to be one of the astronauts to go into space to spend weeks on a space station. It had been her dream to look at Earth from afar ever since she had seen footage of Neil Armstrong take his first steps on the moon. All those years of study—she had majored in physics—the brutal competition to get in on astronaut training, that grueling training where personality counted as much as physical and intellectual prowess. The nail-biter weeks of waiting to see who among her group would be the chosen. [25] And then she received word that she had successfully completed the course and been chosen.

[26] Time to exercise. Astrid floats to the exercise equipment to do resistance training to keep [27] them bones and muscles toned. Crew mate Oleg is already there, exercising away. Astrid floats down next to him and starts "pumping iron."

---

[23]

Which choice is most consistent with the tone of the passage?

A) NO CHANGE
B) impish
C) pretty good
D) devilish

[24]

A) NO CHANGE
B) is fading
C) are fading
D) had been fading

[25]

Which sentence is most consistent with the tone of and provides the best conclusion for the second paragraph?

A) NO CHANGE
B) And she was one of the chosen few.
C) And then, at long last, the results: she made it!
D) Finally, she achieved the success she had been thinking about for a long time.

[26]

If more content were inserted at this point, what would be the most effective topic?

A) An illustration of more of Astrid's daily activities, such as those related to diet and hygiene
B) A statistical analysis of a person's chances of being accepted into the space program
C) A scientific explanation of the negative effects weightlessness can have on the human body
D) A further exploration of the reasons Astrid chose to become an astronaut

[27]

A) NO CHANGE
B) these
C) those
D) their

Astrid knows Oleg's excited about that day's activity: extravehicular activity (EVA), or space-walking. EVA-ing is a full-day affair. "Going outside" is the fun and easy part of the deal. It's the prep that's the killer. The last few days were the prep days, involving battery charging, suit sizing, tool gathering, studying new procedures, reviewing tasks involving the robotic arm, practicing how to get in and out of the airlock, planning for emergencies, [28] and they have to figure out when to sleep and eat.

Soon, [29] she and Oleg are in their suits, heading out the airlock and, *voilà*! it's space in all its magnificence. Astrid [30] has fun in a void that is busy, active, and [31] has the potential of treachery. Space is blowing hot and cold, depending on the solar flares and wind, and the vacuum. Astrid "feels" the sunrise because she feels the change in the heat—it's getting way hotter.

Astrid snaps to attention as Oleg motions to her to follow him to a section of the space [32] station, where something seems to be amiss. They both inspect a bolt—it's busted, and that's bad news for the power channel. Bad bolt equals diminished power to the space station. And this means more time "outside"—10 hours, no food, no bathroom. Ah well. Astrid is okay with this. [33]

28

A) NO CHANGE
B) and figuring out
C) and figure out
D) also they need to figure out

29

A) NO CHANGE
B) her
C) herself
D) she herself

30

Which choice is most consistent with the tone of the passage?

A) NO CHANGE
B) relaxes
C) revels
D) feels nice

31

A) NO CHANGE
B) potentially treacherous
C) could be a place of treachery
D) with potential treacherousness

32

A) NO CHANGE
B) station, in which
C) station where
D) station that

33

Which sentence, inserted here, would provide the most effective conclusion?

A) She's at the edge of the universe, doing what she loves.
B) She can go for a long time without eating or using the bathroom.
C) She has no choice. She has a job to do.
D) She understands the importance of repairing the bolt and restoring full power to the station.

CONTINUE

Questions 34-44 are based on the following passage.

In 221 B.C., when Qin Shi Huang became emperor, China had just ▊34▊ finished over 200 years of provincial conflict known as the Warring States Period. Huang is credited with unifying these provinces under one centralized ▊35▊ government and he established the capital at Xianyang. With centralization came the power to direct a huge workforce able to accomplish remarkable building projects, including an early version of the Great Wall of China. Another major project was the emperor's elaborate burial complex, ▊36▊ which was erected during his lifetime.

In March 1974, peasants working in a field approximately 20 miles east of Xian ▊37▊ found a burial site. Soon identified as the tomb complex of the first emperor, this find was trumpeted as one of the most important archeological discoveries of the 20th century. Excavation of the area ▊38▊ beginning almost immediately. By 1975, preliminary digs and surveys estimated the site to encompass some 20 square miles.

▊34▊

Which choice is most consistent with the information in the first paragraph?

A) NO CHANGE
B) come out of
C) emerged from
D) completed

▊35▊

A) NO CHANGE
B) government and establishing
C) government and established
D) government to establish

▊36▊

The writer is considering revising the end of this sentence to better illustrate that the burial complex was an elaborate project. Which of the following best serves that intention?

A) which was said to have cost more than other tombs previously constructed
B) which still survives, relatively intact, some 2,000 years later
C) supervised directly by the emperor up until just a few months before his death
D) which reportedly took an estimated 700,000 workers some three decades to complete

▊37▊

Which choice most effectively conveys the idea that the peasants uncovered the burial site unintentionally?

A) NO CHANGE
B) stumbled upon
C) discovered
D) fell into

▊38▊

A) NO CHANGE
B) begins
C) began
D) will begin

CONTINUE

In addition to a pyramid mound marking the emperor's tomb, remains of a palace, offices, store houses, stables complete with horses' bones and real straw and sacrificial altars and cemeteries for workers who were killed—presumably to protect grave treasures from robbers—have all been identified. Four pits were **39** unearthed, three of which contained thousands of life-size figures, most in **40** fragments: the fourth pit was **41** empty, suggesting the burial site was left unfinished.

Researchers discovered the approximately 8,000 terracotta soldiers had been arranged in battle formation, and no two figures looked exactly the same. In addition to the soldiers, clay horses, bronze chariots, weapons and other artifacts were unearthed at the site. Restorers set about putting the figures back together again, building bodies, replacing heads, fixing painted surfaces, and **42** they assembled numerous chariots and several hundred horses and their grooms.

[1] The restoration process revealed how the figures originally had been made. [2] An estimated work force of 700,000 convicts and forced laborers were pressed into service. [3] Slavery during the Qin dynasty was mostly confined to certain criminal classes. [4] Craftsmen who knew how to make terracotta drainage pipes applied their skill to create the figures using molds and an assembly-line production system of body parts. [5] Once the figures were assembled, distinctive surface features were applied with clay. **43**

[1] Museums were built nearby to display artifacts, and as tourism increased, the city of Xian opened more hotels, restaurants and gift shops. [2] By the late 1970s, part of the site was opened for tourists. [3] Soon the area was one of the premier tourist attractions in China, with tour groups arriving daily. [4] The discovery of the burial complex and its terracotta army brought worldwide attention to the city of Xian, along with the need to prepare for visitors. **44**

39

A) NO CHANGE
B) unearthed, which
C) unearthed, three of them
D) unearthed and three of them

40

A) NO CHANGE
B) fragments; the fourth pit was
C) fragments, the fourth pit being
D) fragments, the fourth pit was

41

A) NO CHANGE
B) empty, with a suggestion that
C) empty to suggest
D) empty, it suggested that

42

A) NO CHANGE
B) to assemble
C) assembling
D) an assembly of

43

Which sentence should be deleted from the fourth paragraph to improve the focus of the paragraph?

A) Sentence 2
B) Sentence 3
C) Sentence 4
D) Sentence 5

44

Which of the following would be the best arrangement for the sentences in this paragraph?

A) 4, 2, 1, 3
B) 2, 3, 1, 4
C) 3, 2, 4, 1
D) 1, 3, 2, 4

STOP   IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

Math Test

25 MINUTES, 20 QUESTIONS

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

3

For questions 1-20, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

Notes:

1. The use of a calculator **is not permitted.**
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

$A = \pi r^2$
$C = 2\pi r$

$A = lw$

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

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

Special Right Triangles

$V = lwh$

$V = \pi r^2 h$

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

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

$V = \frac{1}{3}lwh$

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 measures in degrees of the angles of a triangle is 180.

CONTINUE
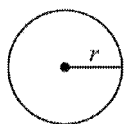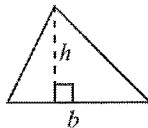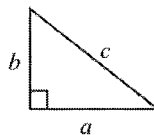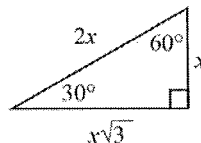
Questions 1 and 2 refer to the following information.

At a seafood restaurant, the signature food is the salmon sandwich. The sandwich can be purchased as a combo for $7.00, or by itself for $5.00. The combo comes with fries and a drink.

1

Which of the following functions model the total cost for making one combo? T is the total cost, S is the cost to make the sandwich, F is the cost of the fries, and D is the cost of the drink.

A) $T = SFD$

B) $T = S + F + D$

C) $T = -S - F - D$

D) $T = \frac{SF}{D}$

2

If the cost of making the sandwich is $2.50, the cost of making fries is $0.75, and the cost of the drink $0.25, what is the margin of profit for every combo sold?

A) $2.00

B) $2.50

C) $3.00

D) $3.50

3

$$(3x - 3)(2x + 1) = 6$$
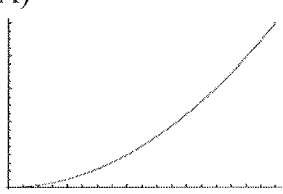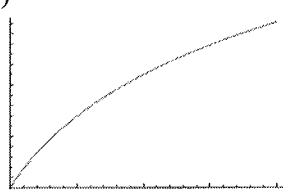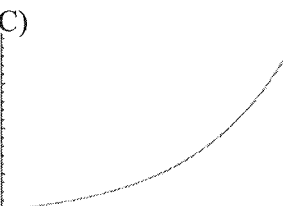
What are the roots of the quadratic equation above?

A) $x = -1, \frac{3}{2}$

B) $x = -\frac{1}{2}, 1$

C) $x = \frac{1}{2}, -\frac{1}{6}$

D) $x = -\frac{1}{8}, \frac{1}{3}$

CONTINUE

4

A search engine compiles results of sites by positively correlating their clicks with their relative position on the list, with a higher position on the list coming earlier. A positive correlation occurs when, as one value increases, the other does as well. If the number of clicks has a logarithmic decay of impact on the ranking, which of the following graphs properly demonstrates this relationship?

A)

B)

C)

D)

5

$$f(x) = (x - 1)(x - 3)$$
$$g(x) = x^2 - 1$$

Based upon the equation above, what is the value of $f\big(g(-2)\big)$?

A) 0
B) 3
C) 24
D) 224

6
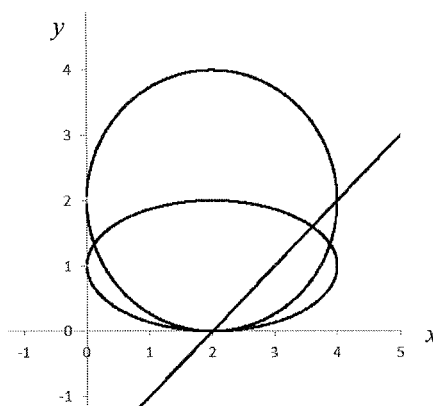
$$\frac{(x - 2)^2}{2^2} + (y - 1)^2 = 1$$
$$(x - 2)^2 + (y - 2)^2 = 4$$
$$y = x - 2$$

Given the graph provided is of the functions above, how many solutions are there to all three equations?

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

7

A 30°-30°-120° triangle has two sides measuring 6. What is the area of the triangle?

A) $6\sqrt{3}$
B) $9\sqrt{3}$
C) $18\sqrt{3}$
D) $36\sqrt{3}$

CONTINUE

8

$$f(x,t) = e^{\frac{kx}{t}}$$

If k and t are negative in the function above, which of the following could be the graph of f?

A)
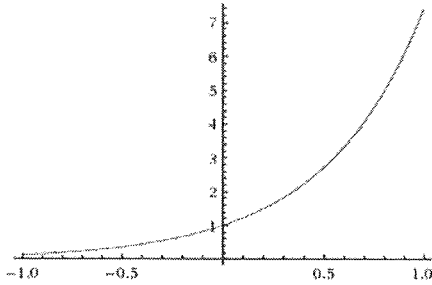
B)
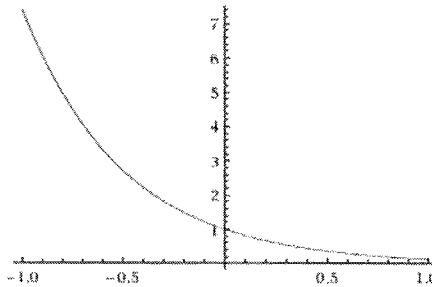
C)
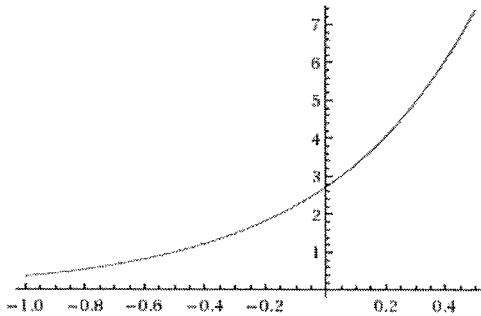
D)
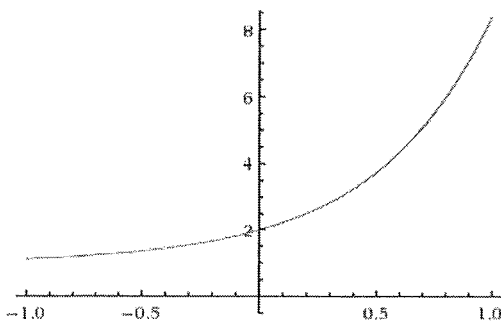
9
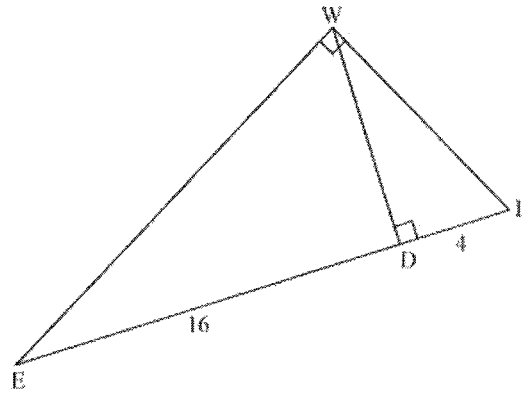
In the figure above $\overline{DE} = 16$ and $\overline{DI} = 4$. Which of the following is the measure of $\overline{WD}$?

A) $4\sqrt{2}$
B) $4\sqrt{3}$
C) 8
D) $8\sqrt{2}$

CONTINUE

10

Two men purchased a damaged car with hopes of repairing it. The two of them together can fix it in 57 hours, even though they work at different rates. On average, the faster worker can work three times as fast as his slower friend.

$$\frac{1}{3x} + \frac{1}{x} = \frac{1}{19}$$

In the equation above, what does the expression $\frac{1}{3x}$ represent?

A) The work done by the faster friend in one hour.
B) The amount of work remaining after 38 hours of work.
C) The amount of work accomplished by both in one hour.
D) The work accomplished by the slower friend in the span of three hours.

11
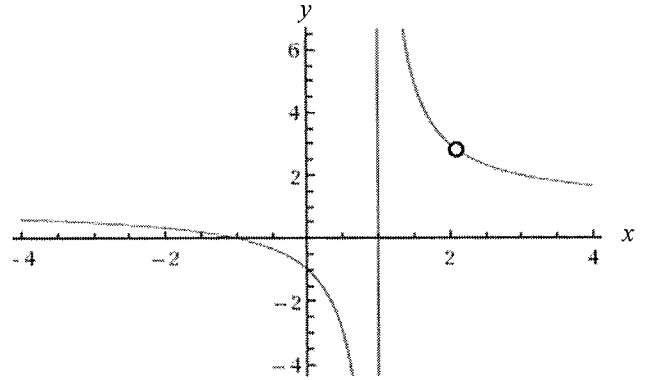
Which of the following functions could be the one graphed above?

A) $f(x) = \frac{(x+2)(x-1)}{(x+2)(x+1)}$

B) $f(x) = \frac{(x-2)(x-1)}{(x-2)(x+1)}$

C) $f(x) = \frac{(x+2)(x-1)}{(x-2)(x+1)}$

D) $f(x) = \frac{(x-2)(x+1)}{(x-2)(x-1)}$

12

What is the minimum number of points of intersection between a circle and an ellipse with the same center point?

A) 0
B) 1
C) 2
D) 4

13

Two lines share both their x and y intercepts with each other. If this is true, which of the following statements must also be true?

A) The lines must be either perpendicular or parallel to each other.
B) Both lines are identical.
C) The lines may intersect at only one point.
D) The lines must intersect at exactly two points.

14

$$\left(\frac{x^2 + x - 2}{x^2 + 2x - 3} \div \frac{x^2 - x}{x^2 + 5x + 6} \right) + 1$$

Which of the following is a simplified version of the rational expression above?

A) $\dfrac{(x+2)^2}{x(x-1)}$

B) $\dfrac{x^2+4x+5}{x^2-x}$

C) $\dfrac{2x^2+3x+4}{x^2-x}$

D) $\dfrac{x(x-1)}{(x+3)^2}$

15

$$y = \frac{3}{108}x + 1$$
$$4x + 3y + 8 = 7x - 2y - 17$$
$$9y - 4 = \frac{1}{3}x - 3y + 8$$

How many solutions does the system of equations above have?

A) 0
B) 1
C) 2
D) Infinitely many solutions

CONTINUE

Each of the remaining questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratch work.

Answer: 201
Either position is correct

← Fraction line

← Decimal point

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, you will receive credit only if the circles are filled in correctly.
- 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.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- Mixed numbers such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2.

(If $3 | 1 | / | 2$ is gridded, it will be

interpreted as $\frac{31}{2}$ not $3\frac{1}{2}$.)

Decimal Answers: If you obtain a decimal answer with more digits than the grid can accomodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666... you should record your result as .666 or .667. A less accurate value such as .66 or .67 will be scored as incorrect.

Acceptable ways to grid 2/3 are:

16

What is the real number part of the following complex number after simplification? $\frac{3-i}{1+i}$

17
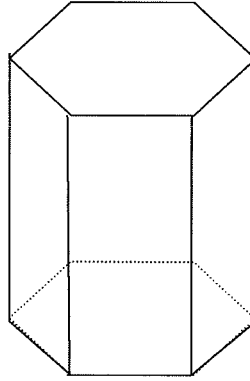
If the height of the prism above is 8, and the volume is $432\sqrt{3}$, what is the length of one of the regular edges of the base? For most prisms, the volume can be determined by multiplying the base and the height. The area of a regular hexagon is $A = \frac{3\sqrt{3}}{2}s^2$, where s is one of the sides.

CONTINUE

18

$$f(t) = -2t^2 + 3$$
$$g(t) = 2t + 4$$

The functions above show the rate of production of two different machines at a factory over the course of an hour. If the machines start at time $t = 0$, then what is the earliest time at which machine g has a greater rate of production?

19

It took 7 hours for Sarah to clean up 168 broken dishes after an earthquake struck her town. If she works at the same pace at her restaurant as she did at home, how many minutes will it take her to clean up the broken 416 dishes at her restaurant?

20
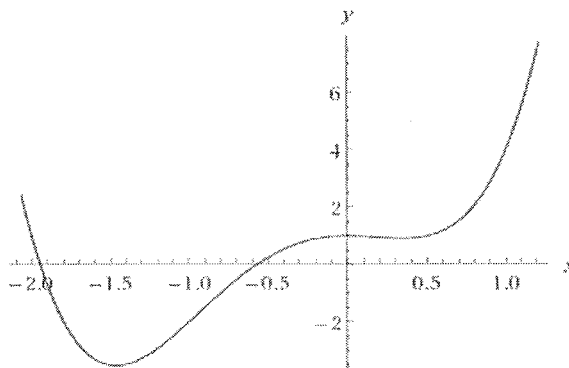
How many real roots does the polynomial above contain?

Math Test

55 MINUTES, 38 QUESTIONS

4

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

Notes:
1. The use of a calculator **is permitted.**
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

$A = \pi r^2$
$C = 2\pi r$

$A = lw$
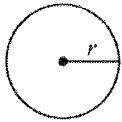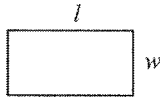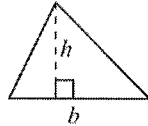
$A = \frac{1}{2}bh$
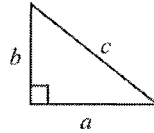
$c^2 = a^2 + b^2$
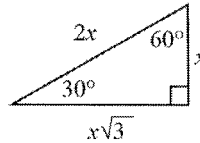
Special Right Triangles

$V = lwh$

$V = \pi r^2 h$

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

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

$V = \frac{1}{3}lwh$

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 measures in degrees of the angles of a triangle is 180.

CONTINUE

1

A theme park cost 12 billion dollars to run for a year. If a theme park charges 100 for each adult ticket and 75 for each child ticket, what is the minimum amount of attendees needed to break even?
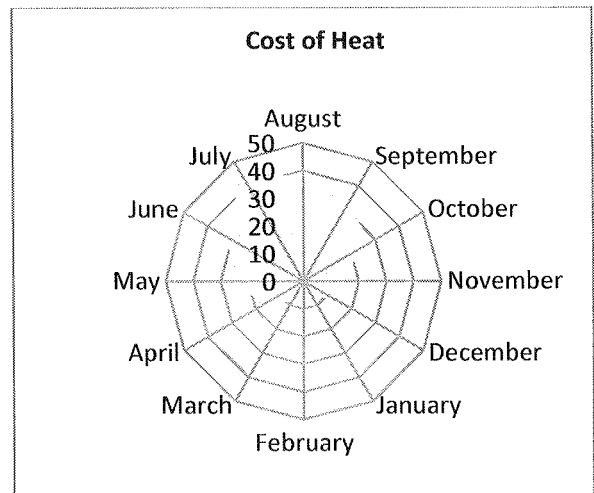
A) 70 million
B) 120 million
C) 160 million
D) 200 million

2

$$f(x) = x^4 - (a^2 + b^2)x^2 + a^2b^2$$

Which of the following are the roots to the function above?

A) a, b
B) $\pm a, \pm b$
C) $-a, -b$
D) $\pm(a + b)$

3

Cost of Heat

The figure above shows the heating cost of an average apartment in Buenos Aires throughout the year. During which months does the winter season occur according to the chart above?

A) June, July, August
B) September, October, November
C) December, January, February
D) March, April, May

4

$$x = \frac{3}{4}y + 2$$

What is the slope of the equation above?

A) $\frac{3}{4}$

B) $\frac{4}{3}$

C) $-\frac{3}{4}$

D) $-\frac{4}{3}$

5

A fever is the reaction of an individual infected by a pathogen. In general, fevers are an effective way of reducing the population of the pathogen by a consistent percentage. A patient has a fever that reduces the number of pathogens by one third every two hours. Which of the following function models the number of pathogens, p, after h hours if the population was n initially?

A) $p(h) = \frac{1}{3}(n)^{\frac{h}{2}}$

B) $p(h) = n\left(\frac{1}{3}\right)^{\frac{h}{2}}$

C) $p(h) = \left(\frac{1}{3}n\right)^{2h}$

D) $p(h) = n\left(\frac{2}{3}\right)^{\frac{h}{2}}$

6

Population Distribution
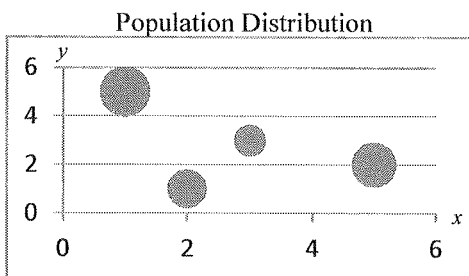
What is the y coordinate of the second largest population shown in the bubble graph above?

A) 5
B) 3
C) 2
D) 1

7

If coffee needs 2 cups of beans for every 12 cups of water, how many cups of beans is needed for 4 cups of water? Assume a linear ratio.

A) $\frac{2}{3}$

B) 2

C) 4

D) 12

8

The volume of a tank is 144. If the height was 12 and the width is 3, what is the length?

A) 144
B) 12
C) 3
D) 4

CONTINUE

Questions 9, 10, and 11 refer to the following information and charts.

Big Bucks	
Payout	Odds of Winning
0x	90%
2x	9%
8x	0.90%
32x	0.10%

Just For Fun	
Payout	Odds of Winning
0x	65%
1x	25%
2x	8%
4x	2%

The payout tables for both types of tickets at the local library raffle, the Big Bucks ticket and the Just For Fun ticket, are shown above.

9

Which of the following functions represents the payout (P) per dollar (d) of the ticket Just For Fun?

A) $P(d) = d(1 \times .25 + 2 \times .08 + 4 \times .02)$

B) $P(d) = d(0 \times .65 + 2 \times .09 + 8 \times .009 + 32 \times .021)$

C) $P(d) = d(.65 + .25 + .08 + .02)(0 + 1 + 2 + 4)$

D) $P(d) = (0 \times .65d + 1 \times .25d + 2d \times .08 + 4 \times .02)$

10

Which of the tickets has a better average payout?

A) Big Bucks
B) Just For Fun
C) They have the same average payout.
D) It varies depending on the amount invested.

11

If the library sold a total of 100 of each type of ticket at $1 per ticket, and each ticket paid out the average amount, how much money was raised to help fund the library for the next year?

A) $200
B) $182.50
C) $167.32
D) $122.60

12

$$y = 3x + 4$$

$$2y - 2 + x = 7x - 4$$

Which of the following statements is true about the system of linear equations above?

A) They are parallel and never intersect.
B) They are perpendicular to each other.
C) They intersect at infinitely many points.
D) They intersect at one point.

13

For the following problem one ton is exactly two thousand pounds.
An ore salesman sells raw iron ore to refineries for $\frac{\$226.15}{ton}$ plus an additional $325 for delivery. If the salesman earned $3,133.70 from a particular sale, how much ore (in pounds) did he sell?

A) 17,893
B) 24,840
C) 30,588
D) 27,714

14

Time in Years
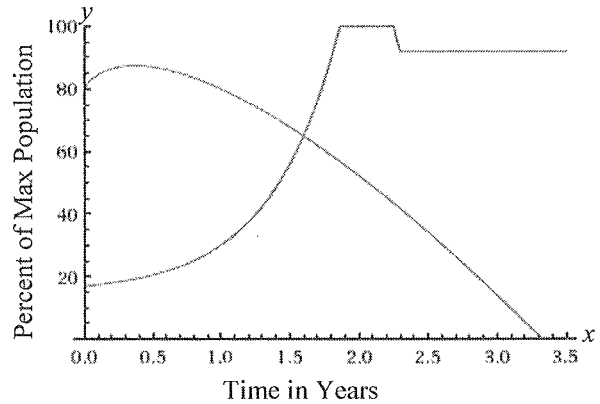
The graph above shows the process of secondary succession, in which one species replaces another species in a biome. According the graph above, how many years into secondary succession is there exactly the same number of individuals of each species?

A) .5 years
B) 1.72 years
C) 2.5 years
D) It is unknown; the graph only shows percent of maximum population, not absolute population.
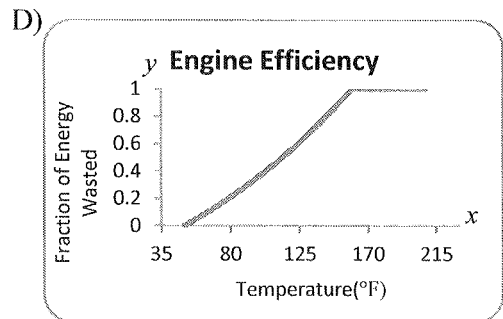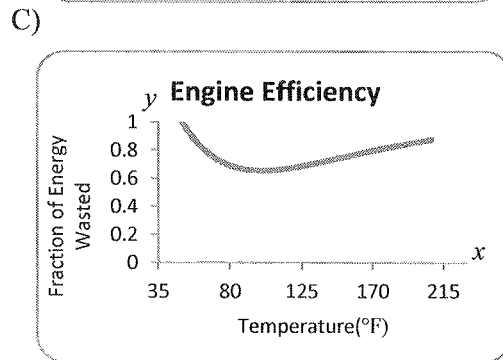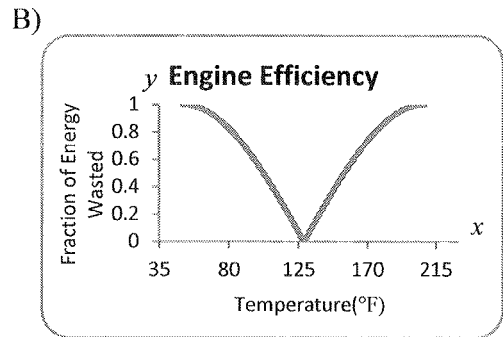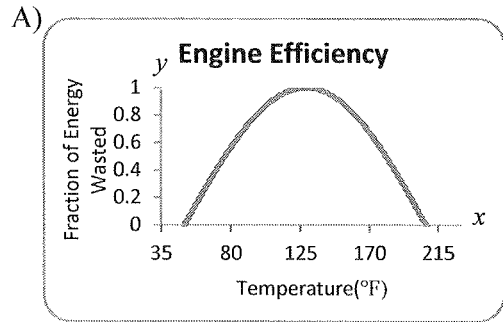
CONTINUE

15

4

30°

8
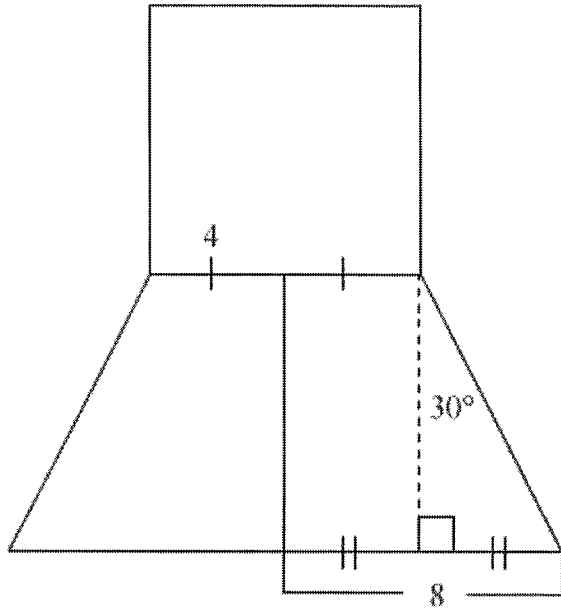
In the figure above, the top quadrilateral is regular while the bottom one is an isosceles trapezoid. What is the combined area of both shapes?

A) $112\sqrt{3}$
B) 112
C) $64\sqrt{3} + 48$
D) $64 + 48\sqrt{3}$

16

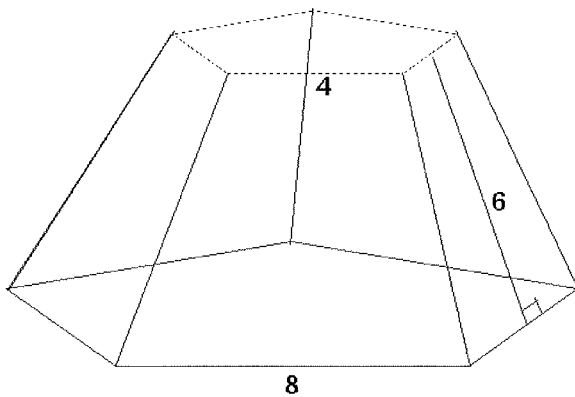Which of the following graphs depicts an engine that is efficient at high temperatures?

A)

Engine Efficiency

B)

Engine Efficiency

C)

Engine Efficiency

D)

Engine Efficiency

17

$$f(x) = e^{5x^2}$$

$$g(x) = \ln(x^{\frac{1}{10}})$$

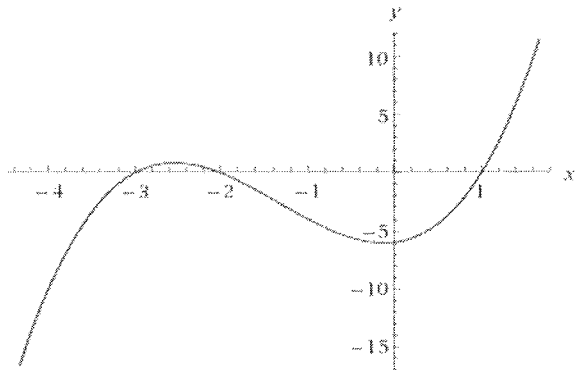What is the value of $g(f(2))$?

A) 1.35
B) 2
C) 4
D) 200

18

What is the surface area of the figure above? Assume the pentagons are regular. The area for a

regular pentagon is $A = \frac{1}{4}\sqrt{5(5 + 2\sqrt{5})} * s^2$,

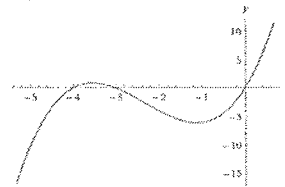where s is a side. The area for a trapezoid is $A = \frac{b_1+b_2}{2}h$, where b_1 and b_2 are the bases.

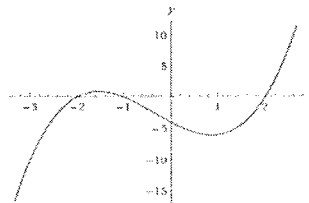A) 206.58
B) 235.56
C) 273.1
D) 317.64

19

The graph above is $f(x)$. Which of the following graphs is $f(x + 1)$?
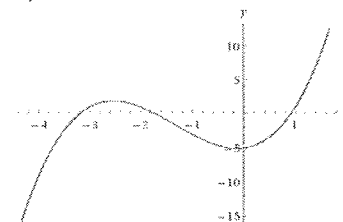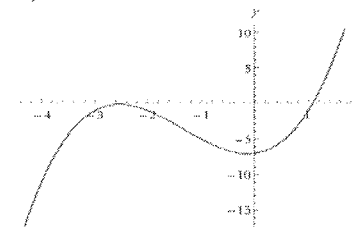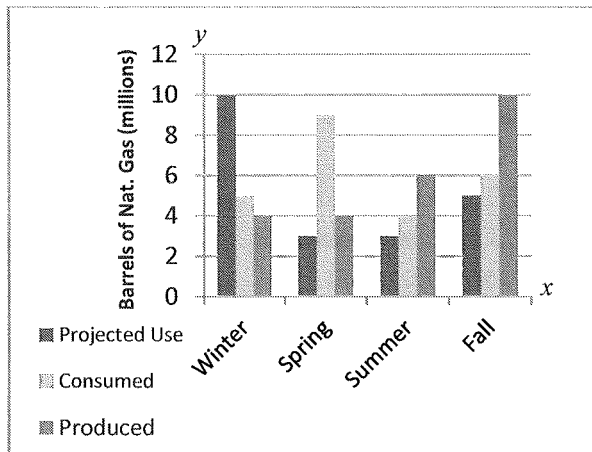
A)

B)

C)

D)

CONTINUE

Questions 20, 21, and 22 refer to the following information and graph.

The Republic of Czetnio nationalized its heating industry. The reason for this was that in previous years there were massive shortages of natural gas, so changes were made in an effort to create a surplus. Consumer demand was predicted based upon the reports of the privatized industries, and the graph above shows the subsequent findings after the first year.

20

What was the surplus of natural gas in the first year?

A) None
B) 2 million barrels
C) 3 million barrels
D) 8 million barrels

21

During what season was there the largest discrepancy between the projected use of natural gas versus the actual amount consumed?

A) Winter
B) Spring
C) Fall
D) Summer

22

On average, how many barrels of natural gas are used each month for heating?

A) 6 million barrels
B) 4 million barrels
C) 2 million barrels
D) 1 million barrels

CONTINUE

23

In order to cure an aggressive infection, a doctor is giving her patient an initial dose of 325mg of penicillin and a follow up dose of 125mg every two hours after. If it took her 9 hours to cure the infection, how many mg of penicillin were used?

A) 325
B) 625
C) 825
D) 950

24

Mr. Hinkley lives 5 miles away from the store. He walks for half a mile in the opposite direction to reach the bus stop and then takes the bus to the store. On the way home the bus driver drops him off in front of his house due to his advanced age. Which of the following expressions describes the distance traveled by Mr. Hinkley?
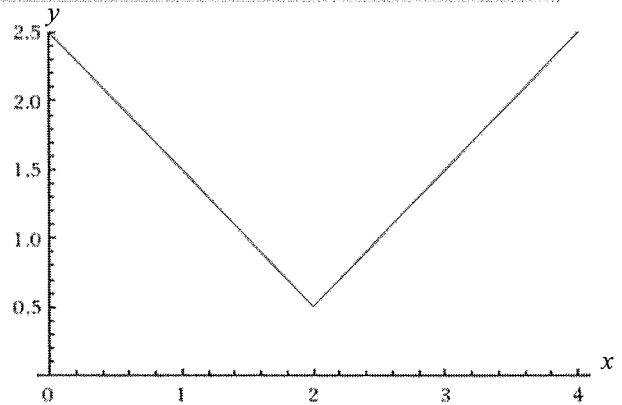
A) $d = 5.5 - .5 + 5$
B) $d = 10.5$
C) $d = 5.5 - 5 - .5$
D) $d = .5 + 5.5 + 5$

25

The energy levels for electrons orbiting a nucleus are quantized. Quantization is the process of arranging data in non-continuous, discrete groups. Which of the following types of functions would be most appropriate to model these energy levels?

A)   Linear Function
B)   Quadratic Function
C)   Step Function
D)   Exponential Function

26

Which of the following functions is that of the graph above?

A) $y = 2\left|\frac{1}{2}x - 1\right| + \frac{1}{2}$
B) $y = \frac{1}{2}|x - 1|$
C) $y = |x| + \frac{5}{2}$
D) $y = |x + 2| + \frac{1}{2}$

CONTINUE

Questions 27 and 28 refer to the following chart.

Month	Profit	Month	Profit
January	$225.75	July	$285.63
February	$137.25	August	$246.56
March	$193.50	September	$149.22
April	$224.24	October	$219.15
May	$347.37	November	$147.61
June	$118.39	December	$295.24

27

An expense report for a 3-month stretch has no labeling for the dates involved. If the total profit over those three months was $690, which three month stretch could this be?

A) January, February, March
B) April, May, June
C) July, August, September
D) October, November, December

28

This business considers summer to be from the start of May to the end of August. What is the average profit per month over the course of summer?

A) 215.83
B) 216.86
C) 249.49
D) 250.46

29

The Von Claus Cycle begins with a kilogram of humid air, which is pressurized through 3 catalytic layers. Each layer captures 5% of the total mass hydrogen peroxide, and 1.5% free hydrogen. If a total of 29 kilograms of hydrogen peroxide and free hydrogen were formed, how many kilograms of humid air were processed?

A) 193.33
B) 148.72
C) 644.44
D) 446.15

30
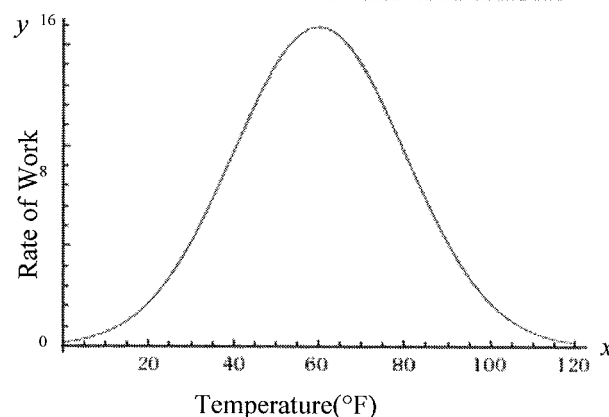
Enzymes, the catalysts that allow biological processes to occur, are extremely sensitive to temperature. At what temperature does the enzyme modeled in the graph above work most efficiently?

A) 0
B) 16
C) 60
D) $20 \leq x \leq 50$

Each of the remaining questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratch work.

Answer: 201
Either position is correct

← Fraction line

← Decimal point

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, you will receive credit only if the circles are filled in correctly.
- 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.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- Mixed numbers such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2.

(If $3\,1\,/\,2$ is gridded, it will be

interpreted as $\frac{31}{2}$ not $3\frac{1}{2}$.)

Decimal Answers: If you obtain a decimal answer with more digits than the grid can accomodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666... you should record your result as .666 or .667. A less accurate value such as .66 or .67 will be scored as incorrect.

Acceptable ways to grid 2/3 are:

31

A polynomial has one unique real root, a set of repeating roots, and two complex roots. What is the minimum order of the polynomial? The order of a polynomial is the degree of the exponent of the leading term.

32

How many intercepts does the graph $y = 3x + 2$ have?

33

$$\frac{(x + 1)(x - 1)(x + 2)(x - 3)(x + 4)(x + 1)}{(x + 1)(x + 1)(x + 2)(x - 4)(x + 3)}$$

If you were to graph the rational expression above, how many holes of discontinuity would there be?

34

Janna has 314 apples, all of which were freshly picked this morning. It took her 2 hours to pick the apples and then an additional 4 hours to sell half the apples. If she sold each apple for $0.30 each, what was her hourly wage for her work that day?

35

The prince of Prussia has one of the finest marbles collections in the world. He has a dozen stone marbles from ancient Rome, nine glass marbles from Zoroaster, three Babylonian silver marbles, six diamond marbles, two platinum marbles, seven crystal marbles from Aristotle's collection, and a dozen gold marbles. If he randomly selects a marble from his bag, what are the odds it is made out of a precious metal? For this scenario, silver, platinum, and gold are considered precious.

36

$$f(x) = x(-3x + 1) + 2(x^2 - 1) + (x + 1)(x - 1)$$

If in the equation above $f(a) = 4$, then what is the value of a ?

37

$$f(x) = 2x^2 + 1$$
$$g(x) = x^2 + c$$

If c is a non-negative integer, and neither of the functions above intersects, then what is one possible value of c ?

38

A teacher of a class of 12 shakes hands with all of his students as well as their parents and grandparents. If everyone in his class has both of their parents alive and on average 3 out of their 4 grandparents alive, how many hands does the teacher shake?

STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT TURN TO ANY OTHER SECTION IN THE TEST.

SAT Practice Essay

5

Directions: The essay portion of this test allows you to demonstrate how well you can read, comprehend, and analyze a passage. In your essay, you should show that you have read the passage carefully, present a coherent analysis, and use language accurately.

Important Reminders:

- You have 50 minutes to write your essay.
- A pencil is required for the essay. An essay written in ink will receive a score of zero.
- Do not write your essay in your test book. You will receive credit only for what you write on your answer sheet.

As you read the passage below, consider how the Editorial Board of The Economist uses

- evidence, such as facts and examples, to support claims.
- reasoning to develop ideas and to connect claims and evidence.
- stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.

Adapted from The Editorial Board, "The Dawn of Artificial Intelligence." © 2014 by The Economist Newspaper Limited. Originally published May 9, 2015.

1   "The development of full artificial intelligence could spell the end of the human race."

2   Dread that technologies will become our masters is hardly new, but these recent warnings have been voiced by renowned cosmologist Stephen Hawking, Silicon Valley entrepreneur Elon Musk, and founder of Microsoft, Bill Gates. Set against the vast investment in AI by big firms like Google, such fears have taken on new weight. With super-computers in every pocket and robots looking down on every battlefield, dismissing them as science fiction seems like self-deception. The question is how to worry wisely.

3   Thanks to the rise in processing power and the growing abundance of digitally available data, AI is enjoying a boom in its capabilities. Today's "deep learning" systems, by mimicking the layers of neurons in a human brain and crunching vast amounts of data, can teach themselves to perform some tasks, from pattern recognition to translation, as well as humans can. As a result, things that once called for a mind, such as interpreting images, are now within the scope of computer programs. DeepFace, an algorithm developed by Facebook, can recognize individual human faces in images 97% of the time.

4   Crucially, this capacity is narrow and specific. Today's AI produces the semblance of intelligence through brute number-crunching force, without any great interest in approximating how minds equip humans with autonomy, interests, and desires. Computers do not yet have anything approaching the wide, fluid ability to infer, judge, and decide that is associated with intelligence.

5   Yet AI is already powerful enough to make a dramatic difference. It can already enhance human endeavor by complementing what people do. Supported by AI, doctors will have a vastly augmented ability to spot cancers in medical images; speech-recognition algorithms running on smartphones will bring the internet to many millions of illiterate people in developing countries; digital assistants will suggest promising hypotheses for academic research.

6   Even in the short run, not all the consequences will be positive. Consider the power that AI brings to the apparatus of state security, in both autocracies and democracies. The capacity to monitor billions of conversations and to pick out every citizen from the crowd by his voice or her face poses grave threats to liberty.

7   Even when there are broad gains for society, many individuals will lose out from AI. Just as simple calculators took the place of workers who performed endless calculations, AI will replace many more workers. Wealth produced with the aid of AI may compensate and generate new jobs. But workers are doomed to dislocations.

8   Surveillance and dislocations are not, though, what worries Hawking, Musk, and Gates. Their concern is more distant and more apocalyptic: the threat of autonomous machines with superhuman cognitive capacity and interests that conflict with our own. Such artificially intelligent beings are still a very long way off; indeed, it may never be possible to create them. Despite a century of poking and prodding at the brain, psychologists, neurologists, and sociologists are still a long way from an understanding of how a mind might be made—or what one is. And even limited intelligence of the general sort—the sort that has interests and autonomy—is far from clear. A car that drives itself better than its owner sounds like a boon; a car with its own ideas about where to go, less so.

9   But even if the prospect of what Hawking calls "full" AI is still distant, it is prudent for societies to plan for how to cope. That is easier than it seems, because humans have been creating autonomous entities for some time. Government bureaucracies, markets and armies: all can do things which unaided, unorganized humans cannot. All need autonomy to function, all can take on life of their own, and all can do great harm.

10   These parallels should comfort the fearful; they also suggest concrete ways for societies to develop AI safely. Just as armies need civilian oversight, markets are regulated, and bureaucracies must be transparent and accountable, so AI systems must be open to scrutiny. Because systems designers cannot foresee every set of circumstances, there must also be an off-switch. These constraints can be put in place without compromising progress. From the nuclear bomb to traffic rules, mankind has used technical ingenuity and legal strictures to constrain other powerful innovations.

11   The specter of eventually creating an autonomous non-human intelligence is so extraordinary that it risks overshadowing the debate. Yes, there are perils. But they should not obscure the huge benefits from the dawn of AI.

Assignment: Write an essay in which you explain how the Editorial Board of *The Economist* builds an argument to persuade its audience that societies can and should prepare for a future in which AI plays a large role. In your essay, analyze how The Editorial Board uses one or more of the features listed in the box above (or features of your own choice) to strengthen the logic and persuasiveness of its argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with the Editorial Board's claims, but rather explain how the Editorial Board builds an argument to persuade its audience.