

Section 1 – Reading

Instructions

You will see passages (or groups of two passages), followed by one or more questions relating to the passages. Read the passages, then select the best answer, keeping in mind any accompanying graphics you see alongside the passages.

You have 65 minutes to complete this section (52 questions).

Questions 1-10 are based on the following passage.

This passage is adapted from Dakota James, *Far in Fairheight*. © 1963 by Dakota James. The setting is a New England mill town in the early 1900s. Clarisa Ratherford is the headmistress of a girls' school, assisted by Miss Polk, a younger teacher.

1 “Let me check for you.” With that, the
maid stepped inside, leaving Tabitha to wait at
the doorstep—dress dirty, hair tangled, heart
thumping wildly. She had hurried from work,
5 and she had known she would be an hour late.
But she had not reckoned on further delays
brought on by the elements. She was prepared
for a cold reception, if she received one at all.

10 Inside, Headmistress Ratherford tidied her
desk, her glasses drooping on her nose as she
shuffled ledgers and notes. She might as well
have been alone. Miss Polk sat unobtrusively

by her side, reading through the day's entrance
examinations. Another year brought its usual
15 batch of hopefuls—unfortunate daughters of
profligate lords. Each year, they sat for their
exams. Each year, Miss Polk noticed that, for
girls of such meager means, they possessed
among them quite a luxurious collection
20 of hats.

The maid's entrance broke through the
gentle atmosphere. “Headmistress, a young
lady is at the door.”

25 The headmistress sighed slightly, straight-
ening her aching back. “Thank you Lydia, I'll
receive her.” Then, Ratherford stood slowly,
grabbing her shawl in preparation for the bitter
weather as she walked into the foyer. She had
no desire to welcome this stranger. However,
30 when she opened the door the child's wind-
swept visage softened Ratherford's resolve.

“Come inside, then,” the headmistress

intoned. A look of relief crossed Tabitha's face.

35 "Thank you, ma'am." She curtsied a little as she entered.

"Come to my study," the headmistress turned abruptly, moving ahead to lead the way.

The two entered the austere room together. Their entry startled Miss Polk, who looked
40 up from her book, though her face remained impassive. The girl was not so subtle: from the moment she entered, the headmistress noted, her eyes had been trained on Miss Polk.

"I'll have Lydia bring some tea," Miss Polk
45 announced, ringing the bell with an agitated flip of her wrist.

"In the meantime," said Headmistress Ratherford, "tell me who you are and what brings you here."

50 "My name is Tabitha Wright," the visitor began, her voice stronger than anyone had expected. "I am fourteen years old. I am here to apply for the scholarship." Miss Polk's face was neutral and attentive. The headmistress
55 frowned.

"The examinations were held earlier today," she began. "It would be unfair to the other girls to allow you to sit for them now." Tabitha lowered her head as the news reached her ears,
60 but she was resolute.

"I understand, and I appreciate your seeing me at all. I've brought a letter explaining my circumstances. I've included my address as well, so that you might let me know if I am so
65 fortunate as to sway your opinion."

The maid had not yet returned with the tea, but Tabitha was steeling herself once more for the cold.

"I apologize for the intrusion—I only wish
70 I could have come at a more reasonable hour. Thank you for your time." Tabitha cast one

final glance at Miss Polk before disappearing back into the hallway.

75 Silence engulfed the study until the front door clicked shut. After they had returned to their tasks, the headmistress addressed her companion. "You know the girl."

"I do. Her father built my family's home.
80 He died a few years ago. The family fell on bad times, and the children had to leave school to work in the mills."

"Did you tell her she should come?"

"The point of the scholarship is to give
85 opportunities to girls from working families. How many of the girls we saw today had so much as a callous on her palm?" Miss Polk's words tumbled out. She hadn't answered the question directly, but, to the headmistress, her
90 meaning was clear enough.

Headmistress Ratherford looked up from her papers for a moment and met Miss Polk's glare. "That is not how we do things here." Her words were clear. Miss Polk picked the damp
95 envelope up from the desk.

"At least do Tabitha the courtesy of reading her letter."

1.

Which choice best describes what happens in the passage?

- A) One character fails to recognize another until she is gone.
- B) One character makes a request and another advocates for her.
- C) Two characters grade scholarship applications late into the night.
- D) A girls' school breaks with tradition to accept a working class student.

2.

Which choice best describes the developmental pattern of the passage?

- A) A careful analysis of historical events.
- B) A detailed discussion of an important request.
- C) A definitive response to an emotional appeal.
- D) A somber synopsis of a tragedy.

3.

As used in line 7, “elements” most nearly means

- A) components.
- B) oxygen and nitrogen.
- C) inclement weather.
- D) basic information.

4.

What response does Tabitha most fear from the headmistress?

- A) The headmistress will refuse to see her at all.
- B) The headmistress will ask her to sit for the examination immediately.
- C) The headmistress will reprimand her for her late visit.
- D) The headmistress will doubt her qualifications.

5.

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

- A) Lines 7–8 (“She was... at all”)
- B) Lines 25–26 (“Thank you... receive her”)
- C) Lines 41–43 (“The girl... Miss Polk”)
- D) Lines 57–58 (“It would... them now”)

6.

In the passage, Tabitha’s demeanor towards the headmistress is

- A) timid but not completely petrified.
- B) urgent but not genuinely in need.
- C) obsequious but not altogether trustworthy.
- D) deferential but not especially self-doubting.

7.

The main purpose of the second paragraph is to

- A) describe a place.
- B) analyze an argument.
- C) question an institution.
- D) introduce two characters.

8.

As used in line 90, “clear” most nearly means

- A) obvious.
- B) unrelenting.
- C) opaque.
- D) simple.

9.

Which reason best explains the headmistress’ confident assertion that Miss Polk knows Tabitha (line 78)?

- A) There is no other way that Tabitha could have learned about the examination.
- B) She observed Miss Polk’s apathetic reactions to Tabitha’s visit.
- C) She witnessed Tabitha’s reaction to Miss Polk’s presence.
- D) It’s a logical guess, since Miss Polk is in charge of the scholarship examinations.

10.

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

- A) Line 12–14 (“Miss Polk...examinations”)
- B) Line 39–41 (“Their entry...impassive”)
- C) Line 41–43 (“The girl...Miss Polk”)
- D) Line 50–53 (“My name...scholarship”)

Questions 11-21 are based on the following passage and supplementary material.

This passage is adapted from Charles A. Holt and Susan K. Laury, "Risk Aversion and Incentive Effects." © 2002 by the American Economic Review.

1 Every year, Americans spend countless
hours scouring the Internet and poring over
policies to determine which insurance best
suits their needs. Billions of dollars are spent
5 on insurance in the United States alone; what
used to be an industry for insuring health
care, vehicles, and homes has greatly expanded
within the last few decades. Insurance is
now available for almost anything, from pets
10 to body parts, yet despite insurance's rising
popularity, the purchase of a plan often gives
rise to discordant emotions. On one hand,
consumers typically feel secure, knowing
that they will be financially compensated if a
15 possession or person is harmed. On the other
hand, consumers also often agonize over
spending money in anticipation of an incident
that might never occur.

Most governing bodies in the United
20 States mandate various forms of insurance
because they guarantee that no individual
will have to suffer the full cost of a sudden
misfortune. By distributing the cost among
many people with regular payments, everyone
25 can rest easy, knowing that in the event of a
catastrophe there will be some relief. However,
as a consequence of this system, many people
end up paying to protect against events that
never affect them personally. For example, a
30 typical car owner spends almost \$1,000 per
year on auto insurance, and, in the event of
an accident, receives \$5,000 on average from
their insurance provider. However, the average

driver will only file insurance claims three
35 times in their lifetime, and this difference
allows insurance providers to collect a profit.

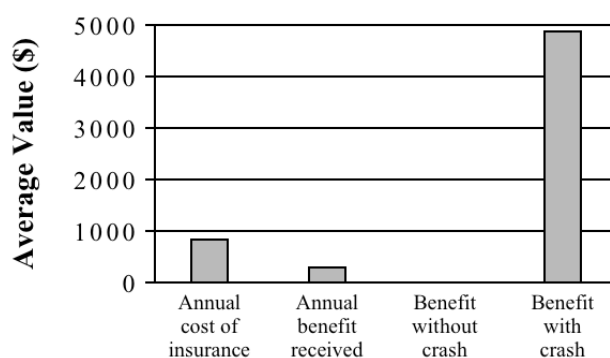
Why do people continue to purchase
insurance plans in which most consumers pay
in more than they take out? In a recent study
40 we conducted, subjects were given the choice
between two hypothetical lottery situations,
and participants more frequently selected
the low risk option, even when the higher
risk option offered a greater average expected
45 payout. According to the risk aversion theory,
the pattern of behavior observed in this study
demonstrates that people are willing to forfeit
money in order to reduce risk. Neuropsychol-
ogists have found support for this theory by
50 mapping the brain during the decision-making
process.

Car insurance companies will often use
emotional appeals to sway consumers and
make them believe that they are more likely
55 to get into an accident than they actually are.
For example, one insurance company runs
commercials depicting careless teenage girls
texting and driving. This tactic is used to instill
fear in car owners. When consumers overesti-
60 mate risk, they are more likely to accept higher
costs.

Many car owners are afraid that they will
get into a deadly crash, but this fear is at odds
with the daily experience of most car
65 insurance subscribers. Almost all car owners
drive every day without getting into an acci-
dent severe enough to require a payout. If that
were not the case, insurance companies could
not stay in business. Though the United States
70 government mandates that car owners buy
insurance, the risk aversion theory suggests
that even without this mandate many people

would still buy insurance plans where they pay more into the plan than they ever receive in compensation. Insurance companies can use this fear of the unknown as a way to convince people to buy plans that are more expensive than government-mandated minimums. On the whole, it seems that people are happy to pay this premium in order to get peace of mind—no matter how irrational it may seem.

Money Spent on and gained from car insurance



11.

The authors most likely use the examples in lines 5–10 of the passage (“what used ... body parts”) to highlight the

- A) the increase in consumer interest in purchasing insurance.
- B) the breadth of items that can be insured.
- C) the anxiety that people feel over buying insurance.
- D) the increase in company willingness to provide insurance.

12.

In line 12, the word “discordant” most closely means

- A) jarring.
- B) opposing.
- C) uncertain.
- D) cacophonous.

13.

The authors indicate that insurance is valued because

- A) most people cannot afford the financial penalties.
- B) people overly doubt their skill as drivers.
- C) it is required by the government.
- D) people prefer to avoid risk.

14.

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

- A) Lines 12–18 (“On one hand... never occur”)
- B) Lines 19–26 (“Most governing... some relief”)
- C) Lines 39–48 (“In a recent study... reduce risk”)
- D) Lines 62–67 (“Many car... a payout”)

15.

The authors refer to their recent study (line 39) in order to

- A) offer a counterargument.
- B) question a motive.
- C) introduce a new idea.
- D) support old theories.

16.

The “neuropsychologists” mentioned in paragraph 3 (line 48) would likely describe the theory of risk aversion as

- A) reasonable.
- B) questionable.
- C) predictable.
- D) discredited.

17.

In line 53, the word “sway” most closely means

- A) wobble.
- B) convert.
- C) swing.
- D) persuade.

18.

The passage indicates that the assumption made by insurance purchasers in lines 62-63 may be

- A) substantiated.
- B) misguided.
- C) contradictory.
- D) undetermined.

19.

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

- A) Lines 56–58 (“For example... driving”)
- B) Lines 65–69 (“Almost all... business”)
- C) Lines 75–78 (“Insurance companies... minimums”)
- D) Lines 78–81 (“On the whole... may seem”)

20.

The graph following the passage offers evidence that insurance purchasers do not base their decision to buy insurance on

- A) potential payout minus average annual cost.
- B) average annual benefit without a crash.
- C) average annual cost of insurance.
- D) payout in the event they do crash.

21.

The authors would likely attribute the differences in annual costs and annual payments as represented in the graph

- A) a government mandate.
- B) a growing acceptance of insurance.
- C) an aversion to risk.
- D) a lack of wealth in America.

Questions 22-32 are based on the following passage and supplementary material.

This passage is adapted from Bruce Albert, "Molecular Biology of the Cell." © 2008 by Garland Science.

1 Though tiny, neurons are the building blocks of the nervous system. They are responsible for receiving and transmitting information throughout the brain. Without these
5 minuscule structures, we would not be able to perform basic tasks such as eating, talking, and walking. Humans are the most advanced animal species in part because we have a high number of neurons. But, whether they are
10 in elephants, crabs, or humans, neurons are complex structures, and each component plays a vital role.

Dendrites are the tiny structures at the ends of neurons that stretch out like branches.
15 They increase the surface area of neuron cells so that they can capture the greatest amount of information. Dendrites in the central nervous system are especially long and complex because they need to receive information from
20 thousands of other neurons. Other dendrites elsewhere are shorter and smaller. In fact, some neurons only have one dendrite!

The next part of the neuron is the soma, also known as the cell body. Unlike other parts
25 of the neuron, the soma does not play a role in transmitting information. The nucleus, which is housed in the soma, also does not play any role in transmitting information. Instead, the nucleus and the soma collaborate to keep the
30 whole cell functional. The soma is responsible for producing the proteins that the other parts of the neuron — the dendrites, axons, and synapses — need. The soma connects the nucleus to these other parts so that the proteins

35 can travel to their intended destination. The mitochondria, which surrounds the nucleus, creates the energy that keeps the operation running.

The axon is the part of the nerve cell that
40 actually transmits the neural signal, which comes in the form of an electrical impulse that stores information. If the dendrites are the branches of the neuron, then the axon can be thought of as the trunk. The axon links the
45 soma to its terminal endings. Like dendrites, axons take a different form depending on where they are located in the body. Some axons are as small as .01 millimeters, while the largest can be up to three feet long. Larger
50 axons are able to transmit information more quickly than their smaller counterparts. Myelinated axons, which are covered in a fatty layer, transmit information at the greatest speed.

55 Finally, the terminal button and the synapse lie at the end of the neuron. Once the neuron receives an electrical impulse, the terminal button converts that electrical signal into a chemical signal in the form of
60 neurotransmitters. These neurotransmitters enter the synapse — a gap at the end of the terminal — where they are then received by other neurons.

When the function of each part of the
65 neuron is explained individually, it may seem as though the information transmission process takes a long time. In fact, the opposite is true. The parts of a neuron come together to form one unit which transmits neural impulses
70 at lightning speeds. Consider the movement of lifting your right arm—whenever you want to, it seems to happen instantaneously. In reality, neurons process the “request” to lift your arm,

- 74 and then engage the muscles necessary to do so in microseconds. Because of neural efficiency, we are able to go about our daily lives without waiting for our bodies to catch up.

Brain Characteristics by Species

Animal	Cerebral cortex neurons (billions)	Weight of the brain (grams)
Mouse	0.004	0.4
Hedgehog	0.024	3
Dog	0.16	72
Marmoset	0.245	8
Cat	0.3	30
Rhesus monkey	0.480	179
Horse	1.2	655
Gorilla	4.3	502
Chimpanzee	6.2	440
African Elephant	11	5712
Human	21	1320
Long-finned pilot whale	37.2	2670

Adapted from J.W. Mink, R.J. Blumenshine, R.J., and D.B. Adams, "Ratio of central nervous system to body metabolism in vertebrates: its constancy and functional basis." ©1981 by the American Journal of Physiology.

22.

The author uses the underlined words "building blocks" in paragraph 1 to indicate that

- A) all neurons are a permanent part of the brain.
- B) neurons play a crucial and foundational role in human functions.
- C) neurons are stacked on top of each other in a precise pattern.
- D) the organization of neurons in the human brain is very simple.

23.

A student claims that every part of the neuron transmits information. Which of the following statements in the passage contradicts the student's claim?

- A) Lines 24–26 ("Unlike other... transmitting information")
- B) Lines 39–42 ("The axon... stores information")
- C) Lines 56–60 ("Once the... neurotransmitters")
- D) Lines 64–67 ("When the... long time")

24.

In the second paragraph, what does the author liken to part of a tree?

- A) The organization of the central nervous system
- B) The manner in which information is transmitted
- C) The smaller neurons
- D) The structure of dendrites

25.

The author's main purpose of including the information about the soma is to

- A) establish the difference between neurons and other cells.
- B) show why dendrites are more important than axons.
- C) provide a complete picture of the structure of neurons.
- D) confirm the role of the soma in information transmission.

26.

Based on the passage, the author's statement "Myelinated axons, which are covered in a fatty layer, transmit information at the greatest speed" (lines 52–54) implies that

- A) myelinated axons are the largest type of axon.
- B) not all axons have a fatty layer.
- C) neurons would function better if they were all encased in fatty layers.
- D) axons will not function without a fatty layer.

27.

The author's use of the words "opposite," "lightning," and "instantaneously" in lines 67–72 in the final paragraph functions mainly to

- A) confirm that neurons are extremely important to human functioning.
- B) counter the claim that all neurons are exactly the same regardless of their location.
- C) support the claim that neurons function as one cohesive unit with many differentiated parts.
- D) emphasize how swiftly neurons process and transmit information.

28.

Based on the table and passage, which choice gives the correct values for the number of cerebral cortex neurons and weight of the brain for marmosets?

- A) 0.245 and 8
- B) 0.245 and 179
- C) 245,000,000 and 80
- D) 245,000,000 and 8

29.

Do the data in the table support the authors' claim that humans are the most advanced animal species?

- A) Yes, because the chart shows that humans have a billion cerebral cortex neurons.
- B) Yes, because the chart shows that humans have more cerebral cortex neurons than cats and chimpanzees.
- C) No, because humans do not have the most cerebral cortex neurons.
- D) No, because humans do not have the heaviest brains.

30.

According to the table, which of the following values provides evidence in support of the answer to the previous question?

- A) 6.2
- B) 11
- C) 37.2
- D) 1320

31.

Based on the table, is the amount of cerebral cortex neurons directly related to brain weight or does it vary, and which statement made by the authors is most consistent with that data?

- A) Directly related; "They increase... information" (lines 15–17)
- B) Directly related; "Some axons... smaller counterparts" (lines 47–51)
- C) It varies; "Humans are... of neurons" (lines 7–9)
- D) It varies; "In fact... speeds" (lines 67–70)

Questions 32-41
are based on the following passage.

This passage is adapted from Shengxi Wei, *I Dream of Yangtze*. © 2002 by Shengxi Wei. The young protagonist, Li Na, lives in a rural village in China and enjoys daydreaming.

1 Above the darkness lurks a broken wooden bridge, far in the distance from the Su Zhou temple near the Yellow River. Cowardly trees hide from the sunlight; bees avoid the scent
5 of nectar from dying plants. This is the place where we were born and the place where we will die. It is a place shrouded with illusions of hope and prosperity told by duplicitous merchants. Only in our dreams and on our deathbeds can
10 we fantasize about a different life.

I imagine children laughing and holding hands, crossing over the street market, and buying jiangbing for 10 yuan from Uncle Ming. I can hear the chatter of students
15 on their way to school, complaining about homework without worrying about whether they will have food. These students expect to attend a university when they grow up. Oh, a university, something I can't even imagine
20 dreaming of, much less going to. The constant stream of new ideas, new friendships, and new obstacles. After graduation, some might go on to be doctors, engineers, or artists. Some might fail, but even they would have their families
25 and each other for support.

In another life, I could be like them, floating like stars in the sky. Why can't I wake up every morning with food on my plate? Why can't I study in a real school where the
30 teachers know more than the students? If only the world were fair and every child could have the same opportunities! I didn't ask to be born in a one-room house, I didn't ask to

walk miles for drinkable water, and I didn't
35 ask for illiterate parents. Then again, none of us asked to be who we are. We are born into a world where there are rich people and poor people. Life is a lottery, and I have never been lucky. Sometimes doors never open for you.
40 Though my fate was decided, my dreams were not: I still imagine that another future might be possible, even though I am sure that future will not come.

The rain outside has stopped, and the
45 flowers open to the sun. I take my knife out to tend to the chickens. Which of them will be lucky today? The cycle starts all over again.

32.

The main purpose of the passage is to

- A) emphasize the value of tradition.
- B) offer a perspective on hardship.
- C) present specific plans for reform.
- D) question the feasibility of an undertaking.

33.

The central claim of the passage is that

- A) with hard work the poor can better their condition.
- B) a university education is the key to happiness.
- C) poverty keeps people from dreaming of a better life.
- D) some people are born into unfortunate positions.

34.

The author uses the word “I” throughout the passage mainly to

- A) express her hopes, dreams, and doubts.
- B) reaffirm that she is ultimately hopeful about her lot.
- C) create a sense of suspense.
- D) advocate for the pursuit of personal happiness.

35.

According to the passage, the girl describes the lives of other people because

- A) she looks down on them.
- B) she wishes that she could be one of them.
- C) she is not sure what she wants.
- D) she admires the variety of different paths people take.

36.

The author indicates that she believes her life

- A) is bound to improve any moment.
- B) will likely remain the same, even as she continues dream.
- C) will soon get much worse.
- D) cannot improve unless she graduates from college.

37.

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

- A) Lines 3–7 (“Cowardly trees... will die”)
- B) Lines 18–23 (“Oh, a university... or artists”)
- C) Lines 27–32 (“Why can’t I... same opportunities”)
- D) Lines 40–43 (“Though my... not come”)

38.

The author characterizes the questions in lines 27–30 (“Why can’t... students?”) as both

- A) wistful and resigned.
- B) ecstatic and jealous.
- C) empathic and thoughtful.
- D) provocative and needling.

39.

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

- A) Lines 5–8 (“This is... merchants”)
- B) Lines 14–17 (“I can... have food”)
- C) Lines 30–36 (“If only... we are”)
- D) Lines 45–47 (“I take... over again”)

40.

Which choice most closely captures the meaning of the figurative “doors” referred to in line 39?

- A) Dreams
- B) Misfortune
- C) Opportunity
- D) Charity

41.

The events listed in lines 44–46 (“The rain... chickens”) mainly serve to emphasize how

- A) the author’s life will likely continue unchanged.
- B) women in China have to do most of the housework.
- C) the author becomes relaxed after contemplating her dreams.
- D) the author believes some radical change is on the horizon.

Questions 42-52

are based on the following passages.

Passage 1 is adapted from Lorna Valentine, "Discarding Phones Without Destroying the Planet." © 2018 by Delaware Designers. Passage 2 is adapted from Hoyt Frank, "E-Waste Examined." © 2018 by Andrews Science Monthly.

Passage 1

1 The average adult will buy a new cell phone every two to three years. But where do all of those discarded phones end up?

Electronic waste, or "e-waste," is a growing
5 problem for developing and developed countries alike. The number of discarded cellphones, laptops, TVs, and other electronics is staggering, leading countries such as the United States to struggle to dispose of the
10 waste.

Between 2009 and 2014, the world produced 42 million tons of new e-waste. However, countries like the United States and China, which produce the greatest amount
15 of waste, are not feeling the repercussions. While the United States has laws preventing the disposal of electronics in landfills or trash dumps on American territory, it permits waste to be shipped to other countries for disposal.
20 As a result, developing countries like Mexico, India, and nations in West Africa are turning into e-waste dumping grounds.

This practice harms the countries' environments and their citizens. Electronics like
25 laptops and computers contain toxic materials and heavy metals that ruin the ecosystem surrounding the dump. African savannas and lakes are being turned into barren deserts as these toxic elements leach into the nearby
30 soil and water. Furthermore, citizens in these

countries cannot simply move away from these toxic sites because, due to a lack of other jobs, they harvest e-waste dumps for parts to sell. As a result, these workers are exposed to harmful
35 substances and run the risk of developing infections or diseases ranging from tetanus to cancer.

It is the responsibility of both the producers and consumers of electronics to ensure that
40 their products are not discarded in dumps like these. Instead, electronics should be recycled for their useful parts while the toxic chemicals are discarded legally and safely. Countries such as China are beginning to hold consumers
45 responsible by creating electronic recycling fees and programs that make disposal more accessible to consumers.

As technology evolves and develops, the e-waste problem facing many countries will
50 continue to grow. Creating the infrastructure for used electronics to be discarded safely, as opposed to being thrown away with common trash, is the first step in combating the dangers
54 of e-waste dumps.

Passage 2

55 E-waste is a growing problem in the United States. Electronic lifespans are shrinking, consumerism is at an all-time high, and there is no infrastructure for used electronics disposal. Nowadays, electronics become obsolete
60 so quickly that a large percentage of disposed of devices become outdated before they reach the shelf.

Business-savvy people are capitalizing on rising disposal rates by finding value in
65 these electronics through a process known as

electronic recycling, or e-recycling.

E-recycling plants are on the rise, especially in the United Kingdom and throughout continental Europe. The U.S. has begun to
70 follow suit after realizing the hidden value that lies in, for example, an outdated TV. These plants have highly specialized machinery that deconstructs TVs and other large electronics. The start-up cost of one of these plants is steep
75 since the machines require complicated technology to carefully take apart electronics that contain dangerous substances like mercury. After such substances are extracted, companies must take care to dispose of them safely and
80 legally.

Factory workers are then introduced to the assembly line in the e-recycling plant. These workers are tasked with going through the electronics by hand to look for reusable parts
85 and precious metals such as gold. Recycling plants find uses for more than 90% of the parts, which can be sold back on the market to bring in a profit.

These improved recycling programs offer a
90 significant step forward in solving the e-waste problem plaguing many developed nations. Currently, used electronics are dumped in developing countries, a practice that negatively impacts both the environment surrounding
95 the dump site and local people.

Skeptics suggest that the mere existence of e-recycling plants is not sufficient to combat e-waste. For these plants to reduce e-waste, the electronics have to make it to the plant in the
100 first place, as opposed to merely being tossed in the trash. To encourage recycling, governments might set up physical sites designated for e-recycling, fine people who do not dispose of electronics correctly, and levy taxes on

105 recyclable goods to pay for these programs.

The problem of e-waste is one that will be around for as long as personal technology plays a major role in modern society. Those
109 who get onboard with e-recycling can surely profit in the coming years.

42.

In paragraph 4, the author of Passage 1 mentions the dangers of e-waste dumping to

- A) emphasize the repercussions that e-waste has on an environment and its people.
- B) explain different methods of disposing of electronics.
- C) portray the innovations that have arisen to combat e-waste.
- D) list the different countries that are dumping grounds for e-waste.

43.

The author of Passage 1 suggests that electronic waste could be reduced through what method?

- A) Designating certain countries as the primary receivers of e-waste.
- B) Holding producers and consumers responsible for their electronics and creating disposal infrastructure.
- C) Decreasing the amount of technology a person disposes of each year.
- D) Creating a market in developing countries for people to resell used electronics.

44.

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

- A) Lines 16–19 (“While the... for disposal”)
- B) Lines 30–33 (“Furthermore... to sell”)
- C) Lines 38–41 (“It is... like these”)
- D) Lines 48–50 (“As technology... to grow”)

45.

As used in paragraph 4 of Passage 1, “leach” (underlined) most nearly means

- A) to dig.
- B) to seep.
- C) to empty.
- D) a bug.

46.

What function does the discussion of China’s recycling program in paragraph 5 serve in Passage 1?

- A) It continues the list of problems portrayed in the previous paragraph.
- B) It asks a question that is answered in the following paragraph.
- C) It provides a concrete example of a proposal put forth in the following paragraph.
- D) It discusses possible outcomes of a problem discussed in the previous paragraph.

47.

The central claim of Passage 2 is that e-recycling plants are an effective solution to e-waste dumping, but will only be successful if combined with

- A) responsible e-waste dumping in landfills.
- B) reducing the amount of e-waste produced in the first place.
- C) taxing e-waste.
- D) A government sponsored recycling program.

48.

As used in paragraph 3 of Passage 2, “deconstruct” (underlined) most nearly means

- A) destroy.
- B) disassemble.
- C) recreate.
- D) interpret.

49.

Which statement best describes the relationship between the passages?

- A) Passage 2 offers a possible solution to the problems raised in Passage 1.
- B) Passage 2 refutes the validity of the claims expressed in Passage 1.
- C) Passage 2 defines and explains the technical terminology used in Passage 1.
- D) Passage 2 provides a different explanation for the problems discussed in Passage 1.

50.

The author of Passage 2 would most likely respond to the discussion of China's recycling program in lines 43–47, Passage 1, by claiming that such a program should include

- A) special provisions for taking care of toxic waste.
- B) the construction of modern recycling plants.
- C) more government regulation than Chinese citizens are accustomed to.
- D) a careful analysis of whether or not these programs will be profitable.

51.

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

- A) Lines 74–77 (“The start-up... like mercury”)
- B) Lines 89–95 (“These improved... local people”)
- C) Lines 96–98 (“Skeptics suggest... combat e-waste”)
- D) Lines 101–105 (“To encourage... these programs”)

52.

Which point about e-waste dumping in developing countries is explicit in Passage 1 and implicit in Passage 2?

- A) E-waste dumping is not as big of a problem as many people believe that it is.
- B) It is only harmful to dump e-waste if it hasn't been processed at a recycling plant first.
- C) It can cause life-threatening diseases and destroy the ecosystem surrounding the dump.
- D) It creates jobs for local people in developing countries and creates a market for reused electronics.

STOP

**IF YOU FINISH BEFORE TIME IS
CALLED, YOU MAY CHECK YOUR
WORK ON THIS SECTION ONLY.**

**DO NOT TURN TO ANY OTHER
SECTION ON THE TEST.**

Section 2 – Writing

Instructions

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

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English.

Many questions include a “NO CHANGE” option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

You have 35 minutes to complete this section. (44 questions)

Questions 1-11

are based on the following passage.

Food On-the-Go

Fast food chains – eateries that quickly prepare meals for sale – have rapidly gained popularity in the United States since the debut of White Castle in 1921.

From 1970 to 2015, revenue produced by the fast food industry increased over 30-fold due to fast food's desirable qualities. The increase in fast food sales has caused the U.S. government to take action against the harmful effects that fast food has on the health of Americans. Unfortunately, the numerous programs created by the government to encourage healthy choices have not stopped the obesity rate in the United States from rising. Given the **(1)** propensity of the obesity epidemic, the negative health effects of fast food outdo its potential benefits.

^[1] Fast food's convenience attracts millions of Americans to this cuisine; they otherwise may look elsewhere for sustenance. ^[2] Because it can be ordered, prepared, and consumed within minutes, fast food saves Americans **(2)** time and provides a plethora of culinary choices. ^[3] To expedite this process, many families make use of meals that have already been prepared for them and are ready to be consumed. ^[4] If a family chooses to eat a conventional home-cooked meal, they **(3)** may spend hours acquiring ingredients at the grocery store and cooking the meal. ^[5] They can buy ready-to-eat meals at the grocery store or go out to eat at a restaurant. ^[6] Many families, **(4)** young adults; and workaholics want the best of both worlds; therefore, they order meals from a fast food eatery. **(5)**

1.

- A) NO CHANGE
- B) intensity
- C) inclination
- D) severity

2.

Which choice provides the most relevant detail?

- A) NO CHANGE
- B) time, allowing them to focus on other tasks.
- C) time, but some still avoid fast food for health reasons.
- D) time so they can stay late at the office.

3.

- A) NO CHANGE
- B) may spend hour's
- C) could have spent hours
- D) spent hour's

4.

- A) NO CHANGE
- B) young adults; and
- C) young adults, and
- D) young adults, and,

5.

To make this paragraph most logical, sentence 3 should be placed

- A) where it is now.
- B) after sentence 1.
- C) after sentence 4.
- D) after sentence 5.

(6) Though fast food saves time, it is not worth the detrimental health problems that are caused by frequent consumption. Many nutritionists believe fast food greatly contributes to obesity: it contains large amounts of calories, is filled with chemicals that act (7) like addictive agents, and (8) sold in large quantities, making it easy for people to eat more than they should. (9) Additionally, because the ingredients are low quality, fast food contains more fat per serving than other meal options, thereby reducing the amount of time that people feel (10) satiated.

6.

The writer is considering deleting the underlined sentence. Should the writer do this?

- A) Yes, because it does not relate to the role of nutritionists in the fast food industry.
- B) Yes, because it contradicts the main point of the passage.
- C) No, because it introduces another reason why people consume fast food.
- D) No, because it sets up the argument in the paragraph about the dangers of fast food.

7.

- A) NO CHANGE
- B) as
- C) to be
- D) in

8.

- A) NO CHANGE
- B) selling
- C) is sold
- D) will be sold

9.

- A) NO CHANGE
- B) Alternatively,
- C) Therefore,
- D) In conclusion,

10.

- A) NO CHANGE
- B) hungry
- C) better
- D) sufficient

These unhealthy qualities of fast food have prompted people to choose other food options and increase their effort to maintain a healthy lifestyle. In fact, many dieting trends and fitness crazes have arisen to counteract the harmful effects of fast food. Because Americans demand a cheap, convenient food option and fast food is **(11)** unhealthy, so there is an opportunity for restaurants to create healthier menus that have all of the benefits of fast food.

11.

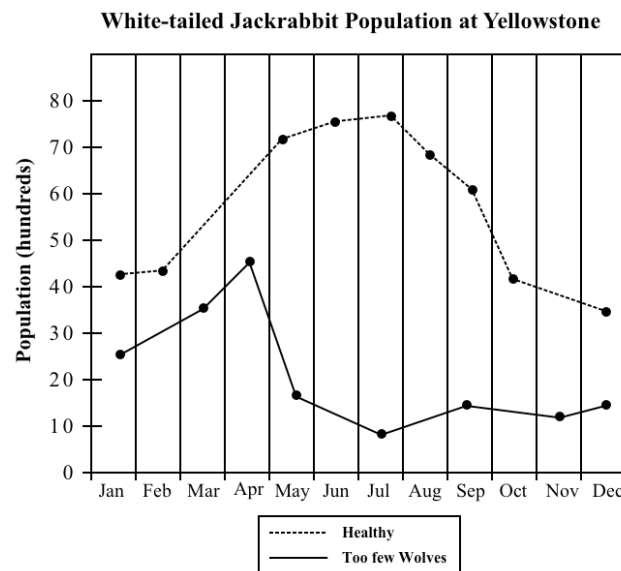
- A) NO CHANGE
- B) unhealthy, there
- C) unhealthy there
- D) unhealthy; so there

Questions 12-22

are based on the following passage.

Too Many Bunnies

Yellowstone National Park is known for its green trees as well as its large population of wild animals. The size of the white-tailed jackrabbit population fluctuates seasonally: in the summer, when there is plenty of food for rabbits in Yellowstone, their population can rise to slightly above 8,000; in the winter, the plants die as additional snow falls, and the average rabbit population can drop **(12)** to 30 Rabbits.



Usually, the rabbit population starts to decline in late **(13)** summer. This follows several weeks of lower temperatures and less rain. **(14)** For example, in the summer of 1961, virtually all of Yellowstone's speargrass, the jackrabbits' food source, died by mid-July, the earliest date on record. Most scientists looking for the causes of the Great Decay of the 1990s have focused exclusively on less rain. Records show that the summer of 1991 was the warmest in 130 years.

12.

Which choice most accurately and effectively represents the information in the graph?

- A) NO CHANGE
- B) to as few as 3,000 rabbits.
- C) to their lowest number on June 7th.
- D) to just over 10,000 rabbits and remain stable for months.

13.

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

- A) summer, following
- B) summer, and this decline follows
- C) summer, and such declining follows
- D) summer:

14.

- A) NO CHANGE
- B) However,
- C) As a result,
- D) Furthermore,

But Matt **(15)** Can, a senior lecturer in biology at Vanderbilt believes that another factor added to the early **(16)** decay; the “no wolf” problem.

According to Can, a prominent Yellowstone expert, wolves in the 1860s from as far away as Canada caused great sheep loss**(17)**, that greatly upset the region’s economic growth. The wolves migrated in giant waves and then **(18)** settled as groups into the U.S. Residents have long known that wolves harm both settlers and sheep, limiting **(19)** it’s population growth. As Can explains, “Wolves are an extremely important aspect of the food chain. They check the rabbit population and preserve the spear grass.” The result is a vicious cycle.

15.

- A) NO CHANGE
- B) Can a senior lecturer in biology at Vanderbilt,
- C) Can, a senior lecturer in biology at Vanderbilt,
- D) Can, a senior lecturer in biology, at Vanderbilt

16.

- A) NO CHANGE
- B) decay; and it was
- C) decay:
- D) decay: being

17.

- A) NO CHANGE
- B) , the loss
- C) which
- D) DELETE the underlined portion.

18.

- A) NO CHANGE
- B) settles
- C) will settle
- D) had settled

19.

- A) NO CHANGE
- B) its
- C) there
- D) their

As the wolves are killed, the rabbit population grows rapidly; once the rabbit population grows too fast, the spear grass cannot support the large population, which **(20)** is related to the declining rabbit population.

^[1] Can's study is important because the decay of 1991 may not be an uncommon incident.

^[2] According to scientists, the declining wolf populations are making the rabbit population increase and the spear grass population decrease.

^[3] The pattern Can observed in 1991 may repeat **(21)** itself again, with harmful effects on the Yellowstone ecosystem. ^[4] The next steps for Can and his team are to travel to Yellowstone asking residents to stop hunting wolves and to determine just how much the spear grass can be preserved to save the rabbit population. ^[5] Members of the public will be able to track his team's progress and even help fund the expedition through a website Can has created. **(22)** ^[6] Can is preparing an investigation to gather this valuable data.

20.

Which choice best articulates the swift change described here?

- A) NO CHANGE
- B) creates even more space for the rabbit population to grow.
- C) over time helps to restore a sustainable rabbit population.
- D) precipitates a sharp decline in the rabbit population.

21.

- A) NO CHANGE
- B) itself,
- C) itself, with decline in rabbit population and
- D) itself possibly,

22.

To make this paragraph most logical, sentence 6 should be placed

- A) where it is now.
- B) before sentence 1.
- C) after sentence 1.
- D) after sentence 4.

Questions 23-33

are based on the following passage.

Watch Your Running

Whenever I go on a run, my cumbersome phone significantly detracts from the experience. Even if I put it in my pocket rather than hold my phone, the bulky device still jostles with every step I take, threatening to fall out of its sanctuary. I am always paranoid that it **(23)** tumbles out of my pocket. Carrying my phone in an armband also is not an option because the armband creates uncomfortable pressure on my arm as I run, and the headphone cord is constantly in my way. I could get cordless headphones or a new armband, but shouldn't there be a way to avoid having so many moving parts? Having exhausted all other options, **(24)** wearable technology like smartwatches started to grow on me.

Smartwatches entered mainstream awareness with the launch of the Apple Watch **(25)** into 2014. Since then sales have climbed to over 400 percent and are predicted to reach 350 million worldwide annual shipments by 2020. Apple's offering provides something for **(26)** everyone: a sport version with a silicone band, an "Edition" version in which the watches are plated in 24-carat gold, a regular version, and an Hermès collaboration that features leather bands made by the namesake French fashion house.

23.

- A) NO CHANGE
- B) accidentally tumbles
- C) should tumble accidentally
- D) will tumble

24.

- A) NO CHANGE
- B) wearable technology, like smartwatches, were of interest to me.
- C) my runs continued to be low-tech endeavors.
- D) I bought a smartwatch.

25.

- A) NO CHANGE
- B) in
- C) for
- D) until

26.

- A) NO CHANGE
- B) everyone a sport
- C) everyone, a sport
- D) everyone! a sport

(27) By contrast, Apple also allows users to change their watch's band and case to make the product feel even more personal. (28)

27.

- A) NO CHANGE
- B) Moreover,
- C) For these reasons,
- D) Similarly,

28.

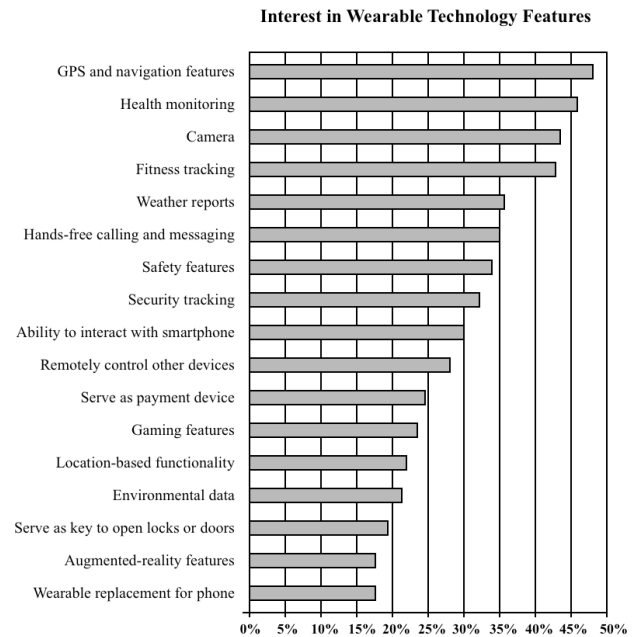
The writer is considering deleting the underlined sentence. Should the sentence be kept or deleted?

- A) Deleted, because the sentence provides extraneous details that do not resurface later.
- B) Deleted, because the sentence contradicts the main idea of this paragraph.
- C) Kept, because the sentence provides relevant details that paint a fuller picture.
- D) Kept, because the sentence summarizes the argument of this paragraph.

Smartwatches are especially useful for those who like to log exercise data such as duration, intensity, and calories burned. A recent survey found that **(29)** 47 percent of individuals considering wearable technology such as smartwatches are most interested in GPS and navigation features. Running magazines have lauded wearable technology because it provides those **(30)** whose use of it with invaluable resources for tracking their indoor and outdoor workouts.

29.

The writer wants to add specific information that supports the main topic of the paragraph.



Based on the graph above, which piece of information is most appropriate to add at this point in the passage?

- A) NO CHANGE
- B) 42 percent of respondents viewed fitness tracking as the most interesting feature provided by wearable technology.
- C) 27 percent of respondents were interested in the social media alerts of wearable technology.
- D) 22 percent of respondents were interested in the environmental data provided by wearable technology.

30.

- A) NO CHANGE
- B) whose make use of
- C) whom use
- D) who use

^[1] Armed with this information, I decided to give smartwatches a try and visited my local Apple store to purchase the Apple Watch and some Bluetooth headphones. ^[2] I chose the watch size, band, and case before setting it up to track my fitness data, and the next day, I went for my first run with the device. ^[3] It was a great experience: the watch didn't bounce or bother my wrist, and the headphones were comfortable. ^[4] Overall, the experience impressed me, and I had a detailed log of my run available at the end of my workout. **(31)**

After learning all the ways that the watch accommodated and enhanced athletic activity, I simply couldn't go back to carrying a bulky phone with me on my runs. After all, the watch is light and doesn't bother me no matter what terrain **(32)** I tackle, from the steepest to the rockiest. With accurate snapshots of my training and personal records, the watch's stand-out feature is its ability to bring me up to speed with my progress—by far my favorite part. This versatility is what makes the smartwatch indispensable and guarantees that it will become **(33)** a staple in people's lives over time.

31.

The writer wants to add the following sentence to the paragraph:

I laced up my running shoes, put in my headphones, strapped on my watch, and made my way along a familiar route.

The best placement for the sentence is immediately

- A) before sentence 1.
- B) after sentence 1.
- C) after sentence 2.
- D) after sentence 3.

32.

- A) NO CHANGE
- B) I tackle from:
- C) I tackle; from
- D) I tackle. From

33.

- A) NO CHANGE
- B) staples
- C) a necessity
- D) the bane

Questions 34-44

refer to the following passage.

The Music Industry's Transformation

In recent years, consumption of entertainment has rapidly shifted from à la carte-style ownership to buffet-style streaming, and this transition has been most apparent in the music industry. **(34)** Essentially, music streaming services provide listeners with access to a neverending smorgasbord of songs, artists, and albums that dwarfs any personal collection. Additionally, people's listening habits no longer have to be constrained by their budgets, since the monthly cost of a subscription is the same **(35)** regardless of use.

Since streaming services **(36)** offers unlimited access, individuals no longer have to weigh price against number of potential listens when deciding whether a purchase is worth the download. With monthly subscriptions costing about as much as one album, streaming unequivocally provides the best value for most listeners. As a result, between 2010 and 2015, revenues from streaming services more than quadrupled, breathing new life into the music industry's previously stagnant growth.

For almost 20 years, the music industry has struggled with its transition into the digital era and has attempted a multitude of approaches to offset dwindling revenues. Recorded music reached its sales peak in 1999, with global revenues of \$27 billion dwarfing 2015 sales of \$15 billion by almost 100%. **(37)**

34.

- A) NO CHANGE
- B) For instance,
- C) Alternatively,
- D) Even so,

35.

- A) NO CHANGE
- B) notwithstanding the frequency with which they use the streaming service.
- C) no matter how much streaming is done by the user.
- D) regardless of how often they use the service.

36.

- A) NO CHANGE
- B) offer
- C) to offer
- D) offering

37.

Which sentence could be added to the end of this paragraph as a summary?

- A) As a consequence, music is sold online less and less, with recording artists preferring to rely on concerts and music festivals to earn a living.
- B) Due to these efforts, the early twenty-first century saw a rapid increase in global music revenues.
- C) As a result, aspiring musicians are and have been more pessimistic about the potential for commercial success.
- D) Nevertheless, at the beginning of the twenty-first century, the recording sales were plummeting.

(38) Within the overall decline, recent trends appear promising; in 2015, digital revenues became the leading driver of sales, with annual growth of over (39) 10%, fueled by a 45% growth in streaming. In particular, the proliferation of smartphones has increased the availability of high-quality services and (40) have bolstered the expansion of premium subscription services.

Undoubtedly, the rise of streaming music services has transformed listening habits and has reshaped the dynamics of the music industry at large. As consumer access to phone data and the Internet expands, the number of (41) listeners' interaction with music on mobile devices continues to grow.

38.

- A) NO CHANGE
- B) Because of
- C) Despite
- D) After

39.

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

- A) NO CHANGE
- B) 10%, and it was
- C) 10%, which arose from being
- D) 10% when the growth was

40.

- A) NO CHANGE
- B) has bolstered
- C) bolster
- D) bolstering

41.

- A) NO CHANGE
- B) listeners interacting
- C) listeners interact
- D) listener's interactions

(42) All stakeholders – songwriters, artists, publishers, and labels – stand to benefit from collective industry action; however, that these players will recognize the benefits of collaboration (43) which remains uncertain. Not everyone has accepted streaming as the new reality of the music industry, but consumers and (44) our listening habits will certainly have an impact on this ongoing evolution.

42.

At this point, the writer is considering adding the following sentence: *A recent popular trend among music enthusiasts is to create playlists drawing from a wide range of genres.*

Should the writer make this addition here?

- A) Yes, because it reinforces the passage's main point about how streaming subscriptions revitalize the music industry.
- B) Yes, because it acknowledges a common counterargument to the passage's central claim.
- C) No, because it blurs the paragraph's focus by introducing a new idea.
- D) No, because it presents a contrary argument without expanding upon it.

43.

- A) NO CHANGE
- B) that
- C) therefore
- D) DELETE the underlined portion.

44.

- A) NO CHANGE
- B) one's
- C) his or her
- D) their

STOP

**IF YOU FINISH BEFORE TIME IS
CALLED, YOU MAY CHECK YOUR
WORK ON THIS SECTION ONLY.**

**DO NOT TURN TO ANY OTHER
SECTION ON THE TEST.**

Section 3 – Math (no calculator)

Instructions

For questions 1-15, find the correct answer from the choices provided, and complete the corresponding bubble on your answer sheet. For questions 16-20, enter the correct answer in the grid on your answer sheet. Instructions are provided on how to fill out the grid. You may fill your booklet with scratchwork if necessary.

Notes

You may not use a calculator on this section.

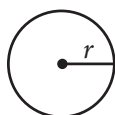
All expressions and variables refer to real numbers unless otherwise specified.

Figures provided in this test are drawn to scale unless otherwise indicated.

All figures exist in a plane unless otherwise specified.

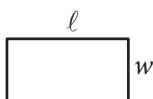
Unless otherwise specified, the domain of a given function g is the set of all real numbers x for which $g(x)$ is a real number.

You have 25 minutes to complete this section (20 questions).

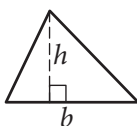


$$A = \pi r^2$$

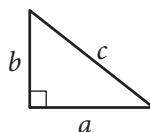
$$C = 2\pi r$$



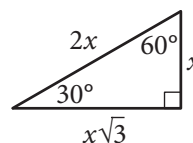
$$A = \ell w$$



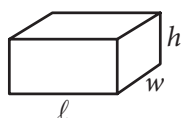
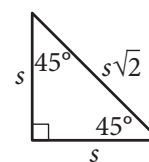
$$A = \frac{1}{2}bh$$



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



Special Right Triangles



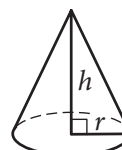
$$V = \ell wh$$



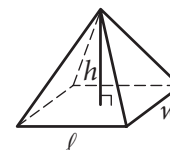
$$V = \pi r^2 h$$



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



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



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

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

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

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

1.

If $\frac{2x+6}{4} = m$ and $m = 4$, what is the value of x ?

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

2.

For $i = \sqrt{-1}$, what is the sum of $(9 - 5i) + (-6 + 12i)$?

- A) $3 + 7i$
- B) $3 - 17i$
- C) $15 + 7i$
- D) $15 - 17i$

3.

Last Wednesday, Emily baked e cookies each hour for 8 hours, and Josh baked j cookies each hour for 7 hours.

Which of the following represents the total number of cookies baked by Emily and Josh last Wednesday?

- A) $15ej$
- B) $56ej$
- C) $8e + 7j$
- D) $7e + 8j$

4.

Evelyn is a product tester for a makeup company. Every month, she receives a shipment of lipsticks that need to be sampled. The number of lipsticks that she has left to sample at the end of each day can be estimated with the equation $L = 300 - 48d$, where L is the number of lipsticks left and d is the number of days she has worked so far that month. What is the meaning of the value 300 in this equation?

- A) Evelyn will complete the samples within 300 days.
- B) Evelyn starts every month with 300 lipsticks to test.
- C) Evelyn samples lipsticks at a rate of 300 per hour.
- D) Evelyn samples lipsticks at a rate of 300 per day.

5.

$$(6a^2b - 5b^2 + 8ab^2) - (-4a^2b + 2ab^2 - 7b^2)$$

Which of the following is equivalent to the expression above?

- A) $24a^2b$
- B) $30ab^2 - 35b^2$
- C) $10a^2b + 12b^2 + 6ab^2$
- D) $10a^2b + 6ab^2 + 2b^2$

6.

$$h = 4.5b + 10.5$$

A gardener uses the model above to estimate the height h of a bush, in inches, in terms of the bush's age b , in years.

Based on the model, what is the estimated increase, in inches, of the bush's height each year?

- A) 4.5
- B) 10.5
- C) 15
- D) 47.25

7.

$$d = \frac{\left(\frac{b}{450}\right)\left(1 - \frac{b}{450}\right)^C}{\left(1 + \frac{b}{450}\right)^C - 1} E$$

The equation above expressed d in terms of b , C , and E (all constants). Which of the following gives E in terms of b , C , and d ?

- A) $E = \frac{\left(\frac{b}{450}\right)\left(1 - \frac{b}{450}\right)^C}{\left(1 + \frac{b}{450}\right)^C - 1} d$
- B) $E = \frac{\left(1 + \frac{b}{450}\right)^C - 1}{\left(\frac{b}{450}\right)\left(1 - \frac{b}{450}\right)^C} d$
- C) $E = \left(\frac{b}{450}\right)d$
- D) $E = \left(\frac{450}{b}\right)d$

8.

If $\frac{x}{y} = 7$, what is the value of $\frac{21y}{x}$?

- A) 0
- B) 1
- C) 3
- D) 6

9.

$$6x - 2y = 10$$

$$y - 7x = 11$$

What is the solution (x, y) to the systems of equations above?

- A) $(-7, -6)$
- B) $(-4, -17)$
- C) $(16, -4)$
- D) $(12, -8)$

10.

$$f(x) = 2bx^2 + 36$$

For the function f defined above, b is a constant and $f(6) = 72$. What is the value of $f(-6)$?

- A) 72
- B) 0
- C) 1
- D) -72

11.

$$R = 2.75 + .5x$$

$$N = 1.25 + .75x$$

In the equations above, R and N represent the price per pound, in dollars, of rice and noodles, respectively, x weeks after January 1st. What was the price per pound of rice when it was equal to the price per pound of noodles?

- A) \$1.75
- B) \$2.50
- C) \$3.75
- D) \$5.75

12.

A line in the xy -plane passes through the origin and has a slope of $\frac{3}{4}$. Which of the following points lies on the line?

- A) (0, 4)
- B) (3, 4)
- C) (4, 4)
- D) (16, 12)

13.

If $x > 5$, which of the following is equivalent to

$$\frac{1}{\frac{1}{x+3} + \frac{1}{x+5}}$$

- A) $\frac{2x+8}{x^2+8x+15}$
- B) $\frac{x^2+8x+15}{2x+8}$
- C) $2x + 8$
- D) $x^2 + 8x + 15$

14.

If $2x - 3y = 4$, what is the value of $\frac{4^x}{8^y}$?

- A) 2^4
- B) 8^2
- C) 4^4
- D) The value cannot be determined from the information given.

15.

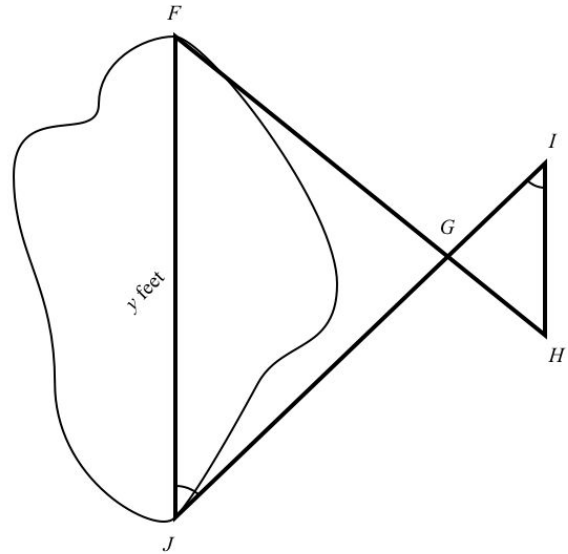
If $(ax + 4)(bx + 2) = 8x^2 + cx + 8$ for all values of x and $a + b = 6$, what are two possible values of c ?

- A) 3 and 5
- B) 6 and 35
- C) 10 and 21
- D) 16 and 20

16.

If $x > 0$ and $x^2 - 36 = 0$, what is the value of x ?

17.



A botanist wants to find a length, y , in feet, across a garden as represented in the sketch above. The lengths represented by FG , JG , GI , and HI on the sketch were determined to be 1,200 feet, 1,000 feet, 500 feet, and 300 feet, respectively. Segments FH and IJ intersect at G , and $\angle FJG$ and $\angle HIG$ have the same measure. What is the value of y ?

18.

$$-3x + y = -16$$

$$x + y = 32$$

According to the system of equations above, what is the value of x ?

19.

In a right triangle, one angle measures x *degrees*, where

$$\cos x = \frac{5}{13},$$
 What is $\sin(90 - x)$?

20.

If $a = 6\sqrt{3}$ and $2a = \sqrt{3x}$, what is the value of x ?

STOP

**IF YOU FINISH BEFORE TIME IS
CALLED, YOU MAY CHECK YOUR
WORK ON THIS SECTION ONLY.**

**DO NOT TURN TO ANY OTHER
SECTION ON THE TEST.**

Section 4 – Math (calculator)

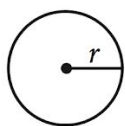
Instructions

For questions 1–30, find the correct answer from the choices provided, and complete the corresponding bubble on your answer sheet. For questions 31–38, enter the correct answer in the grid on your answer sheet. Instructions are provided on how to fill out the grid. You may fill your booklet with scratchwork if necessary.

Notes

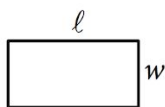
- **You may use a calculator on this section.**
- All expressions and variables refer to real numbers unless otherwise specified.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures exist in a plane unless otherwise specified.
- Unless otherwise specified, the domain of a given function g is the set of all real numbers x for which $g(x)$ is a real number.

Reference

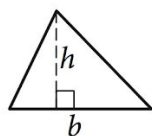


$$A = \pi r^2$$

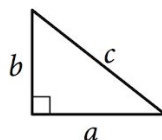
$$C = 2\pi r$$



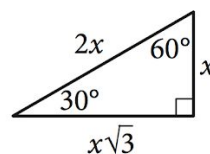
$$A = \ell w$$



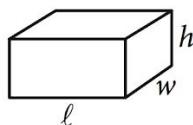
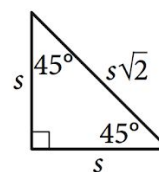
$$A = \frac{1}{2}bh$$



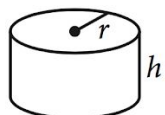
$$c^2 = a^2 + b^2$$



Special Right Triangles



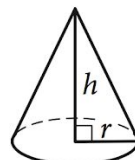
$$V = \ell wh$$



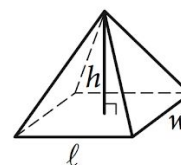
$$V = \pi r^2 h$$



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



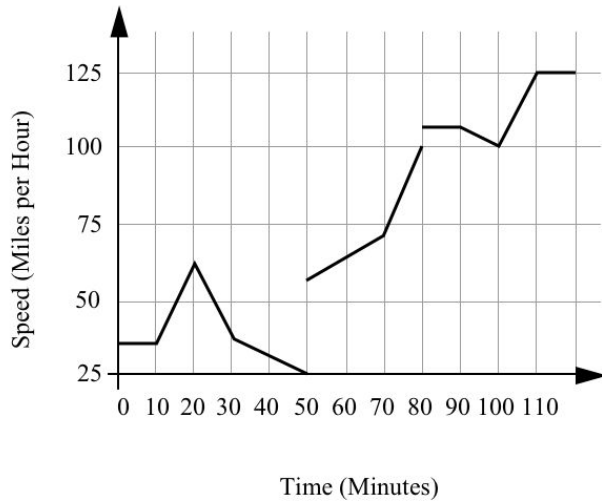
$$V = \frac{1}{3}\pi r^2 h$$



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

You have 55 minutes to complete this section (38 questions).

1.



Patrick drives at different speeds as part of his daily commute. The graph shows his driving speed at different times during his commute. On which interval is his speed strictly decreasing then strictly increasing?

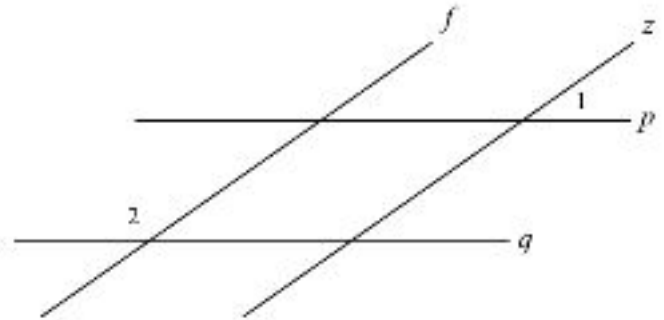
- A) Between 0 and 30 minutes
- B) Between 30 and 60 minutes
- C) Between 60 and 80 minutes
- D) Between 80 and 100 minutes

2.

If $y = cx$, where c is a constant and $y = 48$ when $x = 12$, what is the value of y when $x = 6$?

- A) 12
- B) 20
- C) 24
- D) 33

3.



In the figure above, lines p and q are parallel and lines f and z are parallel. If the measure of $\angle 1$ is 25° , what is the measure of $\angle 2$?

- A) 25
- B) 45
- C) 50
- D) 155

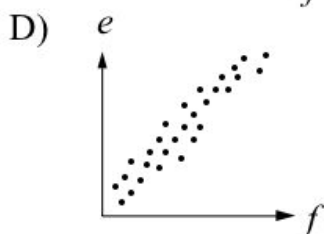
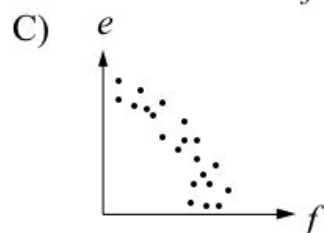
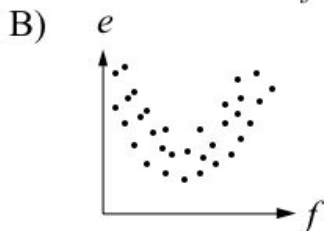
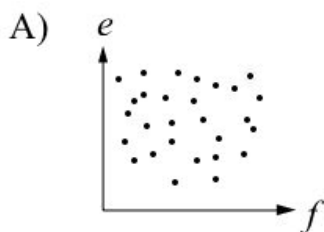
4.

If $112 + 28x$ is 118 more than 50, what is the value of $50x$?

- A) 2
- B) 42
- C) 100
- D) 80

5.

Which of the following graphs best shows a strong positive association between e and f ?



6.

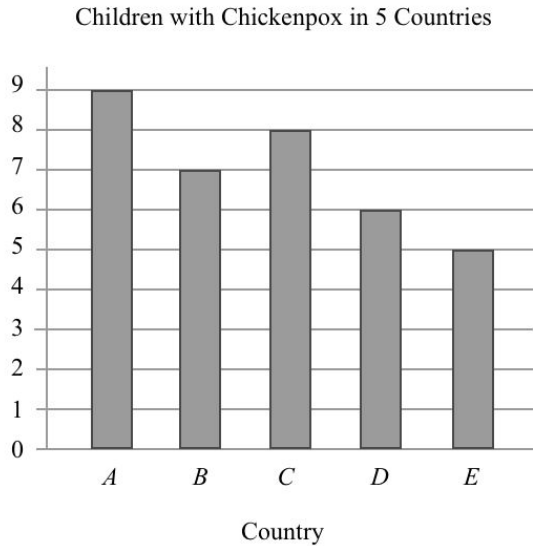
1 decaliter = 10 liters

1,000 milliliters = 1 liter

A water supplier sells industrial-sized containers of water, each with a capacity of 6 decaliters. Based on the information given above, how many milliliters of water are there in a 6-decaliter container?

- A) 0.006
- B) 600
- C) 6,000
- D) 60,000

7.



The number of children with chickenpox infections in 5 countries is shown in the graph above. If the total number of children infected is 356,000, what is an appropriate label for the vertical axis of the graph?

- A) Number of Children (in hundreds)
- B) Number of Children (in thousands)
- C) Number of Children (in tens of thousands)
- D) Number of Children (in hundreds of thousands)

8.

For what value of p is $|p - 8| + 8$ equal to 0?

- A) 0
- B) 8
- C) 16
- D) There is no such value of p

Questions 9 and 10 refer to the following information.

$$m = 305 + 11.5a$$

The maximum speed of an airplane is dependent on the altitude the plane is flying at. The formula above shows the relationship between m , the maximum speed of an airplane, in miles per hour, and a , the altitude, in thousands of feet.

9.

Which of the following expresses the altitude of the plane in terms of the maximum speed?

- A) $a = \frac{m-305}{11.5}$
- B) $a = \frac{m+305}{11.5}$
- C) $a = \frac{305-m}{11.5}$
- D) $a = \frac{11.5}{m+305}$

10.

At which of the following altitudes will the maximum speed of a plane be closest to 607 miles per hour?

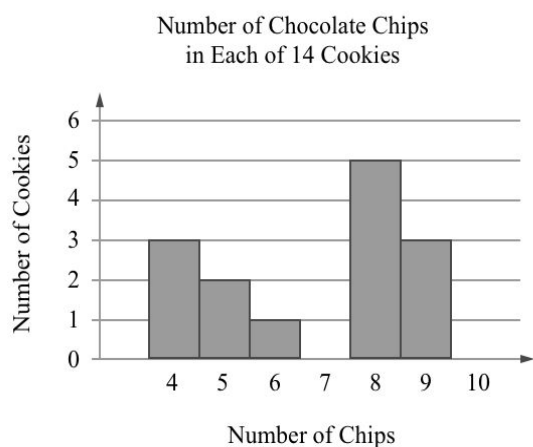
- A) 25,000 feet
- B) 26,000 feet
- C) 27,000 feet
- D) 53,000 feet

11.

Which of the following numbers is NOT a solution of the inequality $4x - 10 \geq 5x - 6$?

- A) 3
- B) -6
- C) -7
- D) -10

12.



Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of chocolate chips per cookie?

- A) 5
- B) 6
- C) 7
- D) 8

13.

		Course			Total
		French I	French II	French III	
Gender	Female	33	55	62	151
	Male	50	47	53	150
	Total	83	102	115	300

A group of ninth-grade students responded to a survey that asked which French courses they were currently enrolled in. The survey data were broken down as shown in the table above. Which of the following categories accounts for approximately 15 percent of all the survey respondents?

- A) Females taking French II
- B) Females taking French III
- C) Males taking French II
- D) Males taking French I

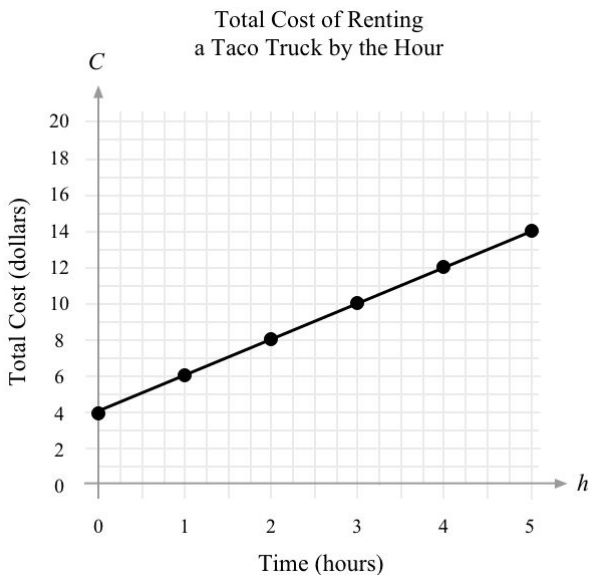
14.

Length of Baobab Trees (in inches)						
7	8	8	8	9	9	10
10	11	11	11	11	12	12
12	13	13	14	14	15	37

The table above lists the lengths, to the nearest inch, of a random sample of 23 Baobab trees. The outlier measurement of 37 is an error. Of the mean, median, and range of the values listed, which will change the most if the 37-inch measurement is removed from the data?

- A) Mean
- B) Median
- C) Range
- D) The will all change by the same amount.

Questions 15 and 16 refer to the following information:



The graph above displays the total cost C , in dollars, of renting a taco truck for h hours.

15.

What does the C -intercept represent in the graph?

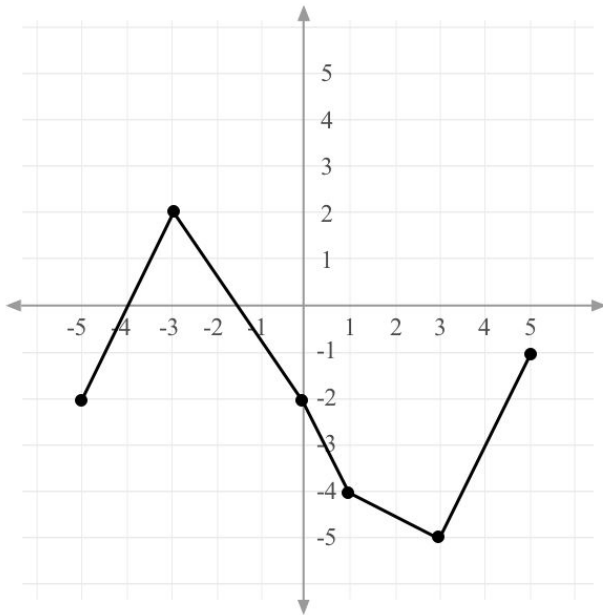
- A) The initial cost of renting the taco truck
- B) The total number of taco trucks rented
- C) The total number of hours the taco truck is rented
- D) The increase in cost to rent the taco truck for each additional hour

16.

Which of the following represents the relationship between h and C ?

- A) $C = 4h$
- B) $C = h$
- C) $C = 2h + 4$
- D) $h = 2C$

17.



The complete graph of the function f is shown in the xy -plane above. For what value of x is the value of $f(x)$ at its minimum?

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

18.

$$y < -x - h$$

$$y > x - k$$

In the xy -plane, if $(4, 4)$ is a solution to the system of inequalities above, which of the following relationships between h and k must be true?

- A) $h < k$
- B) $h > 0$
- C) $|h| < |k|$
- D) $h = -k$

19.

A bicycle store sells tires for \$13.00 each and reflectors for \$3.50 each. The store's revenue from selling a total of 114 tires and reflectors in one day was \$1,045. How many tires were sold that day?

- A) 113
- B) 68
- C) 63
- D) 46

20.

Karen bought a designer purse at a store that gave a 30 percent discount off its original price. The total amount she paid to the cashier was m dollars, including a 3 percent sales tax on the discounted price. Which of the following represents the original price of the designer bag in terms of m ?

- A) $.73m$
- B) $\frac{m}{.73}$
- C) $(.7)(1.03)m$
- D) $\frac{m}{(.7)(1.03)}$

21.

Number of Spices Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	17	29	54	100
Group Y	23	14	63	100
Total	40	43	117	100

The data in the table above was produced by a food scientist studying the number of different spices people recognize when asked to record their tastes for one week. Group X consisted of 100 people who were asked to record the number of spices tasted after lunch, and Group Y consisted of 100 people who were asked to record the number of spices tasted after dinner. If a person is chosen at random from those who recalled at least 5 different spices, what is the probability that person belonged to Group Y?

- A) $\frac{100}{117}$
- B) $\frac{63}{100}$
- C) $\frac{63}{117}$
- D) $\frac{117}{200}$

Questions 22 and 23 refer to the following information.

Annual Budgets for Government in the US
(in thousands of dollars)

Department	Year			
	2012	2013	2014	2015
State	365,904	348,600	485,809	489,108
Education	2,163,508	2,518,600	2,281,411	3,007,034
Defence	15,456,325	13,334,321	10,540,321	15,433,221
Housing	1,467,380	1,666,666	1,450,300	1,600,321
Agriculture	4,050,049	4,080,054	4,555,333	6,802,300
Health	200,221	385,322	345,333	466,666

22.

Which of the following best approximates the average rate of change in the annual budget for the State Department in the US from 2013 – 2015 ?

- A) \$60,000,000 per year
- B) \$70,000,000 per year
- C) \$85,000,000 per year
- D) \$140,000,000 per year

23.

Of the following, which department's ratio of its 2013 budget to its 2015 budget is closest to the Department of Defense's ratio of its 2013 budget to its 2015 budget?

- A) State
- B) Education
- C) Housing
- D) Health

24.

Which of the following is an equation of a circle in the xy -plane with center $(0, -5)$ and a radius with endpoint $(\frac{3}{2}, -6)$?

- A) $x^2 + (y + 5)^2 = \frac{13}{4}$
- B) $x^2 + (y - 5)^2 = \frac{13}{4}$
- C) $x^2 + (y - 5)^2 = \frac{\sqrt{13}}{2}$
- D) $x^2 + (y + 5)^2 = \frac{\sqrt{13}}{2}$

25.

$$h(t) = -16t^2 + 65t$$

The equation above expresses the approximate height h , in feet, of an object t seconds after it is launched vertically upward from the ground with an initial velocity of 65 feet per second. After approximately how many seconds will the object hit the ground?

- A) 2.0
- B) 2.5
- C) 3.5
- D) 4.0

26.

If the height of an oak tree is 30% greater than the height of a maple tree, and the oak tree is 156 feet tall, how tall is the maple tree?

- A) 115 feet
- B) 120 feet
- C) 124 feet
- D) 173 feet

27.

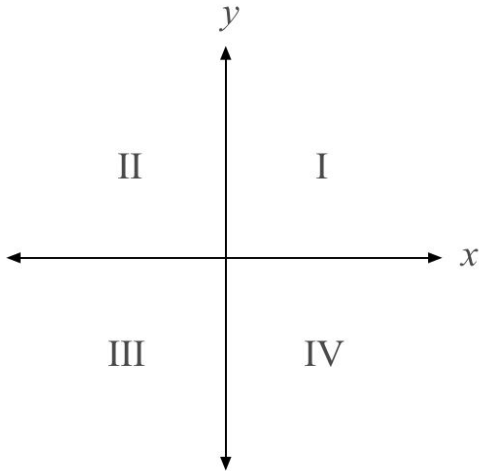
A square garden measures 5 meters by 5 meters. Ten workers each mark off a randomly selected area of the garden; each region is a square and has side lengths of 1 meter, and no two regions overlap. The scientists count the weeds contained in the soil in each region. The results are shown in the table below:

Region	Number of Weeds	Region	Number of Weeds
A	140	F	183
B	191	G	195
C	190	H	200
D	176	I	229
E	194	J	216

Which of the following is a reasonable approximation of the number of weeds in the entire garden?

- A) 190
- B) 950
- C) 4,750
- D) 23,750

28.



If the system of inequalities $y \geq 3x + 2$ and $y > \frac{1}{3}x - 2$ is graphed in the xy -plane above, which quadrant contains no solutions to the system?

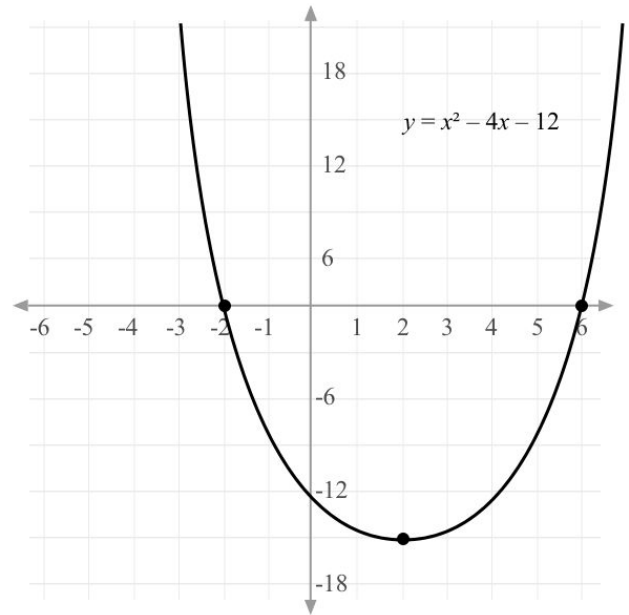
- A) Quadrant II
- B) Quadrant III
- C) Quadrant IV
- D) There are solutions in all four quadrants

29.

For a polynomial $p(x)$, the value of $p(5)$ is -3 . Which of the following must be true about $p(x)$?

- A) $x - 8$ is a factor of $p(x)$.
- B) $x - 5$ is a factor of $p(x)$.
- C) $x + 5$ is a factor of $p(x)$.
- D) The remainder when $p(x)$ is divided by $x - 5$ is -3 .

30.



Which of the following is an equivalent form of the equation of the graph shown in the xy -plane above, from which the coordinates of the vertex can be identified as constants in the equation?

- A) $y = (x - 6)(x + 2)$
- B) $y = (x + 6)(x - 2)$
- C) $y = x(x - 4) - 12$
- D) $y = (x - 2)^2 - 16$

31.

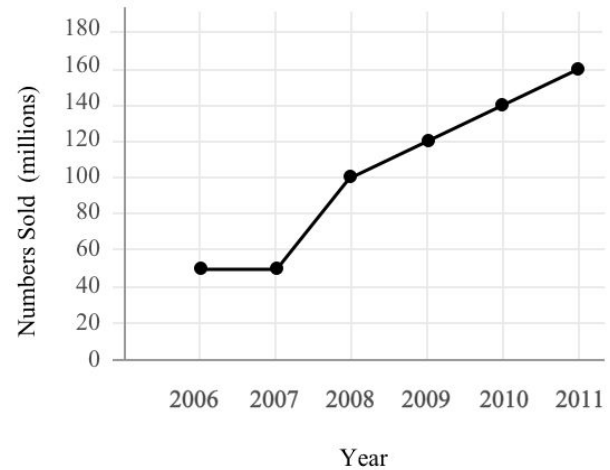
Jackie can build at least 13 toy cars per hour and at most 19 toy cars per hour. Based on this information, what is a possible amount of time, in hours, that it could take Jackie to build 78 toy cars?

32.

The weight limit for a jet bridge is 7000 pounds. A baggage cart that is carrying a certain number of identical suitcases, each weighing 15 pounds, will pass over the jet bridge. If the combined weight of the empty baggage cart and its driver is 5000 pounds, what is the maximum possible number of suitcases that will keep the combined weight of the baggage cart, driver, and suitcases below the jet bridge's posted weight limit?

33.

Number of Iced Coffees
Sold Each Year from 2008 to 2011

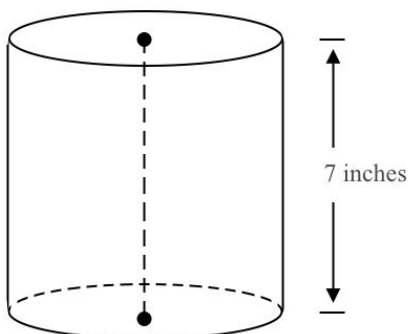


According to the graph above, the number of iced coffees sold in 2007 is what fraction of the number sold in 2011 ?

34.

A fine-dining restaurant is open five days per week for lunch and seven days per week for dinner, and has a capacity of 60 people. If there are two seatings for lunch and three seatings for dinner, what is the maximum number of people that could eat at the restaurant over the course of a week?

35.



A pastry chef uses a oil container in the shape of a right circular cylinder, above. If the volume of the container is 112π , what is the diameter of the base of the cylinder, in inches?

36.

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

For what value of x is the function h above undefined?

Questions 37 and 38 refer to the following information:

Chris opened a bank account that earns 3 percent interest compounded annually. His initial deposit was \$200 and he uses the expression $\$200(x)^t$ to find the value of the account after t years.

37.

What is the value of x in the expression?

38.

Chris's friend Charles found an account that earns 3.5 percent interest, compounded annually. Charles made an initial deposit of \$200 into this account at the same time Chris made a deposit of \$200 into his account. After 10 years, how much more money in dollars will Charles have earned than Chris? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response).

STOP

**IF YOU FINISH BEFORE TIME IS
CALLED, YOU MAY CHECK YOUR
WORK ON THIS SECTION ONLY.**

**DO NOT TURN TO ANY OTHER
SECTION ON THE TEST.**

Section 5 – Essay

Directions

The essay asks you to demonstrate how effectively you can understand and analyze a passage. Your essay should show you have understood the passage, presented a clear and organized analysis, and used language effectively.

You must write your essay on the lines provided in your answer booklet; you will also have access to Planning Paper for preliminary brainstorming. Try to write legibly so that your writing can be understood by other readers. There is enough space for a full essay if you do not skip lines, avoid wide margins, and maintain a reasonable size for your handwriting.

Reminder

Write your essay on the lines of the pages in your answer booklet.

You have 50 minutes to read the passage and write an essay in response to the prompt provided inside this booklet.

As you read the passage below, consider how the author uses

- evidence, such as facts or 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 Kara Messina, *"Got Milk? Get Out."* © 2016 by Diet Data. Originally published March 21, 2016.

(1)

"Got Milk?" It is a question nutritionists have been asking since long before Goodby Silverstein & Co. launched its famous ad campaign in 1993. Milk is often treated as a "super food" necessary for healthy development. Dr. Frank Greer, a professor at the University of Wisconsin-Madison School of Medicine, affirms that the calcium in milk builds strong bones. Similarly, Dr. William Sears, Clinical Professor of Pediatrics at the University of California, Irvine School of Medicine, calls milk "one-stop shopping for nutrition" with the health advantages of veggies, legumes, and seafood mixed together. Yet recent medical, economic, and environmental findings call traditional wisdom on the value of dairy products into question.

(2)

The increasing diagnosis of lactose intolerance leads many to qualify their praise of milk's nutritional value. The production of lactase, an enzyme that breaks down molecules in milk, decreases in most humans after they wean off mother's milk. As many as 65% of human adults develop lactose intolerance over their lifetimes. This percentage differs based on ethnicity, from only 15-20% of Northern European adults to 90-100% of East Asian adults. Only those whose ancestors bred cattle or goats became accustomed to drinking other mammals' milk past weaning age. While some lactose intolerant people opt to consume products like Lactaid (milk without dairy), many question whether they should prioritize consuming a food that their bodies cannot break down.

(3)

Despite the prevalence of lactose intolerance, doctors and policy-makers often neglect to consider milk's adverse health effects. Lactose intolerance often is misdiagnosed as a gastrointestinal infection, leading to the over-prescription of antibiotics and ultimately to an increase in drug-resistant bacteria. Similarly, nutrition intervention programs in developing countries are often based on milk rather than local calcium sources. Yet not all communities can consume milk in the quantities one finds in Northern European diets.

(4)

Even for those whose bodies can tolerate lactose, physicians now posit that the health benefits of milk have been overstated. The Physicians Committee for Responsible Medicine writes, "Milk and other dairy products do not offer any nutrients that cannot be found in a healthier form in other foods. Surprisingly, drinking milk does not even appear to prevent osteoporosis, its major selling point." The research of Dr. Frank Oski, former Director of Pediatrics at Johns Hopkins University, linked consuming cows' milk to anemia, cramps, and diarrhea. He further speculates that milk "may play a central role in the origins of atherosclerosis and heart attacks." Milk also has been linked to childhood diabetes, obesity, cancer, and a plethora of other diseases.

(5)

Finally, the environment seems increasingly resistant to cultivating dairy products. Humanitarian aid efforts often fail when they introduce milk-producing mammals because they require valuable limited resources to stay healthy enough to lactate. Of the environment, the Food and Agriculture Organization of the United Nations writes, "The dairy sector emits 1969 million tonnes CO₂-eq [± 26 percent] of which 1328 million tonnes are attributed to milk [...] The global dairy sector contributes 4.0 percent to the total global anthropogenic [Greenhouse gas] emissions." Our planet appears to be as lactose intolerant as the majority of its human inhabitants.

(6)

In light of adverse impacts on the environment of the planet, the economies of developing communities, and the physical health of consumers, it is high time we stop asking “Got Milk?” and instead tell each other to get over it. While no one is calling for an all-or-nothing solution, individuals should think twice before advocating for the widespread consumption of dairy.

Write an essay in which you explain how the author builds an argument to persuade her audience that they should decrease their reliance on dairy products. In your essay, analyze how the author uses one or more of the features listed above (or features of your own choice) to strengthen the logic and persuasiveness of her 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 author’s claims, but rather explain how she builds an argument to persuade her audience.

STOP

**IF YOU FINISH BEFORE TIME IS
CALLED, YOU MAY CHECK YOUR
WORK ON THIS SECTION ONLY.**

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SECTION ON THE TEST.**