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Practice Test #1

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Reading Test

65 MINUTES, 52 QUESTIONS

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

DIRECTIONS

Each passage or pair of passages below is followed by a number of questions. After reading each passage or pair, 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 1-10 are based on the following passage.

This passage is from Lydia Minatoya, *The Strangeness of Beauty*. ©1999 by Lydia Minatoya. The setting is Japan in 1920. Chie and her daughter Naomi are members of the House of Fuji, a noble family.

Akira came directly, breaking all tradition. Was that it? Had he followed form—had he asked his mother to speak to his father to approach a

Line go-between—would Chie have been more receptive?

5 He came on a winter's eve. He pounded on the door while a cold rain beat on the shuttered veranda, so at first Chie thought him only the wind. The maid knew better. Chie heard her soft scuttling footsteps, the creak of the door. Then the maid brought a
10 calling card to the drawing room, for Chie.

Chie was reluctant to go to her guest; perhaps she was feeling too cozy. She and Naomi were reading at a low table set atop a charcoal brazier. A thick quilt spread over the sides of the table so their legs were
15 tucked inside with the heat.

"Who is it at this hour, in this weather?" Chie questioned as she picked the name card off the maid's lacquer tray.

"Shinoda, Akira. Kobe Dental College," she read.

20 Naomi recognized the name. Chie heard a soft intake of air.

"I think you should go," said Naomi.

Akira was waiting in the entry. He was in his early twenties, slim and serious, wearing the black
25 military-style uniform of a student. As he bowed—his hands hanging straight down, a black cap in one, a yellow oil-paper umbrella in the other—Chie glanced beyond him. In the glistening surface of the courtyard's rain-drenched paving
30 stones, she saw his reflection like a dark double.

"Madame," said Akira, "forgive my disruption, but I come with a matter of urgency."

His voice was soft, refined. He straightened and stole a deferential peek at her face.

35 In the dim light his eyes shone with sincerity. Chie felt herself starting to like him.

"Come inside, get out of this nasty night. Surely your business can wait for a moment or two."

40 "I don't want to trouble you. Normally I would approach you more properly but I've received word of a position. I've an opportunity to go to America, as dentist for Seattle's Japanese community."

"Congratulations," Chie said with amusement.

45 "That is an opportunity, I'm sure. But how am I involved?"

Even noting Naomi's breathless reaction to the name card, Chie had no idea. Akira's message, delivered like a formal speech, filled her with maternal amusement. You know how children speak
50 so earnestly, so hurriedly, so endearingly about things that have no importance in an adult's mind? That's how she viewed him, as a child.

It was how she viewed Naomi. Even though Naomi was eighteen and training endlessly in the arts
55 needed to make a good marriage, Chie had made no effort to find her a husband.

Akira blushed.

“Depending on your response, I may stay in Japan. I’ve come to ask for Naomi’s hand.”

60 Suddenly Chie felt the dampness of the night.

“Does Naomi know anything of your . . . ambitions?”

“We have an understanding. Please don’t judge my candidacy by the unseemliness of this proposal. I
65 ask directly because the use of a go-between takes much time. Either method comes down to the same thing: a matter of parental approval. If you give your consent, I become Naomi’s yoshi.* We’ll live in the House of Fuji. Without your consent, I must go to
70 America, to secure a new home for my bride.”

Eager to make his point, he’d been looking her full in the face. Abruptly, his voice turned gentle. “I see I’ve startled you. My humble apologies. I’ll take no more of your evening. My address is on my card. If
75 you don’t wish to contact me, I’ll reapproach you in two weeks’ time. Until then, good night.”

He bowed and left. Taking her ease, with effortless grace, like a cat making off with a fish.

80 “Mother?” Chie heard Naomi’s low voice and turned from the door. “He has asked you?”

The sight of Naomi’s clear eyes, her dark brows gave Chie strength. Maybe his hopes were preposterous.

85 “Where did you meet such a fellow? Imagine! He thinks he can marry the Fuji heir and take her to America all in the snap of his fingers!”

Chie waited for Naomi’s ripe laughter.

Naomi was silent. She stood a full half minute looking straight into Chie’s eyes. Finally, she spoke.

90 “I met him at my literary meeting.”

Naomi turned to go back into the house, then stopped.

“Mother.”

“Yes?”

95 “I mean to have him.”

* a man who marries a woman of higher status and takes her family’s name

1

Which choice best describes what happens in the passage?

- A) One character argues with another character who intrudes on her home.
- B) One character receives a surprising request from another character.
- C) One character reminisces about choices she has made over the years.
- D) One character criticizes another character for pursuing an unexpected course of action.

2

Which choice best describes the developmental pattern of the passage?

- A) A careful analysis of a traditional practice
- B) A detailed depiction of a meaningful encounter
- C) A definitive response to a series of questions
- D) A cheerful recounting of an amusing anecdote

3

As used in line 1 and line 65, “directly” most nearly means

- A) frankly.
- B) confidently.
- C) without mediation.
- D) with precision.

4

Which reaction does Akira most fear from Chie?

- A) She will consider his proposal inappropriate.
- B) She will mistake his earnestness for immaturity.
- C) She will consider his unscheduled visit an imposition.
- D) She will underestimate the sincerity of his emotions.

5

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

- A) Line 33 (“His voice . . . refined”)
- B) Lines 49-51 (“You . . . mind”)
- C) Lines 63-64 (“Please . . . proposal”)
- D) Lines 71-72 (“Eager . . . face”)

6

In the passage, Akira addresses Chie with

- A) affection but not genuine love.
- B) objectivity but not complete impartiality.
- C) amusement but not mocking disparagement.
- D) respect but not utter deference.

7

The main purpose of the first paragraph is to

- A) describe a culture.
- B) criticize a tradition.
- C) question a suggestion.
- D) analyze a reaction.

8

As used in line 2, “form” most nearly means

- A) appearance.
- B) custom.
- C) structure.
- D) nature.

9

Why does Akira say his meeting with Chie is “a matter of urgency” (line 32)?

- A) He fears that his own parents will disapprove of Naomi.
- B) He worries that Naomi will reject him and marry someone else.
- C) He has been offered an attractive job in another country.
- D) He knows that Chie is unaware of his feelings for Naomi.

10

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

- A) Line 39 (“I don’t . . . you”)
- B) Lines 39-42 (“Normally . . . community”)
- C) Lines 58-59 (“Depending . . . Japan”)
- D) Lines 72-73 (“I see . . . you”)

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

This passage is adapted from Francis J. Flynn and Gabrielle S. Adams, "Money Can't Buy Love: Asymmetric Beliefs about Gift Price and Feelings of Appreciation." ©2008 by Elsevier Inc.

Every day, millions of shoppers hit the stores in full force—both online and on foot—searching frantically for the perfect gift. Last year, Americans spent over \$30 billion at retail stores in the month of December alone. Aside from purchasing holiday gifts, most people regularly buy presents for other occasions throughout the year, including weddings, birthdays, anniversaries, graduations, and baby showers. This frequent experience of gift-giving can engender ambivalent feelings in gift-givers. Many relish the opportunity to buy presents because gift-giving offers a powerful means to build stronger bonds with one's closest peers. At the same time, many dread the thought of buying gifts; they worry that their purchases will disappoint rather than delight the intended recipients.

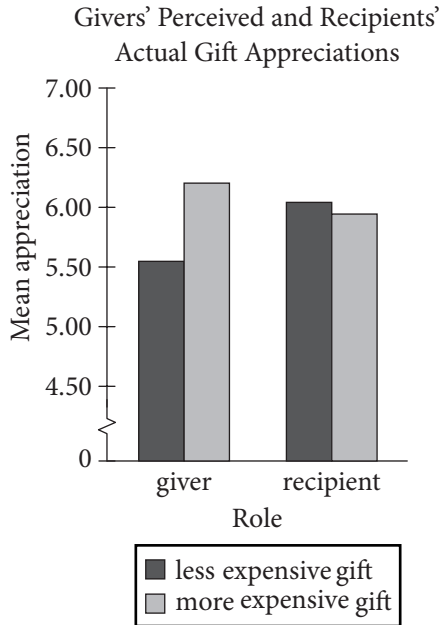
Anthropologists describe gift-giving as a positive social process, serving various political, religious, and psychological functions. Economists, however, offer a less favorable view. According to Waldfogel (1993), gift-giving represents an objective waste of resources. People buy gifts that recipients would not choose to buy on their own, or at least not spend as much money to purchase (a phenomenon referred to as "the deadweight loss of Christmas"). To wit, givers are likely to spend \$100 to purchase a gift that receivers would spend only \$80 to buy themselves. This "deadweight loss" suggests that gift-givers are not very good at predicting what gifts others will appreciate. That in itself is not surprising to social psychologists. Research has found that people often struggle to take account of others' perspectives—their insights are subject to egocentrism, social projection, and multiple attribution errors.

What is surprising is that gift-givers have considerable experience acting as both gift-givers and gift-recipients, but nevertheless tend to overspend each time they set out to purchase a meaningful gift. In the present research, we propose a unique psychological explanation for this overspending problem—i.e., that gift-givers equate how much they

spend with how much recipients will appreciate the gift (the more expensive the gift, the stronger a gift-recipient's feelings of appreciation). Although a link between gift price and feelings of appreciation might seem intuitive to gift-givers, such an assumption may be unfounded. Indeed, we propose that gift-recipients will be less inclined to base their feelings of appreciation on the magnitude of a gift than givers assume.

Why do gift-givers assume that gift price is closely linked to gift-recipients' feelings of appreciation? Perhaps givers believe that bigger (i.e., more expensive) gifts convey stronger signals of thoughtfulness and consideration. According to Camerer (1988) and others, gift-giving represents a symbolic ritual, whereby gift-givers attempt to signal their positive attitudes toward the intended recipient and their willingness to invest resources in a future relationship. In this sense, gift-givers may be motivated to spend more money on a gift in order to send a "stronger signal" to their intended recipient. As for gift-recipients, they may not construe smaller and larger gifts as representing smaller and larger signals of thoughtfulness and consideration.

The notion of gift-givers and gift-recipients being unable to account for the other party's perspective seems puzzling because people slip in and out of these roles every day, and, in some cases, multiple times in the course of the same day. Yet, despite the extensive experience that people have as both givers and receivers, they often struggle to transfer information gained from one role (e.g., as a giver) and apply it in another, complementary role (e.g., as a receiver). In theoretical terms, people fail to utilize information about their own preferences and experiences in order to produce more efficient outcomes in their exchange relations. In practical terms, people spend hundreds of dollars each year on gifts, but somehow never learn to calibrate their gift expenditures according to personal insight.



11

- The authors most likely use the examples in lines 1-9 of the passage (“Every . . . showers”) to highlight the
- A) regularity with which people shop for gifts.
 - B) recent increase in the amount of money spent on gifts.
 - C) anxiety gift shopping causes for consumers.
 - D) number of special occasions involving gift-giving.

12

- In line 10, the word “ambivalent” most nearly means
- A) unrealistic.
 - B) conflicted.
 - C) apprehensive.
 - D) supportive.

13

- The authors indicate that people value gift-giving because they feel it
- A) functions as a form of self-expression.
 - B) is an inexpensive way to show appreciation.
 - C) requires the gift-recipient to reciprocate.
 - D) can serve to strengthen a relationship.

14

- Which choice provides the best evidence for the answer to the previous question?
- A) Lines 10-13 (“Many . . . peers”)
 - B) Lines 22-23 (“People . . . own”)
 - C) Lines 31-32 (“Research . . . perspectives”)
 - D) Lines 44-47 (“Although . . . unfounded”)

15

- The “social psychologists” mentioned in paragraph 2 (lines 17-34) would likely describe the “deadweight loss” phenomenon as
- A) predictable.
 - B) questionable.
 - C) disturbing.
 - D) unprecedented.

16

- The passage indicates that the assumption made by gift-givers in lines 41-44 may be
- A) insincere.
 - B) unreasonable.
 - C) incorrect.
 - D) substantiated.

17

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

- A) Lines 53-55 (“Perhaps . . . consideration”)
- B) Lines 55-60 (“According . . . relationship”)
- C) Lines 63-65 (“As . . . consideration”)
- D) Lines 75-78 (“In . . . relations”)

18

As it is used in line 54, “convey” most nearly means

- A) transport.
- B) counteract.
- C) exchange.
- D) communicate.

19

The authors refer to work by Camerer and others (line 56) in order to

- A) offer an explanation.
- B) introduce an argument.
- C) question a motive.
- D) support a conclusion.

20

The graph following the passage offers evidence that gift-givers base their predictions of how much a gift will be appreciated on

- A) the appreciation level of the gift-recipients.
- B) the monetary value of the gift.
- C) their own desires for the gifts they purchase.
- D) their relationship with the gift-recipients.

21

The authors would likely attribute the differences in gift-giver and recipient mean appreciation as represented in the graph to

- A) an inability to shift perspective.
- B) an increasingly materialistic culture.
- C) a growing opposition to gift-giving.
- D) a misunderstanding of intentions.

Questions 22-31 are based on the following passage and supplementary material.

This passage is adapted from J. D. Watson and F. H. C. Crick, "Genetical Implications of the Structure of Deoxyribonucleic Acid." ©1953 by Nature Publishing Group. Watson and Crick deduced the structure of DNA using evidence from Rosalind Franklin and R. G. Gosling's X-ray crystallography diagrams of DNA and from Erwin Chargaff's data on the base composition of DNA.

The chemical formula of deoxyribonucleic acid (DNA) is now well established. The molecule is a very long chain, the backbone of which consists of a regular alternation of sugar and phosphate groups.

To each sugar is attached a nitrogenous base, which can be of four different types. Two of the possible bases—adenine and guanine—are purines, and the other two—thymine and cytosine—are pyrimidines. So far as is known, the sequence of bases along the chain is irregular. The monomer unit, consisting of phosphate, sugar and base, is known as a nucleotide.

The first feature of our structure which is of biological interest is that it consists not of one chain, but of two. These two chains are both coiled around a common fiber axis. It has often been assumed that since there was only one chain in the chemical formula there would only be one in the structural unit. However, the density, taken with the X-ray evidence, suggests very strongly that there are two.

The other biologically important feature is the manner in which the two chains are held together. This is done by hydrogen bonds between the bases. The bases are joined together in pairs, a single base from one chain being hydrogen-bonded to a single base from the other. The important point is that only certain pairs of bases will fit into the structure.

One member of a pair must be a purine and the other a pyrimidine in order to bridge between the two chains. If a pair consisted of two purines, for example, there would not be room for it.

We believe that the bases will be present almost entirely in their most probable forms. If this is true, the conditions for forming hydrogen bonds are more restrictive, and the only pairs of bases possible are: adenine with thymine, and guanine with cytosine. Adenine, for example, can occur on either chain; but when it does, its partner on the other chain must always be thymine.

The phosphate-sugar backbone of our model is completely regular, but any sequence of the pairs of bases can fit into the structure. It follows that in a

long molecule many different permutations are possible, and it therefore seems likely that the precise sequence of bases is the code which carries the
45 genetical information. If the actual order of the bases on one of the pair of chains were given, one could write down the exact order of the bases on the other one, because of the specific pairing. Thus one chain is, as it were, the complement of the other, and it is
50 this feature which suggests how the deoxyribonucleic acid molecule might duplicate itself.

The table shows, for various organisms, the percentage of each of the four types of nitrogenous bases in that organism's DNA.

Base Composition of DNA				
Organism	Percentage of base in organism's DNA			
	adenine (%)	guanine (%)	cytosine (%)	thymine (%)
Maize	26.8	22.8	23.2	27.2
Octopus	33.2	17.6	17.6	31.6
Chicken	28.0	22.0	21.6	28.4
Rat	28.6	21.4	20.5	28.4
Human	29.3	20.7	20.0	30.0
Grasshopper	29.3	20.5	20.7	29.3
Sea urchin	32.8	17.7	17.3	32.1
Wheat	27.3	22.7	22.8	27.1
Yeast	31.3	18.7	17.1	32.9
<i>E. coli</i>	24.7	26.0	25.7	23.6

Adapted from Manju Bansal, "DNA Structure: Revisiting the Watson-Crick Double Helix." ©2003 by Current Science Association, Bangalore.

22

The authors use the word “backbone” in lines 3 and 39 to indicate that

- A) only very long chains of DNA can be taken from an organism with a spinal column.
- B) the main structure of a chain in a DNA molecule is composed of repeating units.
- C) a chain in a DNA molecule consists entirely of phosphate groups or of sugars.
- D) nitrogenous bases form the main structural unit of DNA.

23

A student claims that nitrogenous bases pair randomly with one another. Which of the following statements in the passage contradicts the student’s claim?

- A) Lines 5-6 (“To each . . . types”)
- B) Lines 9-10 (“So far . . . irregular”)
- C) Lines 23-25 (“The bases . . . other”)
- D) Lines 27-29 (“One member . . . chains”)

24

In the second paragraph (lines 12-19), what do the authors claim to be a feature of biological interest?

- A) The chemical formula of DNA
- B) The common fiber axis
- C) The X-ray evidence
- D) DNA consisting of two chains

25

The authors’ main purpose of including the information about X-ray evidence and density is to

- A) establish that DNA is the molecule that carries the genetic information.
- B) present an alternate hypothesis about the composition of a nucleotide.
- C) provide support for the authors’ claim about the number of chains in a molecule of DNA.
- D) confirm the relationship between the density of DNA and the known chemical formula of DNA.

26

Based on the passage, the authors’ statement “If a pair consisted of two purines, for example, there would not be room for it” (lines 29-30) implies that a pair

- A) of purines would be larger than the space between a sugar and a phosphate group.
- B) of purines would be larger than a pair consisting of a purine and a pyrimidine.
- C) of pyrimidines would be larger than a pair of purines.
- D) consisting of a purine and a pyrimidine would be larger than a pair of pyrimidines.

27

The authors’ use of the words “exact,” “specific,” and “complement” in lines 47-49 in the final paragraph functions mainly to

- A) confirm that the nucleotide sequences are known for most molecules of DNA.
- B) counter the claim that the sequences of bases along a chain can occur in any order.
- C) support the claim that the phosphate-sugar backbone of the authors’ model is completely regular.
- D) emphasize how one chain of DNA may serve as a template to be copied during DNA replication.

28

Based on the table and passage, which choice gives the correct percentages of the purines in yeast DNA?

- A) 17.1% and 18.7%
- B) 17.1% and 32.9%
- C) 18.7% and 31.3%
- D) 31.3% and 32.9%

29

Do the data in the table support the authors' proposed pairing of bases in DNA?

- A) Yes, because for each given organism, the percentage of adenine is closest to the percentage of thymine, and the percentage of guanine is closest to the percentage of cytosine.
- B) Yes, because for each given organism, the percentage of adenine is closest to the percentage of guanine, and the percentage of cytosine is closest to the percentage of thymine.
- C) No, because for each given organism, the percentage of adenine is closest to the percentage of thymine, and the percentage of guanine is closest to the percentage of cytosine.
- D) No, because for each given organism, the percentage of adenine is closest to the percentage of guanine, and the percentage of cytosine is closest to the percentage of thymine.

30

According to the table, which of the following pairs of base percentages in sea urchin DNA provides evidence in support of the answer to the previous question?

- A) 17.3% and 17.7%
- B) 17.3% and 32.1%
- C) 17.3% and 32.8%
- D) 17.7% and 32.8%

31

Based on the table, is the percentage of adenine in each organism's DNA the same or does it vary, and which statement made by the authors is most consistent with that data?

- A) The same; "Two of . . . pyrimidines" (lines 6-8)
- B) The same; "The important . . . structure" (lines 25-26)
- C) It varies; "Adenine . . . thymine" (lines 36-38)
- D) It varies; "It follows . . . information" (lines 41-45)

Questions 32-41 are based on the following passage.

This passage is adapted from Virginia Woolf, *Three Guineas*. ©1938 by Harcourt, Inc. Here, Woolf considers the situation of women in English society.

Close at hand is a bridge over the River Thames, an admirable vantage ground for us to make a survey. The river flows beneath; barges pass, laden with timber, bursting with corn; there on one side are the domes and spires of the city; on the other, Westminster and the Houses of Parliament. It is a place to stand on by the hour, dreaming. But not now. Now we are pressed for time. Now we are here to consider facts; now we must fix our eyes upon the procession—the procession of the sons of educated men.

There they go, our brothers who have been educated at public schools and universities, mounting those steps, passing in and out of those doors, ascending those pulpits, preaching, teaching, administering justice, practising medicine, transacting business, making money. It is a solemn sight always—a procession, like a caravanserai crossing a desert. . . . But now, for the past twenty years or so, it is no longer a sight merely, a photograph, or fresco scrawled upon the walls of time, at which we can look with merely an esthetic appreciation. For there, trapesing along at the tail end of the procession, we go ourselves. And that makes a difference. We who have looked so long at the pageant in books, or from a curtained window watched educated men leaving the house at about nine-thirty to go to an office, returning to the house at about six-thirty from an office, need look passively no longer. We too can leave the house, can mount those steps, pass in and out of those doors, . . . make money, administer justice. . . . We who now agitate these humble pens may in another century or two speak from a pulpit. Nobody will dare contradict us then; we shall be the mouthpieces of the divine spirit—a solemn thought, is it not? Who can say whether, as time goes on, we may not dress in military uniform, with gold lace on our breasts, swords at our sides, and something like the old family coal-scuttle on our heads, save that that venerable object was never decorated with plumes of white horsehair. You laugh—indeed the shadow of the private house still makes those dresses look a little queer. We have worn private clothes so long. . . . But we have not come here to laugh, or to

talk of fashions—men’s and women’s. We are here, on the bridge, to ask ourselves certain questions. And they are very important questions; and we have very little time in which to answer them. The questions that we have to ask and to answer about that procession during this moment of transition are so important that they may well change the lives of all men and women for ever. For we have to ask ourselves, here and now, do we wish to join that procession, or don’t we? On what terms shall we join that procession? Above all, where is it leading us, the procession of educated men? The moment is short; it may last five years; ten years, or perhaps only a matter of a few months longer. . . . But, you will object, you have no time to think; you have your battles to fight, your rent to pay, your bazaars to organize. That excuse shall not serve you, Madam. As you know from your own experience, and there are facts that prove it, the daughters of educated men have always done their thinking from hand to mouth; not under green lamps at study tables in the cloisters of secluded colleges. They have thought while they stirred the pot, while they rocked the cradle. It was thus that they won us the right to our brand-new sixpence. It falls to us now to go on thinking; how are we to spend that sixpence? Think we must. Let us think in offices; in omnibuses; while we are standing in the crowd watching Coronations and Lord Mayor’s Shows; let us think . . . in the gallery of the House of Commons; in the Law Courts; let us think at baptisms and marriages and funerals. Let us never cease from thinking—what is this “civilization” in which we find ourselves? What are these ceremonies and why should we take part in them? What are these professions and why should we make money out of them? Where in short is it leading us, the procession of the sons of educated men?

32

The main purpose of the passage is to

- A) emphasize the value of a tradition.
- B) stress the urgency of an issue.
- C) highlight the severity of social divisions.
- D) question the feasibility of an undertaking.

33

The central claim of the passage is that

- A) educated women face a decision about how to engage with existing institutions.
- B) women can have positions of influence in English society only if they give up some of their traditional roles.
- C) the male monopoly on power in English society has had grave and continuing effects.
- D) the entry of educated women into positions of power traditionally held by men will transform those positions.

34

Woolf uses the word “we” throughout the passage mainly to

- A) reflect the growing friendliness among a group of people.
- B) advance the need for candor among a group of people.
- C) establish a sense of solidarity among a group of people.
- D) reinforce the need for respect among a group of people.

35

According to the passage, Woolf chooses the setting of the bridge because it

- A) is conducive to a mood of fanciful reflection.
- B) provides a good view of the procession of the sons of educated men.
- C) is within sight of historic episodes to which she alludes.
- D) is symbolic of the legacy of past and present sons of educated men.

36

Woolf indicates that the procession she describes in the passage

- A) has come to have more practical influence in recent years.
- B) has become a celebrated feature of English public life.
- C) includes all of the richest and most powerful men in England.
- D) has become less exclusionary in its membership in recent years.

37

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

- A) Lines 12-17 (“There . . . money”)
- B) Lines 17-19 (“It . . . desert”)
- C) Lines 23-24 (“For . . . ourselves”)
- D) Lines 30-34 (“We . . . pulpit”)

38

Woolf characterizes the questions in lines 53-57 (“For we . . . men”) as both

- A) controversial and threatening.
- B) weighty and unanswerable.
- C) momentous and pressing.
- D) provocative and mysterious.

39

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

- A) Lines 46-47 (“We . . . questions”)
- B) Lines 48-49 (“And . . . them”)
- C) Line 57 (“The moment . . . short”)
- D) Line 62 (“That . . . Madam”)

40

Which choice most closely captures the meaning of the figurative “sixpence” referred to in lines 70 and 71?

- A) Tolerance
- B) Knowledge
- C) Opportunity
- D) Perspective

41

The range of places and occasions listed in lines 72-76 (“Let us . . . funerals”) mainly serves to emphasize how

- A) novel the challenge faced by women is.
- B) pervasive the need for critical reflection is.
- C) complex the political and social issues of the day are.
- D) enjoyable the career possibilities for women are.

Questions 42-52 are based on the following passages.

Passage 1 is adapted from Michael Slezak, "Space Mining: the Next Gold Rush?" ©2013 by New Scientist. Passage 2 is from the editors of *New Scientist*, "Taming the Final Frontier." ©2013 by New Scientist.

Passage 1

Follow the money and you will end up in space. That's the message from a first-of-its-kind forum on mining beyond Earth.

Line Convened in Sydney by the Australian Centre for
5 Space Engineering Research, the event brought together mining companies, robotics experts, lunar scientists, and government agencies that are all working to make space mining a reality.

The forum comes hot on the heels of the
10 2012 unveiling of two private asteroid-mining firms. Planetary Resources of Washington says it will launch its first prospecting telescopes in two years, while Deep Space Industries of Virginia hopes to be harvesting metals from asteroids by 2020. Another
15 commercial venture that sprung up in 2012, Golden Spike of Colorado, will be offering trips to the moon, including to potential lunar miners.

Within a few decades, these firms may be meeting earthly demands for precious metals, such as
20 platinum and gold, and the rare earth elements vital for personal electronics, such as yttrium and lanthanum. But like the gold rush pioneers who transformed the western United States, the first space miners won't just enrich themselves. They also hope
25 to build an off-planet economy free of any bonds with Earth, in which the materials extracted and processed from the moon and asteroids are delivered for space-based projects.

In this scenario, water mined from other
30 worlds could become the most desired commodity. "In the desert, what's worth more: a kilogram of gold or a kilogram of water?" asks Kris Zacny of HoneyBee Robotics in New York. "Gold is useless. Water will let you live."

35 Water ice from the moon's poles could be sent to astronauts on the International Space Station for drinking or as a radiation shield. Splitting water into oxygen and hydrogen makes spacecraft fuel, so ice-rich asteroids could become interplanetary
40 refuelling stations.

Companies are eyeing the iron, silicon, and aluminium in lunar soil and asteroids, which could be used in 3D printers to make spare parts or machinery. Others want to turn space dirt into
45 concrete for landing pads, shelters, and roads.

Passage 2

The motivation for deep-space travel is shifting from discovery to economics. The past year has seen a flurry of proposals aimed at bringing celestial riches down to Earth. No doubt this will make a few
50 billionaires even wealthier, but we all stand to gain: the mineral bounty and spin-off technologies could enrich us all.

But before the miners start firing up their rockets, we should pause for thought. At first glance, space
55 mining seems to sidestep most environmental concerns: there is (probably!) no life on asteroids, and thus no habitats to trash. But its consequences—both here on Earth and in space—merit careful consideration.

60 Part of this is about principles. Some will argue that space's "magnificent desolation" is not ours to despoil, just as they argue that our own planet's poles should remain pristine. Others will suggest that glutting ourselves on space's riches is not an
65 acceptable alternative to developing more sustainable ways of earthly life.

History suggests that those will be hard lines to hold, and it may be difficult to persuade the public that such barren environments are worth preserving.
70 After all, they exist in vast abundance, and even fewer people will experience them than have walked through Antarctica's icy landscapes.

There's also the emerging off-world economy to consider. The resources that are valuable in orbit and
75 beyond may be very different to those we prize on Earth. Questions of their stewardship have barely been broached—and the relevant legal and regulatory framework is fragmentary, to put it mildly.

Space miners, like their earthly counterparts, are
80 often reluctant to engage with such questions. One speaker at last week's space-mining forum in Sydney, Australia, concluded with a plea that regulation should be avoided. But miners have much to gain from a broad agreement on the for-profit
85 exploitation of space. Without consensus, claims will be disputed, investments risky, and the gains made insecure. It is in all of our long-term interests to seek one out.

42

In lines 9-17, the author of Passage 1 mentions several companies primarily to

- A) note the technological advances that make space mining possible.
- B) provide evidence of the growing interest in space mining.
- C) emphasize the large profits to be made from space mining.
- D) highlight the diverse ways to carry out space mining operations.

43

The author of Passage 1 indicates that space mining could have which positive effect?

- A) It could yield materials important to Earth's economy.
- B) It could raise the value of some precious metals on Earth.
- C) It could create unanticipated technological innovations.
- D) It could change scientists' understanding of space resources.

44

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

- A) Lines 18-22 (“Within . . . lanthanum”)
- B) Lines 24-28 (“They . . . projects”)
- C) Lines 29-30 (“In this . . . commodity”)
- D) Lines 41-44 (“Companies . . . machinery”)

45

As used in line 19, “demands” most nearly means

- A) offers.
- B) claims.
- C) inquiries.
- D) desires.

46

What function does the discussion of water in lines 35-40 serve in Passage 1?

- A) It continues an extended comparison that begins in the previous paragraph.
- B) It provides an unexpected answer to a question raised in the previous paragraph.
- C) It offers hypothetical examples supporting a claim made in the previous paragraph.
- D) It examines possible outcomes of a proposal put forth in the previous paragraph.

47

The central claim of Passage 2 is that space mining has positive potential but

- A) it will end up encouraging humanity's reckless treatment of the environment.
- B) its effects should be thoughtfully considered before it becomes a reality.
- C) such potential may not include replenishing key resources that are disappearing on Earth.
- D) experts disagree about the commercial viability of the discoveries it could yield.

48

As used in line 68, “hold” most nearly means

- A) maintain.
- B) grip.
- C) restrain.
- D) withstand.

49

Which statement best describes the relationship between the passages?

- A) Passage 2 refutes the central claim advanced in Passage 1.
- B) Passage 2 illustrates the phenomenon described in more general terms in Passage 1.
- C) Passage 2 argues against the practicality of the proposals put forth in Passage 1.
- D) Passage 2 expresses reservations about developments discussed in Passage 1.

50

The author of Passage 2 would most likely respond to the discussion of the future of space mining in lines 18-28, Passage 1, by claiming that such a future

- A) is inconsistent with the sustainable use of space resources.
- B) will be difficult to bring about in the absence of regulations.
- C) cannot be attained without technologies that do not yet exist.
- D) seems certain to affect Earth's economy in a negative way.

51

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

- A) Lines 60-63 (“Some . . . pristine”)
- B) Lines 74-76 (“The resources . . . Earth”)
- C) Lines 81-83 (“One . . . avoided”)
- D) Lines 85-87 (“Without . . . insecure”)

52

Which point about the resources that will be highly valued in space is implicit in Passage 1 and explicit in Passage 2?

- A) They may be different resources from those that are valuable on Earth.
- B) They will be valuable only if they can be harvested cheaply.
- C) They are likely to be primarily precious metals and rare earth elements.
- D) They may increase in value as those same resources become rare on Earth.

STOP

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

Do not turn to any other section.

No Test Material On This Page

Writing and Language Test

35 MINUTES, 44 QUESTIONS

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

DIRECTIONS

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.

Questions 1-11 are based on the following passage.

Whey to Go

Greek yogurt—a strained form of cultured yogurt—has grown enormously in popularity in the United States since it was first introduced in the country in the late 1980s.

From 2011 to 2012 alone, sales of Greek yogurt in the US increased by 50 percent. The resulting increase in Greek yogurt production has forced those involved in the business to address the detrimental effects that the yogurt-making process may be having on the environment. Fortunately, farmers and others in the

Greek yogurt business have found many methods of controlling and eliminating most environmental threats. Given these solutions as well as the many health benefits of the food, the advantages of Greek yogurt **1** outdo the potential drawbacks of its production.

[1] The main environmental problem caused by the production of Greek yogurt is the creation of acid whey as a by-product. [2] Because it requires up to four times more milk to make than conventional yogurt does, Greek yogurt produces larger amounts of acid whey, which is difficult to dispose of. [3] To address the problem of disposal, farmers have found a number of uses for acid whey. [4] They can add it to livestock feed as a protein **2** supplement, and people can make their own Greek-style yogurt at home by straining regular yogurt. [5] If it is improperly introduced into the environment, acid-whey runoff **3** can pollute waterways, depleting the oxygen content of streams and rivers as it decomposes. [6] Yogurt manufacturers, food **4** scientists; and government officials are also working together to develop additional solutions for reusing whey. **5**

1

- A) NO CHANGE
- B) defeat
- C) outperform
- D) outweigh

2

Which choice provides the most relevant detail?

- A) NO CHANGE
- B) supplement and convert it into gas to use as fuel in electricity production.
- C) supplement, while sweet whey is more desirable as a food additive for humans.
- D) supplement, which provides an important element of their diet.

3

- A) NO CHANGE
- B) can pollute waterway's,
- C) could have polluted waterways,
- D) has polluted waterway's,

4

- A) NO CHANGE
- B) scientists: and
- C) scientists, and
- D) scientists, and,

5

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

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

6 Though these conservation methods can be costly and time-consuming, they are well worth the effort. Nutritionists consider Greek yogurt to be a healthy food: it is an excellent source of calcium and protein, serves 7 to be a digestive aid, and 8 it contains few calories in its unsweetened low- and non-fat forms. Greek yogurt is slightly lower in sugar and carbohydrates than conventional yogurt is. 9 Also, because it is more concentrated, Greek yogurt contains slightly more protein per serving, thereby helping people stay

6

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

- A) Yes, because it does not provide a transition from the previous paragraph.
- B) Yes, because it fails to support the main argument of the passage as introduced in the first paragraph.
- C) No, because it continues the explanation of how acid whey can be disposed of safely.
- D) No, because it sets up the argument in the paragraph for the benefits of Greek yogurt.

7

- A) NO CHANGE
- B) as
- C) like
- D) for

8

- A) NO CHANGE
- B) containing
- C) contains
- D) will contain

9

- A) NO CHANGE
- B) In other words,
- C) Therefore,
- D) For instance,

10 satiated for longer periods of time. These health benefits have prompted Greek yogurt's recent surge in popularity. In fact, Greek yogurt can be found in an increasing number of products such as snack food and frozen desserts. Because consumers reap the nutritional benefits of Greek yogurt and support those who make and sell **11** it, therefore farmers and businesses should continue finding safe and effective methods of producing the food.

10

- A) NO CHANGE
- B) fulfilled
- C) complacent
- D) sufficient

11

- A) NO CHANGE
- B) it, farmers
- C) it, so farmers
- D) it: farmers

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

Dark Snow

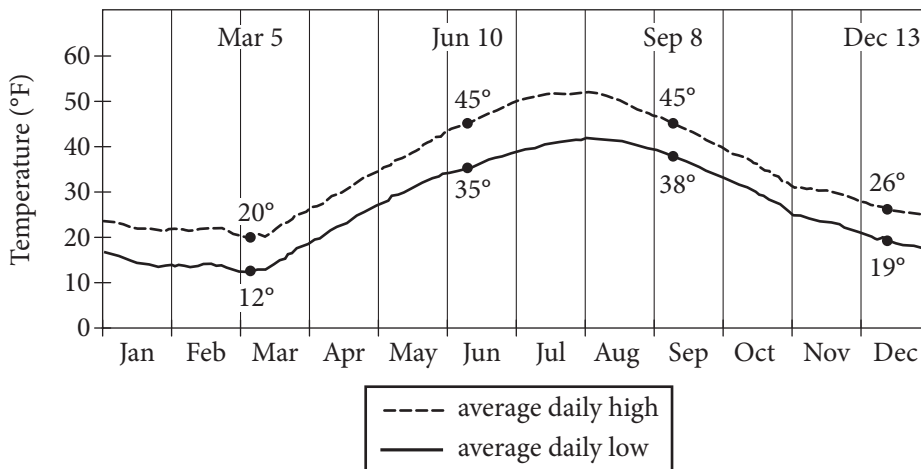
Most of Greenland's interior is covered by a thick layer of ice and compressed snow known as the Greenland Ice Sheet. The size of the ice sheet fluctuates seasonally: in summer, average daily high temperatures in Greenland can rise to slightly above 50 degrees Fahrenheit, partially melting the ice; in the winter, the sheet thickens as additional snow falls, and average daily low temperatures can drop **12** to as low as 20 degrees.

12

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

- A) NO CHANGE
- B) to 12 degrees Fahrenheit.
- C) to their lowest point on December 13.
- D) to 10 degrees Fahrenheit and stay there for months.

Average Daily High and Low Temperatures Recorded at Nuuk Weather Station, Greenland (1961—1990)



Adapted from WMO. ©2014 by World Meteorological Organization.

Typically, the ice sheet begins to show evidence of thawing in late **13** summer. This follows several weeks of higher temperatures. **14** For example, in the summer of 2012, virtually the entire Greenland Ice Sheet underwent thawing at or near its surface by mid-July, the earliest date on record. Most scientists looking for the causes of the Great Melt of 2012 have focused exclusively on rising temperatures. The summer of 2012 was the warmest in 170 years, records show. But Jason **15** Box, an associate professor of geology at Ohio State believes that another factor added to the early **16** thaw; the “dark snow” problem.

13

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

- A) summer, following
- B) summer, and this thawing follows
- C) summer, and such thawing follows
- D) summer and this evidence follows

14

- A) NO CHANGE
- B) However,
- C) As such,
- D) Moreover,

15

- A) NO CHANGE
- B) Box an associate professor of geology at Ohio State,
- C) Box, an associate professor of geology at Ohio State,
- D) Box, an associate professor of geology, at Ohio State

16

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

According to Box, a leading Greenland expert, tundra fires in 2012 from as far away as North America produced great amounts of soot, some **17** of it drifted over Greenland in giant plumes of smoke and then **18** fell as particles onto the ice sheet. Scientists have long known that soot particles facilitate melting by darkening snow and ice, limiting **19** it's ability to reflect the Sun's rays. As Box explains, "Soot is an extremely powerful light absorber. It settles over the ice and captures the Sun's heat." The result is a self-reinforcing cycle. As the ice melts, the land and water under the ice become exposed, and since land and water are darker than snow, the surface absorbs even more heat, which **20** is related to the rising temperatures.

17

- A) NO CHANGE
- B) soot
- C) of which
- D) DELETE the underlined portion.

18

- A) NO CHANGE
- B) falls
- C) will fall
- D) had fallen

19

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

20

Which choice best completes the description of a self-reinforcing cycle?

- A) NO CHANGE
- B) raises the surface temperature.
- C) begins to cool at a certain point.
- D) leads to additional melting.

[1] Box's research is important because the fires of 2012 may not be a one-time phenomenon. [2] According to scientists, rising Arctic temperatures are making northern latitudes greener and thus more fire prone. [3] The pattern Box observed in 2012 may repeat

21 itself again, with harmful effects on the Arctic ecosystem. [4] Box is currently organizing an expedition to gather this crucial information. [5] The next step for Box and his team is to travel to Greenland to perform direct sampling of the ice in order to determine just how much the soot is contributing to the melting of the ice sheet. [6] Members of the public will be able to track his team's progress—and even help fund the expedition—through a website Box has created. **22**

21

- A) NO CHANGE
- B) itself,
- C) itself, with damage and
- D) itself possibly,

22

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

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

Questions 23-33 are based on the following passage.

Coworking: A Creative Solution

When I left my office job as a website developer at a small company for a position that allowed me to work full-time from home, I thought I had it made: I gleefully traded in my suits and dress shoes for sweatpants and slippers, my frantic early-morning bagged lunch packing for a leisurely midday trip to my refrigerator. The novelty of this comfortable work-from-home life, however,

23 soon got worn off quickly. Within a month, I found myself feeling isolated despite having frequent email and instant messaging contact with my colleagues. Having become frustrated trying to solve difficult problems,

24 no colleagues were nearby to share ideas. It was during this time that I read an article **25** into coworking spaces.

23

- A) NO CHANGE
- B) was promptly worn
- C) promptly wore
- D) wore

24

- A) NO CHANGE
- B) colleagues were important for sharing ideas.
- C) ideas couldn't be shared with colleagues.
- D) I missed having colleagues nearby to consult.

25

- A) NO CHANGE
- B) about
- C) upon
- D) for

The article, published by *Forbes* magazine, explained that coworking spaces are designated locations that, for a fee, individuals can use to conduct their work. The spaces are usually stocked with standard office **26** equipment, such as photocopiers, printers, and fax machines. **27** In these locations, however, the spaces often include small meeting areas and larger rooms for hosting presentations. **28** The cost of launching a new coworking business in the United States is estimated to be approximately \$58,000.

26

- A) NO CHANGE
- B) equipment, such as:
- C) equipment such as:
- D) equipment, such as,

27

- A) NO CHANGE
- B) In addition to equipment,
- C) For these reasons,
- D) Likewise,

28

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

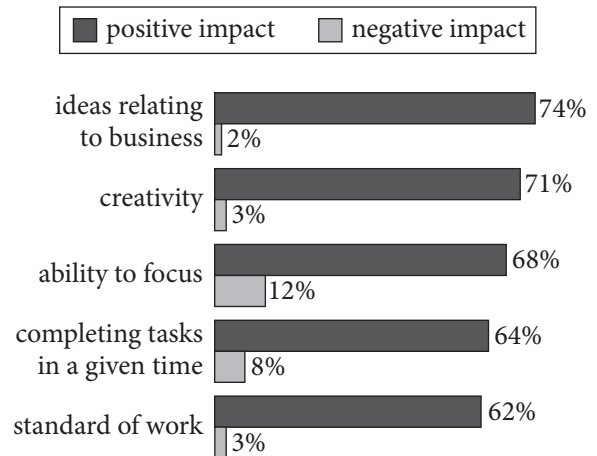
- A) Kept, because it provides a detail that supports the main topic of the paragraph.
- B) Kept, because it sets up the main topic of the paragraph that follows.
- C) Deleted, because it blurs the paragraph's main focus with a loosely related detail.
- D) Deleted, because it repeats information that has been provided in an earlier paragraph.

What most caught my interest, though, was a quotation from someone who described coworking spaces as “melting pots of creativity.” The article refers to a 2012 survey in which **29** 64 percent of respondents noted that coworking spaces prevented them from completing tasks in a given time. The article goes on to suggest that the most valuable resources provided by coworking spaces are actually the people **30** whom use them.

29

At this point, the writer wants to add specific information that supports the main topic of the paragraph.

Perceived Effect of Coworking on Business Skills



Adapted from “The 3rd Global Coworking Survey.” ©2013 by Deskmag.

Which choice most effectively completes the sentence with relevant and accurate information based on the graph above?

- A) NO CHANGE
- B) 71 percent of respondents indicated that using a coworking space increased their creativity.
- C) respondents credited coworking spaces with giving them 74 percent of their ideas relating to business.
- D) respondents revealed that their ability to focus on their work improved by 12 percent in a coworking space.

30

- A) NO CHANGE
- B) whom uses
- C) who uses
- D) who use

[1] Thus, even though I already had all the equipment I needed in my home office, I decided to try using a coworking space in my city. [2] Because I was specifically interested in coworking's reported benefits related to creativity, I chose a facility that offered a bright, open work area where I wouldn't be isolated. [3] Throughout the morning, more people appeared. [4] Periods of quiet, during which everyone worked independently, were broken up occasionally with lively conversation. **31**

I liked the experience so much that I now go to the coworking space a few times a week. Over time, I've gotten to know several of my coworking **32** colleagues: another website developer, a graphic designer, a freelance writer, and several mobile app coders. Even those of us who work in disparate fields are able to **33** share advice and help each other brainstorm. In fact, it's the diversity of their talents and experiences that makes my coworking colleagues so valuable.

31

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

After filling out a simple registration form and taking a quick tour of the facility, I took a seat at a table and got right to work on my laptop.

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) colleagues;
- C) colleagues,
- D) colleagues

33

- A) NO CHANGE
- B) give some wisdom
- C) proclaim our opinions
- D) opine

Questions 34-44 are based on the following passage.

The Consolations of Philosophy

Long viewed by many as the stereotypical useless major, philosophy is now being seen by many students and prospective employers as in fact a very useful and practical major, offering students a host of transferable skills with relevance to the modern workplace. **34** In broad terms, philosophy is the study of meaning and the values underlying thought and behavior. But **35** more pragmatically, the discipline encourages students to analyze complex material, question conventional beliefs, and express thoughts in a concise manner.

Because philosophy **36** teaching students not what to think but how to think, the age-old discipline offers consistently useful tools for academic and professional achievement. **37** A 1994 survey concluded that only 18 percent of American colleges required at least one philosophy course. **38** Therefore, between 1992 and 1996, more than 400 independent philosophy departments were eliminated from institutions.

34

- A) NO CHANGE
- B) For example,
- C) In contrast,
- D) Nevertheless,

35

- A) NO CHANGE
- B) speaking in a more pragmatic way,
- C) speaking in a way more pragmatically,
- D) in a more pragmatic-speaking way,

36

- A) NO CHANGE
- B) teaches
- C) to teach
- D) and teaching

37

Which choice most effectively sets up the information that follows?

- A) Consequently, philosophy students have been receiving an increasing number of job offers.
- B) Therefore, because of the evidence, colleges increased their offerings in philosophy.
- C) Notwithstanding the attractiveness of this course of study, students have resisted majoring in philosophy.
- D) However, despite its many utilitarian benefits, colleges have not always supported the study of philosophy.

38

- A) NO CHANGE
- B) Thus,
- C) Moreover,
- D) However,

More recently, colleges have recognized the practicality and increasing popularity of studying philosophy and have markedly increased the number of philosophy programs offered. By 2008 there were 817 programs, up from 765 a decade before. In addition, the number of four-year graduates in philosophy has grown 46 percent in a decade. Also, studies have found that those students who major in philosophy often do better than students from other majors in both verbal reasoning and analytical **39** writing. These results can be measured by standardized test scores. On the Graduate Record Examination (GRE), for example, students intending to study philosophy in graduate school **40** has scored higher than students in all but four other majors.

These days, many **41** student's majoring in philosophy have no intention of becoming philosophers; instead they plan to apply those skills to other disciplines. Law and business specifically benefit from the complicated theoretical issues raised in the study of philosophy, but philosophy can be just as useful in engineering or any field requiring complex analytic skills.

42 That these skills are transferable across professions

39

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

- A) writing as
- B) writing, and these results can be
- C) writing, which can also be
- D) writing when the results are

40

- A) NO CHANGE
- B) have scored
- C) scores
- D) scoring

41

- A) NO CHANGE
- B) students majoring
- C) students major
- D) student's majors

42

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

The ancient Greek philosopher Plato, for example, wrote many of his works in the form of dialogues.

Should the writer make this addition here?

- A) Yes, because it reinforces the passage's main point about the employability of philosophy majors.
- 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 that goes unexplained.
- D) No, because it undermines the passage's claim about the employability of philosophy majors.

43 which makes them especially beneficial to twenty-first-century students. Because today's students can expect to hold multiple jobs—some of which may not even exist yet—during 44 our lifetime, studying philosophy allows them to be flexible and adaptable. High demand, advanced exam scores, and varied professional skills all argue for maintaining and enhancing philosophy courses and majors within academic institutions.

43

- A) NO CHANGE
- B) that
- C) and
- 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.**

No Test Material On This Page



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

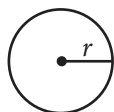
DIRECTIONS

For questions 1-15, 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

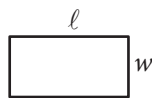
1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated,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

REFERENCE

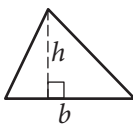


$$A = \pi r^2$$

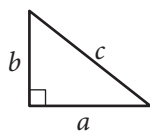
$$C = 2\pi r$$



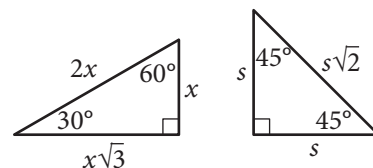
$$A = \ell w$$



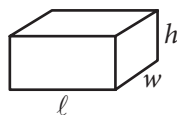
$$A = \frac{1}{2}bh$$



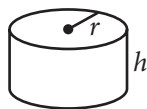
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



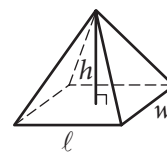
$$V = \pi r^2 h$$



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



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



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

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

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

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



1

If $\frac{x-1}{3} = k$ and $k = 3$, what is the value of x ?

- A) 2
- B) 4
- C) 9
- D) 10

2

For $i = \sqrt{-1}$, what is the sum $(7 + 3i) + (-8 + 9i)$?

- A) $-1 + 12i$
- B) $-1 - 6i$
- C) $15 + 12i$
- D) $15 - 6i$

3

On Saturday afternoon, Armand sent m text messages each hour for 5 hours, and Tyrone sent p text messages each hour for 4 hours. Which of the following represents the total number of messages sent by Armand and Tyrone on Saturday afternoon?

- A) $9mp$
- B) $20mp$
- C) $5m + 4p$
- D) $4m + 5p$

4

Kathy is a repair technician for a phone company. Each week, she receives a batch of phones that need repairs. The number of phones that she has left to fix at the end of each day can be estimated with the equation $P = 108 - 23d$, where P is the number of phones left and d is the number of days she has worked that week. What is the meaning of the value 108 in this equation?

- A) Kathy will complete the repairs within 108 days.
- B) Kathy starts each week with 108 phones to fix.
- C) Kathy repairs phones at a rate of 108 per hour.
- D) Kathy repairs phones at a rate of 108 per day.



5

$$(x^2y - 3y^2 + 5xy^2) - (-x^2y + 3xy^2 - 3y^2)$$

Which of the following is equivalent to the expression above?

- A) $4x^2y^2$
- B) $8xy^2 - 6y^2$
- C) $2x^2y + 2xy^2$
- D) $2x^2y + 8xy^2 - 6y^2$

6

$$h = 3a + 28.6$$

A pediatrician uses the model above to estimate the height h of a boy, in inches, in terms of the boy's age a , in years, between the ages of 2 and 5. Based on the model, what is the estimated increase, in inches, of a boy's height each year?

- A) 3
- B) 5.7
- C) 9.5
- D) 14.3

7

$$m = \frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1} P$$

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months. Which of the following gives P in terms of m , r , and N ?

- A) $P = \frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1} m$
- B) $P = \frac{\left(1 + \frac{r}{1,200}\right)^N - 1}{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N} m$
- C) $P = \left(\frac{r}{1,200}\right) m$
- D) $P = \left(\frac{1,200}{r}\right) m$



8

If $\frac{a}{b} = 2$, what is the value of $\frac{4b}{a}$?

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

9

$$\begin{aligned} 3x + 4y &= -23 \\ 2y - x &= -19 \end{aligned}$$

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

- A) $(-5, -2)$
- B) $(3, -8)$
- C) $(4, -6)$
- D) $(9, -6)$

10

$$g(x) = ax^2 + 24$$

For the function g defined above, a is a constant and $g(4) = 8$. What is the value of $g(-4)$?

- A) 8
- B) 0
- C) -1
- D) -8

11

$$b = 2.35 + 0.25x$$

$$c = 1.75 + 0.40x$$

In the equations above, b and c represent the price per pound, in dollars, of beef and chicken, respectively, x weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

- A) \$2.60
- B) \$2.85
- C) \$2.95
- D) \$3.35

12

A line in the xy -plane passes through the origin and has a slope of $\frac{1}{7}$. Which of the following points lies on the line?

- A) $(0, 7)$
- B) $(1, 7)$
- C) $(7, 7)$
- D) $(14, 2)$



13

If $x > 3$, which of the following is equivalent

to $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$?

A) $\frac{2x+5}{x^2+5x+6}$

B) $\frac{x^2+5x+6}{2x+5}$

C) $2x+5$

D) x^2+5x+6

14

If $3x - y = 12$, what is the value of $\frac{8^x}{2^y}$?

A) 2^{12}

B) 4^4

C) 8^2

D) The value cannot be determined from the information given.

15

If $(ax+2)(bx+7) = 15x^2 + cx + 14$ for all values of x , and $a + b = 8$, what are the two possible values for c ?

A) 3 and 5

B) 6 and 35

C) 10 and 21

D) 31 and 41

**DIRECTIONS**

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

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If $\begin{array}{|c|c|c|c|} \hline 3 & 1 & / & 2 \\ \hline \bullet & \bullet & / & \bullet \\ \hline \end{array}$ is entered into the grid, 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 accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Write answer → in boxes.

Answer: $\frac{7}{12}$

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

← Fraction line

Grid in result.

Answer: 2.5

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

← Decimal point

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

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

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

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

Answer: 201 – either position is correct

	2	0	1
	•	•	•
	0	•	0
①	①	①	•
②	•	②	②
③	③	③	③

	2	0	1
	•	•	•
	•	0	0
①	①	•	①
②	•	②	②
③	③	③	③

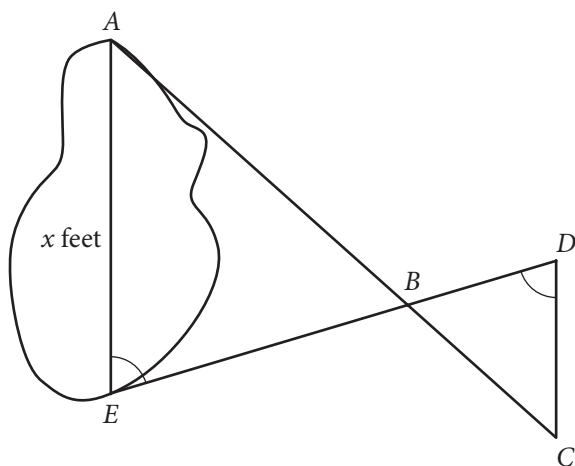
NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



16

If $t > 0$ and $t^2 - 4 = 0$, what is the value of t ?

17



A summer camp counselor wants to find a length, x , in feet, across a lake as represented in the sketch above. The lengths represented by AB , EB , BD , and CD on the sketch were determined to be 1800 feet, 1400 feet, 700 feet, and 800 feet, respectively. Segments AC and DE intersect at B , and $\angle AEB$ and $\angle CDB$ have the same measure. What is the value of x ?

18

$$\begin{aligned}x + y &= -9 \\x + 2y &= -25\end{aligned}$$

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

19

In a right triangle, one angle measures x° , where

$$\sin x^\circ = \frac{4}{5}. \text{ What is } \cos(90^\circ - x^\circ) ?$$

20

If $a = 5\sqrt{2}$ and $2a = \sqrt{2x}$, 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.**

No Test Material On This Page



Math Test – Calculator

55 MINUTES, 38 QUESTIONS

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

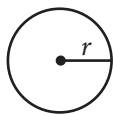
DIRECTIONS

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

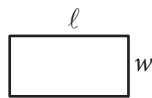
- The use of a calculator **is permitted**.
- All variables and expressions used represent real numbers unless otherwise indicated.
- Figures provided in this test are drawn to scale unless otherwise indicated.
- All figures lie in a plane unless otherwise indicated.
- Unless otherwise indicated, the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

REFERENCE

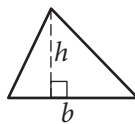


$$A = \pi r^2$$

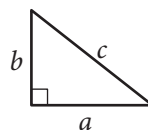
$$C = 2\pi r$$



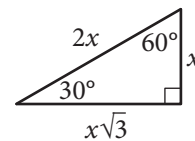
$$A = \ell w$$



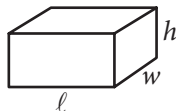
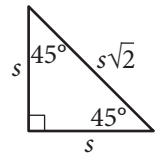
$$A = \frac{1}{2}bh$$



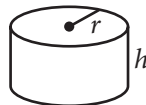
$$c^2 = a^2 + b^2$$



Special Right Triangles



$$V = \ell wh$$



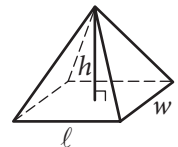
$$V = \pi r^2 h$$



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



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



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

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

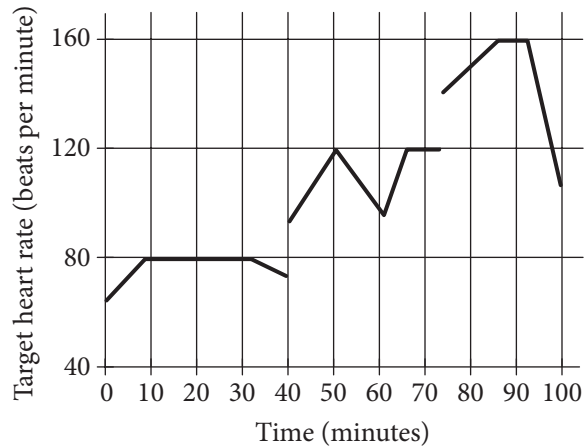
The number of radians of arc in a circle is 2π .

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



1

John runs at different speeds as part of his training program. The graph shows his target heart rate at different times during his workout. On which interval is the target heart rate strictly increasing then strictly decreasing?



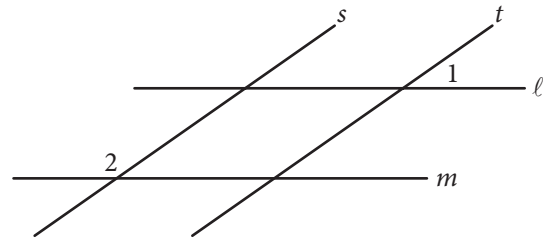
- A) Between 0 and 30 minutes
- B) Between 40 and 60 minutes
- C) Between 50 and 65 minutes
- D) Between 70 and 90 minutes

2

If $y = kx$, where k is a constant, and $y = 24$ when $x = 6$, what is the value of y when $x = 5$?

- A) 6
- B) 15
- C) 20
- D) 23

3



In the figure above, lines l and m are parallel and lines s and t are parallel. If the measure of $\angle 1$ is 35° , what is the measure of $\angle 2$?

- A) 35°
- B) 55°
- C) 70°
- D) 145°

4

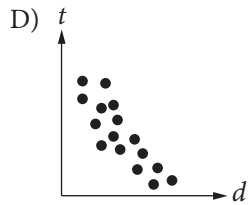
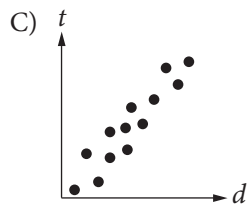
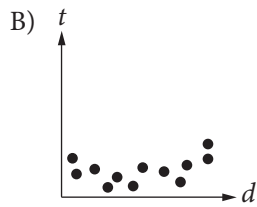
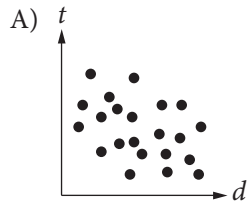
If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

- A) 2
- B) 6
- C) 16
- D) 80



5

Which of the following graphs best shows a strong negative association between d and t ?



6

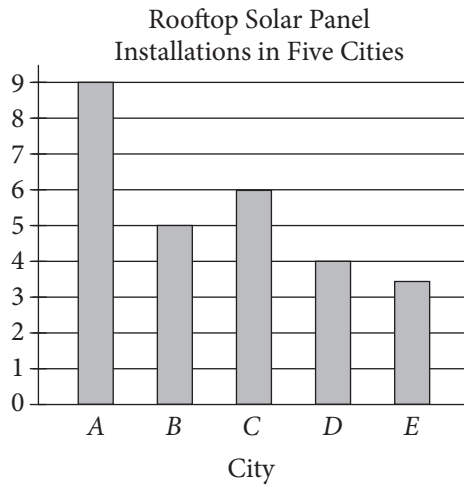
$1 \text{ decagram} = 10 \text{ grams}$ $1,000 \text{ milligrams} = 1 \text{ gram}$

A hospital stores one type of medicine in 2-decagram containers. Based on the information given in the box above, how many 1-milligram doses are there in one 2-decagram container?

- A) 0.002
- B) 200
- C) 2,000
- D) 20,000



7



The number of rooftops with solar panel installations in 5 cities is shown in the graph above. If the total number of installations is 27,500, what is an appropriate label for the vertical axis of the graph?

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

8

For what value of n is $|n - 1| + 1$ equal to 0?

- A) 0
- B) 1
- C) 2
- D) There is no such value of n .



Questions 9 and 10 refer to the following information.

$$a = 1,052 + 1.08t$$

The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between a , the speed of a sound wave, in feet per second, and t , the air temperature, in degrees Fahrenheit ($^{\circ}\text{F}$).

9

Which of the following expresses the air temperature in terms of the speed of a sound wave?

- A) $t = \frac{a - 1,052}{1.08}$
- B) $t = \frac{a + 1,052}{1.08}$
- C) $t = \frac{1,052 - a}{1.08}$
- D) $t = \frac{1.08}{a + 1,052}$

10

At which of the following air temperatures will the speed of a sound wave be closest to 1,000 feet per second?

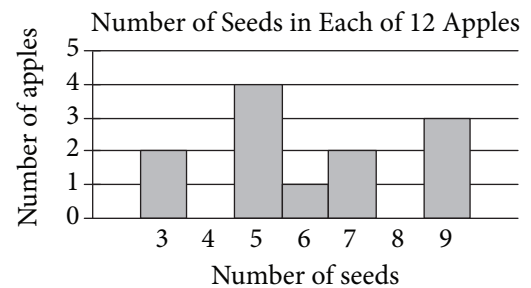
- A) -46°F
- B) -48°F
- C) -49°F
- D) -50°F

11

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 4x - 3$?

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

12



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

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



13

		Course			Total
		Algebra I	Geometry	Algebra II	
Gender	Female	35	53	62	150
	Male	44	59	57	160
	Total	79	112	119	310

A group of tenth-grade students responded to a survey that asked which math course 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 19 percent of all the survey respondents?

- A) Females taking Geometry
- B) Females taking Algebra II
- C) Males taking Geometry
- D) Males taking Algebra I

14

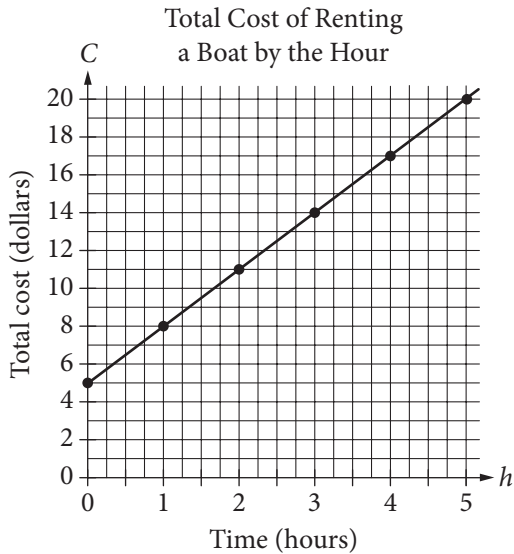
Lengths of Fish (in inches)						
8	9	9	9	10	10	11
11	12	12	12	12	13	13
13	14	14	15	15	16	24

The table above lists the lengths, to the nearest inch, of a random sample of 21 brown bullhead fish. The outlier measurement of 24 inches is an error. Of the mean, median, and range of the values listed, which will change the most if the 24-inch measurement is removed from the data?

- A) Mean
- B) Median
- C) Range
- D) They 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 boat for h hours.

15

What does the C -intercept represent in the graph?

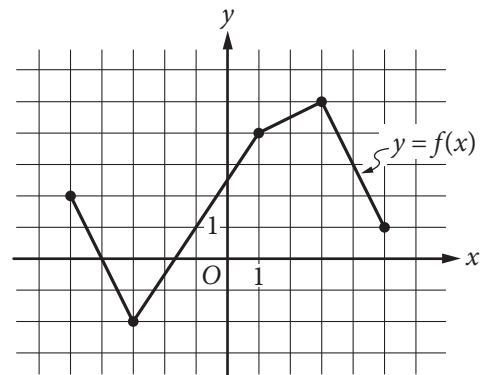
- A) The initial cost of renting the boat
- B) The total number of boats rented
- C) The total number of hours the boat is rented
- D) The increase in cost to rent the boat for each additional hour

16

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

- A) $C = 5h$
- B) $C = \frac{3}{4}h + 5$
- C) $C = 3h + 5$
- D) $h = 3C$

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

$$y < -x + a$$
$$y > x + b$$

In the xy -plane, if $(0, 0)$ is a solution to the system of inequalities above, which of the following relationships between a and b must be true?

- A) $a > b$
- B) $b > a$
- C) $|a| > |b|$
- D) $a = -b$

19

A food truck sells salads for \$6.50 each and drinks for \$2.00 each. The food truck's revenue from selling a total of 209 salads and drinks in one day was \$836.50. How many salads were sold that day?

- A) 77
- B) 93
- C) 99
- D) 105



20

Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was p dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of p ?

- A) $0.88p$
- B) $\frac{p}{0.88}$
- C) $(0.8)(1.08)p$
- D) $\frac{p}{(0.8)(1.08)}$

21

Dreams Recalled during One Week

	None	1 to 4	5 or more	Total
Group X	15	28	57	100
Group Y	21	11	68	100
Total	36	39	125	200

The data in the table above were produced by a sleep researcher studying the number of dreams people recall when asked to record their dreams for one week. Group X consisted of 100 people who observed early bedtimes, and Group Y consisted of 100 people who observed later bedtimes. If a person is chosen at random from those who recalled at least 1 dream, what is the probability that the person belonged to Group Y ?

- A) $\frac{68}{100}$
- B) $\frac{79}{100}$
- C) $\frac{79}{164}$
- D) $\frac{164}{200}$



Questions 22 and 23 refer to the following information.

Annual Budgets for Different Programs in Kansas, 2007 to 2010

Program	Year			
	2007	2008	2009	2010
Agriculture/natural resources	373,904	358,708	485,807	488,106
Education	2,164,607	2,413,984	2,274,514	3,008,036
General government	14,347,325	12,554,845	10,392,107	14,716,155
Highways and transportation	1,468,482	1,665,636	1,539,480	1,773,893
Human resources	4,051,050	4,099,067	4,618,444	5,921,379
Public safety	263,463	398,326	355,935	464,233

The table above lists the annual budget, in thousands of dollars, for each of six different state programs in Kansas from 2007 to 2010.

22

Which of the following best approximates the average rate of change in the annual budget for agriculture/natural resources in Kansas from 2008 to 2010 ?

- A) \$50,000,000 per year
- B) \$65,000,000 per year
- C) \$75,000,000 per year
- D) \$130,000,000 per year

23

Of the following, which program's ratio of its 2007 budget to its 2010 budget is closest to the human resources program's ratio of its 2007 budget to its 2010 budget?

- A) Agriculture/natural resources
- B) Education
- C) Highways and transportation
- D) Public safety



24

Which of the following is an equation of a circle in the xy -plane with center $(0, 4)$ and a radius with endpoint $\left(\frac{4}{3}, 5\right)$?

- A) $x^2 + (y - 4)^2 = \frac{25}{9}$
- B) $x^2 + (y + 4)^2 = \frac{25}{9}$
- C) $x^2 + (y - 4)^2 = \frac{5}{3}$
- D) $x^2 + (y + 4)^2 = \frac{3}{5}$

25

$$h = -4.9t^2 + 25t$$

The equation above expresses the approximate height h , in meters, of a ball t seconds after it is launched vertically upward from the ground with an initial velocity of 25 meters per second. After approximately how many seconds will the ball hit the ground?

- A) 3.5
- B) 4.0
- C) 4.5
- D) 5.0

26

Katarina is a botanist studying the production of pears by two types of pear trees. She noticed that Type A trees produced 20 percent more pears than Type B trees did. Based on Katarina's observation, if the Type A trees produced 144 pears, how many pears did the Type B trees produce?

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

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

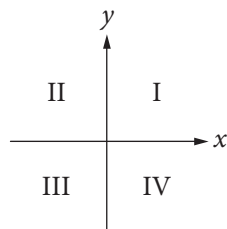
Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?

- A) 150
- B) 1,500
- C) 15,000
- D) 150,000



28



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

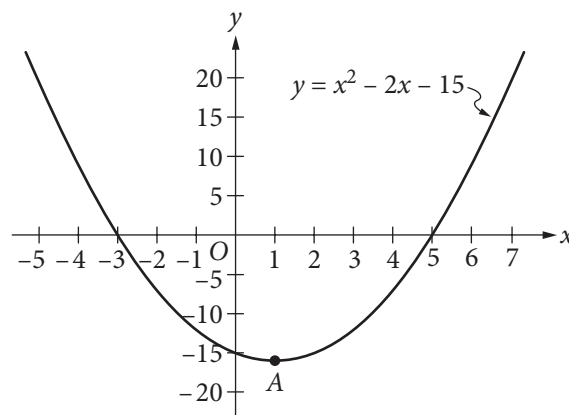
- A) Quadrant II
- B) Quadrant III
- C) Quadrant IV
- D) There are solutions in all four quadrants.

29

For a polynomial $p(x)$, the value of $p(3)$ is -2 . Which of the following must be true about $p(x)$?

- A) $x - 5$ is a factor of $p(x)$.
- B) $x - 2$ is a factor of $p(x)$.
- C) $x + 2$ is a factor of $p(x)$.
- D) The remainder when $p(x)$ is divided by $x - 3$ is -2 .

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 vertex A can be identified as constants in the equation?

- A) $y = (x + 3)(x - 5)$
- B) $y = (x - 3)(x + 5)$
- C) $y = x(x - 2) - 15$
- D) $y = (x - 1)^2 - 16$


DIRECTIONS

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

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
- Mark no more than one circle in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If

3	1	/	2
•	•	•	•

 is entered into the grid, 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 accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Write answer in boxes. →

← Fraction line

← Decimal point

Grid in result.

Answer: $\frac{7}{12}$			
7	/	1	2
•	•	•	•
0	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Answer: 2.5			
2	.	5	
•	•	•	•
0	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

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

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

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

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

Answer: 201 – either position is correct

2	0	1	
•	•	•	•
0	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③

2	0	1	
•	•	•	•
0	0	0	0
①	①	①	①
②	②	②	②
③	③	③	③

NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



31

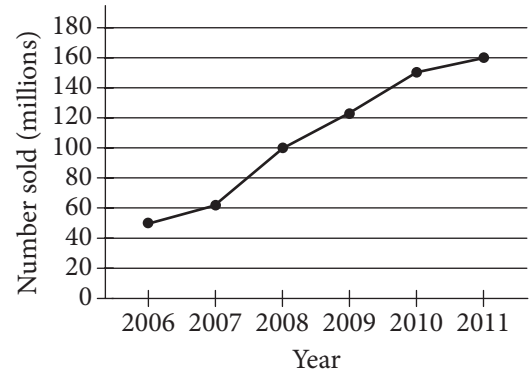
Wyatt can husk at least 12 dozen ears of corn per hour and at most 18 dozen ears of corn per hour. Based on this information, what is a possible amount of time, in hours, that it could take Wyatt to husk 72 dozen ears of corn?

32

The posted weight limit for a covered wooden bridge in Pennsylvania is 6000 pounds. A delivery truck that is carrying x identical boxes each weighing 14 pounds will pass over the bridge. If the combined weight of the empty delivery truck and its driver is 4500 pounds, what is the maximum possible value for x that will keep the combined weight of the truck, driver, and boxes below the bridge's posted weight limit?

33

Number of Portable Media Players Sold Worldwide Each Year from 2006 to 2011



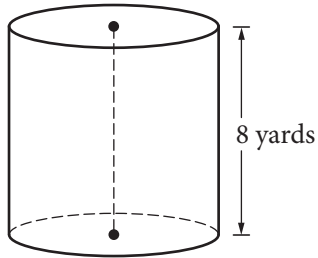
According to the line graph above, the number of portable media players sold in 2008 is what fraction of the number sold in 2011?

34

A local television station sells time slots for programs in 30-minute intervals. If the station operates 24 hours per day, every day of the week, what is the total number of 30-minute time slots the station can sell for Tuesday and Wednesday?



35



A dairy farmer uses a storage silo that is in the shape of the right circular cylinder above. If the volume of the silo is 72π cubic yards, what is the diameter of the base of the cylinder, in yards?

36

$$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$

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

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was \$100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

38

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of \$100 into this account at the same time Jessica made a deposit of \$100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (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.

No Test Material On This Page

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The SAT

GENERAL DIRECTIONS

- You may work on only one section at a time.
- If you finish a section before time is called, check your work on that section. You may NOT turn to any other section.

MARKING ANSWERS

- Be sure to mark your answer sheet properly.

COMPLETE MARK ● EXAMPLES OF INCOMPLETE MARKS



- You must use a No. 2 pencil.
- Carefully mark only one answer for each question.
- Make sure you fill the entire circle darkly and completely.
- Do not make any stray marks on your answer sheet.
- If you erase, do so completely. Incomplete erasures may be scored as intended answers.
- Use only the answer spaces that correspond to the question numbers.

USING YOUR TEST BOOK

- You may use the test book for scratch work, but you will not receive credit for anything that you write in your test book.
- After time has been called, you may not transfer answers from your test book to your answer sheet or fill in circles.
- You may not fold or remove pages or portions of a page from this book, or take the book or answer sheet from the testing room.

SCORING

- For each correct answer, you receive one point.
- You do not lose points for wrong answers; therefore, you should try to answer every question even if you are not sure of the correct answer.

IMPORTANT

The codes below are unique to your test book. Copy them on your answer sheet in boxes 8 and 9 and fill in the corresponding circles exactly as shown.

9	TEST ID					
	(Copy from back of test book.)					

8	FORM CODE					
	(Copy and grid as on back of test book.)					
(A)	(A)	(A)	(A)	(0)	(0)	(0)
(B)	(B)	(B)	(B)	(1)	(1)	(1)
(C)	(C)	(C)	(C)	(2)	(2)	(2)
(D)	(D)	(D)	(D)	(3)	(3)	(3)
(E)	(E)	(E)	(E)	(4)	(4)	(4)
(F)	(F)	(F)	(F)	(5)	(5)	(5)
(G)	(G)	(G)	(G)	(6)	(6)	(6)
(H)	(H)	(H)	(H)	(7)	(7)	(7)
(I)	(I)	(I)	(I)	(8)	(8)	(8)
(J)	(J)	(J)	(J)	(9)	(9)	(9)
(K)	(K)	(K)	(K)			
(L)	(L)	(L)	(L)			
(M)	(M)	(M)	(M)			
(N)	(N)	(N)	(N)			
(O)	(O)	(O)	(O)			
(P)	(P)	(P)	(P)			
(Q)	(Q)	(Q)	(Q)			
(R)	(R)	(R)	(R)			
(S)	(S)	(S)	(S)			
(T)	(T)	(T)	(T)			
(U)	(U)	(U)	(U)			
(V)	(V)	(V)	(V)			
(W)	(W)	(W)	(W)			
(X)	(X)	(X)	(X)			
(Y)	(Y)	(Y)	(Y)			
(Z)	(Z)	(Z)	(Z)			

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Practice Essay #1

Make time to take the practice Essay.
It's one of the best ways to get ready
for the SAT Essay.

For information on scoring your essay, view
the SAT Essay scoring rubric at sat.org/essay.



As you read the passage below, consider how Jimmy Carter 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 former US President Jimmy Carter, Foreword to *Arctic National Wildlife Refuge: Seasons of Life and Land, A Photographic Journey* by Subhankar Banerjee. ©2003 by Subhankar Banerjee.

- 1 The Arctic National Wildlife Refuge stands alone as America’s last truly great wilderness. This magnificent area is as vast as it is wild, from the windswept coastal plain where polar bears and caribou give birth, to the towering Brooks Range where Dall sheep cling to cliffs and wolves howl in the midnight sun.
- 2 More than a decade ago, [my wife] Rosalynn and I had the fortunate opportunity to camp and hike in these regions of the Arctic Refuge. During bright July days, we walked along ancient caribou trails and studied the brilliant mosaic of wildflowers, mosses, and lichens that hugged the tundra. There was a timeless quality about this great land. As the never-setting sun circled above the horizon, we watched muskox, those shaggy survivors of the Ice Age, lumber along braided rivers that meander toward the Beaufort Sea.
- 3 One of the most unforgettable and humbling experiences of our lives occurred on the coastal plain. We had hoped to see caribou during our trip, but to our amazement, we witnessed the migration of tens of thousands of caribou with their newborn calves. In a matter of a few minutes, the sweep of tundra before us became flooded with life, with the sounds of grunting animals and clicking hooves filling the air. The dramatic procession of the Porcupine caribou herd was a once-in-a-lifetime wildlife spectacle. We understand firsthand why some have described this special birthplace as “America’s Serengeti.”
- 4 Standing on the coastal plain, I was saddened to think of the tragedy that might occur if this great wilderness was consumed by a web of roads and pipelines, drilling rigs and industrial facilities. Such proposed developments would forever destroy the wilderness character of America’s only Arctic Refuge and disturb countless numbers of animals that depend on this northernmost terrestrial ecosystem.

- 5 The extraordinary wilderness and wildlife values of the Arctic Refuge have long been recognized by both Republican and Democratic presidents. In 1960, President Dwight D. Eisenhower established the original 8.9 million-acre Arctic National Wildlife Range to preserve its unique wildlife, wilderness, and recreational values. Twenty years later, I signed the Alaska National Interest Lands Conservation Act, monumental legislation that safeguarded more than 100 million acres of national parks, refuges, and forests in Alaska. This law specifically created the Arctic National Wildlife Refuge, doubled the size of the former range, and restricted development in areas that are clearly incompatible with oil exploration.
- 6 Since I left office, there have been repeated proposals to open the Arctic Refuge coastal plain to oil drilling. Those attempts have failed because of tremendous opposition by the American people, including the Gwich'in Athabascan Indians of Alaska and Canada, indigenous people whose culture has depended on the Porcupine caribou herd for thousands of years. Having visited many aboriginal peoples around the world, I can empathize with the Gwich'ins' struggle to safeguard one of their precious human rights.
- 7 We must look beyond the alleged benefits of a short-term economic gain and focus on what is really at stake. At best, the Arctic Refuge might provide 1 to 2 percent of the oil our country consumes each day. We can easily conserve more than that amount by driving more fuel-efficient vehicles. Instead of tearing open the heart of our greatest refuge, we should use our resources more wisely.
- 8 There are few places on earth as wild and free as the Arctic Refuge. It is a symbol of our national heritage, a remnant of frontier America that our first settlers once called wilderness. Little of that precious wilderness remains.
- 9 It will be a grand triumph for America if we can preserve the Arctic Refuge in its pure, untrammelled state. To leave this extraordinary land alone would be the greatest gift we could pass on to future generations.

Write an essay in which you explain how Jimmy Carter builds an argument to persuade his audience that the Arctic National Wildlife Refuge should not be developed for industry. In your essay, analyze how Carter 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 his argument. Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Carter's claims, but rather explain how Carter builds an argument to persuade his audience.

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Answer Explanations

SAT Practice Test #1

Section 1: Reading Test

QUESTION 1

Choice B is the best answer. In the passage, a young man (Akira) asks a mother (Chie) for permission to marry her daughter (Naomi). The request was certainly surprising to the mother, as can be seen from line 47, which states that prior to Akira’s question Chie “had no idea” the request was coming.

Choice A is incorrect because the passage depicts two characters engaged in a civil conversation, with Chie being impressed with Akira’s “sincerity” and finding herself “starting to like him.” Choice C is incorrect because the passage is focused on the idea of Akira’s and Naomi’s present lives and possible futures. Choice D is incorrect because the interactions between Chie and Akira are polite, not critical; for example, Chie views Akira with “amusement,” not animosity.

QUESTION 2

Choice B is the best answer. The passage centers on a night when a young man tries to get approval to marry a woman’s daughter. The passage includes detailed descriptions of setting (a “winter’s eve” and a “cold rain,” lines 5-6); character (Akira’s “soft, refined” voice, line 33; Akira’s eyes “sh[ining] with sincerity,” line 35); and plot (“Naomi was silent. She stood a full half minute looking straight into Chie’s eyes. Finally, she spoke,” lines 88-89).

Choice A is incorrect because the passage focuses on a nontraditional marriage proposal. Choice C is incorrect because the passage concludes without resolution to the question of whether Akira and Naomi will receive permission to marry. Choice D is incorrect because the passage repeatedly makes clear that for Chie, her encounter with Akira is momentous and unsettling, as when Akira acknowledges in line 73 that he has “startled” her.

QUESTION 3

Choice C is the best answer. Akira “came directly, breaking all tradition,” (line 1) when he approached Chie and asked to marry her daughter, and he “ask[ed] directly,” without “a go-between” (line 65) or “mediation,” because doing otherwise would have taken too much time.

Choices A, B, and D are incorrect because in these contexts, “directly” does not mean in a frank, confident, or precise manner.

QUESTION 4

Choice A is the best answer. Akira is very concerned Chie will find his marriage proposal inappropriate because he did not follow traditional protocol and use a “go-between” (line 65). This is clear in lines 63-64, when Akira says to Chie “Please don’t judge my candidacy by the unseemliness of this proposal.”

Choice B is incorrect because there is no evidence in the passage that Akira worries that Chie will mistake his earnestness for immaturity. Choice C is incorrect because while Akira recognizes that his unscheduled visit is a nuisance, his larger concern is that Chie will reject him due to the inappropriateness of his proposal. Choice D is incorrect because there is no evidence in the passage that Akira worries Chie will underestimate the sincerity of his emotions.

QUESTION 5

Choice C is the best answer. In lines 63-64, Akira says to Chie, “Please don’t judge my candidacy by the unseemliness of this proposal.” This reveals Akira’s concern that Chie may say no to the proposal simply because Akira did not follow traditional practices.

Choices A, B, and D do not provide the best evidence for the answer to the previous question. Choice A is incorrect because line 33 merely describes Akira’s voice as “soft, refined.” Choice B is incorrect because lines 49-51 reflect Chie’s perspective, not Akira’s. Choice D is incorrect because lines 71-72 indicate only that Akira was speaking in an eager and forthright matter.

QUESTION 6

Choice D is the best answer because Akira clearly treats Chie with respect, including “bow[ing]” (line 26) to her, calling her “Madame” (line 31), and looking at her with “a deferential peek” (line 34). Akira does not offer Chie utter deference, though, as he asks to marry Naomi after he concedes that he is not following protocol and admits to being a “disruption” (line 31).

Choice A is incorrect because while Akira conveys respect to Chie, there is no evidence in the passage that he feels affection for her. Choice B is incorrect because neither objectivity nor impartiality accurately describes how Akira addresses Chie. Choice C is incorrect because Akira conveys respect to Chie and takes the conversation seriously.

QUESTION 7

Choice D is the best answer. The first paragraph (lines 1-4) reflects on how Akira approached Chie to ask for her daughter’s hand in marriage. In these lines, the narrator is wondering whether Chie would have been more likely to say yes to Akira’s proposal if Akira had followed tradition: “Akira came directly, breaking all tradition. Was that it? Had he followed form — had he asked his mother to speak to his father to approach a go-between — would Chie have been more receptive?” Thus, the main purpose of the first paragraph is to examine why Chie reacted a certain way to Akira’s proposal.

Choice A is incorrect because the first paragraph describes only one aspect of Japanese culture (marriage proposals) but not the culture as a whole. Choice B is incorrect because the first paragraph implies a criticism of Akira’s individual marriage proposal but not the entire tradition of Japanese marriage proposals. Choice C is incorrect because the narrator does not question a suggestion.

QUESTION 8

Choice B is the best answer. In line 1, the narrator suggests that Akira’s direct approach broke “all tradition.” The narrator then wonders if Akira had “followed form,” or the tradition expected of him, would Chie have been more receptive to his proposal. In this context, following “form” thus means following a certain tradition or custom.

Choices A, C, and D are incorrect because in this context “form” does not mean the way something looks (appearance), the way it is built (structure), or its essence (nature).

QUESTION 9

Choice C is the best answer. Akira states that his unexpected meeting with Chie occurred only because of a “matter of urgency,” which he explains as “an opportunity to go to America, as dentist for Seattle’s Japanese community” (lines 41-42). Akira decides to directly speak to Chie because Chie’s response to his marriage proposal affects whether Akira accepts the job offer.

Choice A is incorrect because there is no evidence in the passage that Akira is worried his parents will not approve of Naomi. Choice B is incorrect because Akira has “an understanding” with Naomi (line 63). Choice D is incorrect; while Akira may know that Chie is unaware of his feelings for Naomi, this is not what he is referring to when he mentions “a matter of urgency.”

QUESTION 10

Choice B is the best answer. In lines 39-42, Akira clarifies that the “matter of urgency” is that he has “an opportunity to go to America, as dentist for Seattle’s Japanese community.” Akira needs Chie’s answer to his marriage proposal so he can decide whether to accept the job in Seattle.

Choices A, C, and D do not provide the best evidence for the answer to the previous question. Choice A is incorrect because in line 39 Akira apologizes for interrupting Chie’s quiet evening. Choice C is incorrect because lines 58-59 address the seriousness of Akira’s request, not its urgency. Choice D is incorrect because line 73 shows only that Akira’s proposal has “startled” Chie and does not explain why his request is time-sensitive.

QUESTION 11

Choice A is the best answer. Lines 1-9 include examples of how many people shop (“millions of shoppers”), how much money they spend (“over \$30 billion at retail stores in the month of December alone”), and the many occasions that lead to shopping for gifts (“including weddings, birthdays, anniversaries, graduations, and baby showers.”). Combined, these examples show how frequently people in the US shop for gifts.

Choice B is incorrect because even though the authors mention that “\$30 billion” had been spent in retail stores in one month, that figure is never discussed as an increase (or a decrease). Choice C is incorrect because lines 1-9 provide a context for the amount of shopping that occurs in the US, but the anxiety (or “dread”) it might cause is not introduced until later in the passage. Choice D is incorrect because lines 1-9 do more than highlight the number of different occasions that lead to gift-giving.

QUESTION 12

Choice B is the best answer. Lines 9-10 state “This frequent experience of gift-giving can engender ambivalent feelings in gift-givers.” In the subsequent sentences, those “ambivalent” feelings are further exemplified as conflicted feelings, as shopping is said to be something that “[m]any relish” (lines 10-11) and “many dread” (line 14).

Choices A, C, and D are incorrect because in this context, “ambivalent” does not mean feelings that are unrealistic, apprehensive, or supportive.

QUESTION 13

Choice D is the best answer. In lines 10-13, the authors clearly state that some people believe gift-giving can help a relationship because it “offers a powerful means to build stronger bonds with one’s closest peers.”

Choice A is incorrect because even though the authors state that some shoppers make their choices based on “egocentrism,” (line 33) there is no evidence in the passage that people view shopping as a form of self-expression. Choice B is incorrect because the passage implies that shopping is an expensive habit. Choice C is incorrect because the passage states that most people have purchased and received gifts, but it never implies that people are *required* to reciprocate the gift-giving process.

QUESTION 14

Choice A is the best answer. In lines 10-13, the authors suggest that people value gift-giving because it may strengthen their relationships with others: “Many relish the opportunity to buy presents because gift-giving offers a powerful means to build stronger bonds with one’s closest peers.”

Choices B, C, and D do not provide the best evidence for the answer to the previous question. Choice B is incorrect because lines 22-23 discuss how people often buy gifts that the recipients would not purchase. Choice C is incorrect because lines 31-32 explain how gift-givers often fail to consider the recipients’ preferences. Choice D is incorrect because lines 44-47 suggest that the cost of a gift may not correlate to a recipient’s appreciation of it.

QUESTION 15

Choice A is the best answer. The “deadweight loss” mentioned in the second paragraph is the significant monetary difference between what a gift-giver would pay for something and what a gift-recipient would pay for the same item. That difference would be predictable to social psychologists, whose research “has found that people often struggle to take account of others’ perspectives — their insights are subject to egocentrism, social projection, and multiple attribution errors” (lines 31-34).

Choices B, C, and D are all incorrect because lines 31-34 make clear that social psychologists would expect a disconnect between gift-givers and gift-recipients, not that they would question it, be disturbed by it, or find it surprising or unprecedented.

QUESTION 16

Choice C is the best answer. Lines 41-44 suggest that gift-givers assume a correlation between the cost of a gift and how well-received it will be: “. . . gift-givers equate how much they spend with how much recipients will appreciate the gift (the more expensive the gift, the stronger a gift-recipient’s feelings of appreciation).” However, the authors suggest this assumption may be incorrect or “unfounded” (line 47), as gift-recipients “may not construe smaller and larger gifts as representing smaller and larger signals of thoughtfulness and consideration” (lines 63-65).

Choices A, B, and D are all incorrect because the passage neither states nor implies that the gift-givers’ assumption is insincere, unreasonable, or substantiated.

QUESTION 17

Choice C is the best answer. Lines 63-65 suggest that the assumption made by gift-givers in lines 41-44 may be incorrect. The gift-givers assume that recipients will have a greater appreciation for costly gifts

than for less costly gifts, but the authors suggest this relationship may be incorrect, as gift-recipients “may not construe smaller and larger gifts as representing smaller and larger signals of thoughtfulness and consideration” (lines 63-65).

Choices A and D are incorrect because lines 53-55 and 75-78 address the question of “why” gift-givers make specific assumptions rather than addressing the validity of these assumptions. Choice B is incorrect because lines 55-60 focus on the reasons people give gifts to others.

QUESTION 18

Choice D is the best answer. Lines 53-55 state that “Perhaps givers believe that bigger (i.e., more expensive) gifts convey stronger signals of thoughtfulness and consideration.” In this context, saying that more expensive gifts “convey” stronger signals means the gifts send, or communicate, stronger signals to the recipients.

Choices A, B, and C are incorrect because in this context, to “convey” something does not mean to transport it (physically move something), counteract it (act in opposition to something), or exchange it (trade one thing for another).

QUESTION 19

Choice A is the best answer. The paragraph examines how gift-givers believe expensive gifts are more thoughtful than less expensive gifts and will be more valued by recipients. The work of Camerer and others offers an explanation for the gift-givers’ reasoning: “gift-givers attempt to signal their positive attitudes toward the intended recipient and their willingness to invest resources in a future relationship” (lines 57-60).

Choices B, C, and D are incorrect because the theory articulated by Camerer and others is used to explain an idea put forward by the authors (“givers believe that bigger . . . gifts convey stronger signals”), not to introduce an argument, question a motive, or support a conclusion.

QUESTION 20

Choice B is the best answer. The graph clearly shows that gift-givers believe that a “more valuable” gift will be more appreciated than a “less valuable gift.” According to the graph, gift-givers believe the monetary value of a gift will determine whether that gift is well received or not.

Choice A is incorrect because the graph does not suggest that gift-givers are aware of gift-recipients’ appreciation levels. Choices C and D are incorrect because neither the gift-givers’ desire for the gifts they purchase nor the gift-givers’ relationship with the gift-recipients is addressed in the graph.

QUESTION 21

Choice A is the best answer. Lines 69-75 explain that while people are often both gift-givers and gift-receivers, they struggle to apply information they learned as a gift-giver to a time when they were a gift-receiver: “Yet, despite the extensive experience that people have as both givers and receivers, they often struggle to transfer information gained from one role (e.g., as a giver) and apply it in another, complementary role (e.g., as a receiver).” The authors suggest that the disconnect between how much appreciation a gift-giver thinks a gift merits and how much appreciation a gift-recipient displays for the gift may be caused by both individuals’ inability to comprehend the other’s perspective.

Choices B and C are incorrect because neither the passage nor the graph addresses the idea that society has become more materialistic or that there is a growing opposition to gift-giving. Choice D is incorrect because the passage emphasizes that gift-givers and gift-recipients fail to understand each other’s perspective, but it offers no evidence that the disconnect results only from a failure to understand the other’s intentions.

QUESTION 22

Choice B is the best answer. Lines 2-4 of the passage describe DNA as “a very long chain, the backbone of which consists of a regular alternation of sugar and phosphate groups.” The backbone of DNA, in other words, is the main structure of a chain made up of repeating units of sugar and phosphate.

Choice A is incorrect because the passage describes DNA on the molecular level only and never mentions the spinal column of organisms. Choice C is incorrect because the passage describes the backbone of the molecule as having “a regular alternation” of sugar and phosphate, not one or the other. Choice D is incorrect because the nitrogenous bases are not the main structural unit of DNA; rather, they are attached only to the repeating units of sugar.

QUESTION 23

Choice D is the best answer. The authors explain that hydrogen bonds join together pairs of nitrogenous bases, and that these bases have a specific structure that leads to the pairing: “One member of a pair must be a purine and the other a pyrimidine in order to bridge between the two chains” (lines 27-29). Given the specific chemical properties of a nitrogenous base, it would be inaccurate to call the process random.

Choice A is incorrect because lines 5-6 describe how nitrogenous bases attach to sugar but not how those bases pair with one another. Choice B is incorrect because lines 9-10 do not contradict the student’s claim. Choice C is incorrect because lines 23-25 describe how the two molecules’ chains are linked, not what the specific pairing between nitrogenous bases is.

QUESTION 24

Choice D is the best answer. In lines 12-14 the authors state: “the first feature of our structure which is of biological interest is that it consists not of one chain, but of two.”

Choices A and B are incorrect because lines 12-14 explicitly state that it is the two chains of DNA that are of “biological interest,” not the chemical formula of DNA, nor the common fiber axis those two chains are wrapped around. Choice C is incorrect because, while the X-ray evidence did help Watson and Crick to discover that DNA consists of two chains, it was not claimed to be the feature of biological interest.

QUESTION 25

Choice C is the best answer. In lines 12-14 the authors claim that DNA molecules appear to be comprised of two chains, even though “it has often been assumed . . . there would be only one” (lines 15-17). The authors support this claim with evidence compiled from an X-ray: “the density, taken with the X-ray evidence, suggests very strongly that there are two [chains]” (lines 18-19).

Choices A, B, and D are incorrect because the authors mention density and X-ray evidence to support a claim, not to establish that DNA carries genetic information, present a hypothesis about the composition of a nucleotide, or confirm a relationship between the density and chemical formula of DNA.

QUESTION 26

Choice B is the best answer. The authors explain that “only certain pairs of bases will fit into the structure” (lines 25-26) of the DNA molecule. These pairs must contain “a purine and the other a pyrimidine in order to bridge between the two chains” (lines 27-29), which implies that any other pairing would not “fit into the structure” of the DNA molecule. Therefore, a pair of purines would be larger than the required purine/pyrimidine pair and would not fit into the structure of the DNA molecule.

Choice A is incorrect because this section is not discussing the distance between a sugar and phosphate group. Choice C is incorrect because the passage never makes clear the size of the pyrimidines or purines in relation to each other, only in relation to the space needed to bond the chains of the DNA molecule. Choice D is incorrect because the lines do not make an implication about the size of a pair of pyrimidines in relation to the size of a pair consisting of a purine and a pyrimidine.

QUESTION 27

Choice D is the best answer. The authors explain how the DNA molecule contains a “precise sequence of bases” (lines 43-44), and that the authors can use the order of bases on one chain to determine the order of bases on the other chain: “If the actual order of the bases on one of the pair of chains were given, one could write down the exact

order of the bases on the other one, because of the specific pairing. Thus one chain is, as it were, the complement of the other, and it is this feature which suggests how the deoxyribonucleic acid molecule might duplicate itself” (lines 45-51). The authors use the words “exact,” “specific,” and “complement” in these lines to suggest that the base pairings along a DNA chain is understood and predictable, and may explain how DNA “duplicate[s] itself” (line 51).

Choice A is incorrect because the passage does not suggest that most nucleotide sequences are known. Choice B is incorrect because these lines are not discussing the random nature of the base sequence along one chain of DNA. Choice C is incorrect because the authors are describing the bases attached only to the sugar, not to the sugar-phosphate backbone.

QUESTION 28

Choice C is the best answer. Lines 6-7 state that “Two of the possible bases — adenine and guanine — are purines,” and on the table the percentages of adenine and guanine in yeast DNA are listed as 31.3% and 18.7% respectively.

Choices A, B, and D are incorrect because they do not state the percentages of both purines, adenine and guanine, in yeast DNA.

QUESTION 29

Choice A is the best answer. The authors state: “We believe that the bases will be present almost entirely in their most probable forms. If this is true, the conditions for forming hydrogen bonds are more restrictive, and the only pairs of bases possible are: adenine with thymine, and guanine with cytosine” (lines 31-35). The table shows that the pairs adenine/thymine and guanine/cytosine have notably similar percentages in DNA for all organisms listed.

Choice B is incorrect. Although the choice of “Yes” is correct, the explanation for that choice misrepresents the data in the table. Choices C and D are incorrect because the table does support the authors’ proposed pairing of nitrogenous bases in DNA molecules.

QUESTION 30

Choice A is the best answer because it gives the percentage of cytosine (17.3%) in sea urchin DNA and the percentage of guanine (17.7%) in sea urchin DNA. Their near similar pairing supports the authors’ proposal that possible pairings of nitrogenous bases are “adenine with thymine, and guanine with cytosine” (line 35).

Choices B, C, and D do not provide the best evidence for the answer to the previous question. Choice B (cytosine and thymine), Choice C (cytosine and adenine), and Choice D (guanine and adenine) are incorrect because they show pairings of nitrogenous bases that do not compose a similar percentage of the bases in sea urchin DNA.

QUESTION 31

Choice D is the best answer. The table clearly shows that the percentage of adenine in each organism's DNA is different, ranging from 24.7% in *E.coli* to 33.2% in the octopus. That such a variability would exist is predicted in lines 41-43, which states that "in a long molecule many different permutations are possible."

Choices A and B are incorrect because the table shows that the percentage of adenine varies between 24.7% and 33.2% in different organisms. Choice C is incorrect because lines 36-38 state that adenine pairs with thymine but does not mention the variability of the base composition of DNA.

QUESTION 32

Choice B is the best answer. In this passage, Woolf asks women a series of questions. Woolf wants women to consider joining "the procession of educated men" (lines 56-57) by becoming members of the workforce. Woolf stresses that this issue is urgent, as women "have very little time in which to answer [these questions]" (lines 48-49).

Choice A is incorrect because Woolf argues against the tradition of only "the sons of educated men" (lines 82-83) joining the workforce. Choice C is incorrect because Woolf is not highlighting the severity of social divisions as much as she is explaining how those divisions might be reduced (with women joining the workforce). Choice D is incorrect because Woolf does not question the feasibility of changing the workforce dynamic.

QUESTION 33

Choice A is the best answer. Throughout the passage, Woolf advocates for more women to engage with existing institutions by joining the workforce: "We too can leave the house, can mount those steps [to an office], pass in and out of those doors, . . . make money, administer justice . . ." (lines 30-32). Woolf tells educated women that they are at a "moment of transition" (line 51) where they must consider their future role in the workforce.

Choice B is incorrect because even though Woolf mentions women's traditional roles (lines 68-69: "while they stirred the pot, while they rocked the cradle"), she does not suggest that women will have to give up these traditional roles to gain positions of influence. Choice C is incorrect because though Woolf wonders how "the procession of the sons of educated men" impacts women's roles, she does not argue that this male-dominated society has had grave and continuing effects. Choice D is incorrect because while Woolf suggests educated women can hold positions currently held by men, she does not suggest that women's entry into positions of power will change those positions.

QUESTION 34

Choice C is the best answer. Woolf uses the word “we” to refer to herself and educated women in English society, the “daughters of educated men” (line 64). Woolf wants these women to consider participating in a changing workforce: “For there, trapesing along at the tail end of the procession [to and from work], we go ourselves” (lines 23-24). In using the word “we” throughout the passage, Woolf establishes a sense of solidarity among educated women.

Choice A is incorrect because Woolf does not use “we” to reflect on whether people in a group are friendly to one another; she is concerned with generating solidarity among women. Choice B is incorrect because though Woolf admits women have predominantly “done their thinking” within traditional female roles (lines 64-69), she does not use “we” to advocate for more candor among women. Choice D is incorrect because Woolf does not use “we” to emphasize a need for people in a group to respect one other; rather, she wants to establish a sense of solidarity among women.

QUESTION 35

Choice B is the best answer. Woolf argues that the “bridge over the River Thames, [has] an admirable vantage ground for us to make a survey” (lines 1-3). The phrase “make a survey” means to carefully examine an event or activity. Woolf wants educated women to “fix [their] eyes upon the procession — the procession of the sons of educated men” (lines 9-11) walking to work.

Choice A is incorrect because while Woolf states the bridge “is a place to stand on by the hour dreaming,” she states that she is using the bridge “to consider the facts” (lines 6-9). Woolf is not using the bridge for fanciful reflection; she is analyzing “the procession of the sons of educated men” (lines 10-11). Choice C is incorrect because Woolf does not compare the bridge to historic episodes. Choice D is incorrect because Woolf does not suggest that the bridge is a symbol of a male-dominated past, but rather that it serves as a good place to watch men proceed to work.

QUESTION 36

Choice D is the best answer. Woolf writes that the men who conduct the affairs of the nation (lines 15-17: “ascending those pulpits, preaching, teaching, administering justice, practising medicine, transacting business, making money”) are the same men who go to and from work in a “procession” (line 10). Woolf notes that women are joining this procession, an act that suggests the workforce has become less exclusionary: “For there, trapesing along at the tail end of the procession, we go ourselves” (lines 23-24).

Choice A is incorrect because the procession is described as “a solemn sight always” (lines 17-18), which indicates that it has always been influential. Choice B is incorrect because the passage

does not indicate that this procession has become a celebrated feature of English life. Choice C is incorrect because the passage states only that the procession is made up of “the sons of educated men” (lines 10-11).

QUESTION 37

Choice C is the best answer, as lines 23-24 suggest that the workforce has become less exclusionary. In these lines Woolf describes how women are joining the male-dominated procession that travels to and from the work place: “For there, trapesing along at the tail end of the procession, we go ourselves.”

Choices A, B, and D are incorrect because they do not provide the best evidence for the answer to the previous question. Choice A is incorrect because lines 12-17 describe the positions predominantly held by men. Choice B is incorrect because lines 17-19 use a metaphor to describe how the procession physically looks.

Choice D is incorrect because lines 30-34 hypothesize about future jobs for women.

QUESTION 38

Choice C is the best answer. Woolf characterizes the questions she asks in lines 53-57 as significant (“so important that they may well change the lives of all men and women for ever,” lines 52-53) and urgent (“we have very little time in which to answer them,” lines 48-49). Therefore, Woolf considers the questions posed in lines 53-57 as both momentous (significant) and pressing (urgent).

Choice A is incorrect because Woolf characterizes the questions as urgent and important, not as something that would cause controversy or fear. Choice B is incorrect because though Woolf considers the questions to be weighty (or “important”), she implies that they can be answered. Choice D is incorrect because Woolf does not imply that the questions are mysterious.

QUESTION 39

Choice B is the best answer. The answer to the previous question shows how Woolf characterizes the questions posed in lines 53-57 as momentous and pressing. In lines 48-49, Woolf describes these questions as “important,” or momentous, and states that women “have very little time in which to answer them,” which shows their urgency.

Choices A, C, and D do not provide the best evidence for the answer to the previous question. Choices A and D are incorrect because lines 46-47 and line 62 suggest that women need to think about these questions and not offer trivial objections to them. Choice C is incorrect because line 57 characterizes only the need for urgency and does not mention the significance of the questions.

QUESTION 40

Choice C is the best answer. Woolf writes that women “have thought” while performing traditional roles such as cooking and caring for children (lines 67-69). Woolf argues that this “thought” has shifted women’s roles in society and earned them a “brand-new sixpence” that they need to learn how to “spend” (lines 70-71). The “sixpence” mentioned in these lines is not a literal coin. Woolf is using the “sixpence” as a metaphor, as she is suggesting women take advantage of the opportunity to join the male-dominated workforce.

Choices A, B, and D are incorrect because in this context, “sixpence” does not refer to tolerance, knowledge, or perspective.

QUESTION 41

Choice B is the best answer. In lines 72-76, Woolf repeats the phrase “let us think” to emphasize how important it is for women to critically reflect on their role in society. Woolf states this reflection can occur at any time: “Let us think in offices; in omnibuses; while we are standing in the crowd watching Coronations and Lord Mayor’s Shows; let us think . . . in the gallery of the House of Commons; in the Law Courts; let us think at baptisms and marriages and funerals.”

Choices A, C, and D are incorrect because in lines 72-76 Woolf is not emphasizing the novelty of the challenge faced by women, the complexity of social and political issues, or the enjoyable aspect of women’s career possibilities.

QUESTION 42

Choice B is the best answer. The author of Passage 1 identifies specific companies such as the “Planetary Resources of Washington,” “Deep Space Industries of Virginia,” and “Golden Spike of Colorado” to support his earlier assertion that there are many interested groups “working to make space mining a reality” (line 8).

Choices A, C, and D are incorrect because the author of Passage 1 does not mention these companies to profile the technological advances in space mining, the profit margins from space mining, or the diverse approaches to space mining.

QUESTION 43

Choice A is the best answer. The author of Passage 1 explicitly states that one benefit to space mining is access to precious metals and earth elements: “within a few decades, [space mining] may be meeting earthly demands for precious metals, such as platinum and gold, and the rare earth elements vital for personal electronics, such as yttrium and lanthanum” (lines 18-22).

Choice B is incorrect because Passage 1 does not suggest that precious metals extracted from space may make metals more valuable on Earth. Choice C and Choice D are incorrect because Passage 1 never mentions how space mining could create unanticipated technological innovations or change scientists' understanding of space resources.

QUESTION 44

Choice A is the best answer. Lines 18-22 suggest that space mining may help meet “earthly demands for precious metals . . . and the rare earth elements vital for personal electronics.” In this statement, the author is stating materials (“metals,” “earth elements”) that may be gathered as a result of space mining, and that these materials may be important to Earth’s economy.

Choices B, C, and D do not provide the best evidence for the answer to the previous question. Choice B is incorrect because lines 24-28 focus on an “off-planet economy” but never address positive effects of space mining. Choice C is incorrect because lines 29-30 suggest the relative value of water found in space. Choice D is incorrect because lines 41-44 state that space mining companies hope to find specific resources in lunar soil and asteroids but do not address how these resources are important to Earth’s economy.

QUESTION 45

Choice D is the best answer. The author suggests in lines 19-22 that space mining may meet “earthly demands for precious metals, such as platinum and gold, and the rare earth elements vital for personal electronics.” In this sentence, “earthly demands” suggests that people want, or desire, these precious metals and rare earth elements.

Choices A, B, and C are incorrect because in this context “demands” does not mean offers, claims, or inquiries.

QUESTION 46

Choice C is the best answer. Lines 29-30 introduce the idea that water mined in space may be very valuable: “water mined from other worlds could become the most desired commodity.” Lines 35-40 support this assertion by suggesting how mined space water could be used “for drinking or as a radiation shield” (lines 36-37) or to make “spacecraft fuel” (line 38).

Choice A is incorrect because the comparison in the previous paragraph (the relative value of gold and water to someone in the desert) is not expanded upon in lines 35-40. Choice B is incorrect because the question asked in the previous paragraph is also answered in that paragraph. Choice D is incorrect because no specific proposals are made in the previous paragraph; rather, an assertion is made and a question is posed.

QUESTION 47

Choice B is the best answer. The author of Passage 2 recognizes that space mining may prove beneficial to humanity, stating that “we all stand to gain: the mineral bounty and spin-off technologies could enrich us all” (lines 50-52). The author also repeatedly mentions that space mining should be carefully considered before it is implemented: “But before the miners start firing up their rockets, we should pause for thought” (lines 53-54); “But [space mining’s] consequences — both here on Earth and in space — merit careful consideration” (lines 57-59).

Choice A is incorrect because the author of Passage 2 concedes that “space mining seems to sidestep most environmental concerns” (lines 55-56) but does not imply that space mining will recklessly harm the environment, either on Earth or in space. Choice C is incorrect because the author of Passage 2 does not address any key resources that may be disappearing on Earth. Choice D is incorrect because the author of Passage 2 admits that “resources that are valuable in orbit and beyond may be very different to those we prize on Earth” (lines 74-76) but does not mention any disagreement about the commercial viabilities of space mining discoveries.

QUESTION 48

Choice A is the best answer. In lines 60-66, the author presents some environmental arguments against space mining: “[space] is not ours to despoil” and we should not “[glut] ourselves on space’s riches.” The author then suggests that these environmental arguments will be hard to “hold,” or maintain, when faced with the possible monetary rewards of space mining: “History suggests that those will be hard lines to hold . . .” (line 68).

Choices B, C, and D are incorrect because in this context, “hold” does not mean grip, restrain, or withstand.

QUESTION 49

Choice D is the best answer. The author of Passage 1 is excited about the possibilities of space mining and how it can yield valuable materials, such as metals and elements (lines 19-20 and lines 41-42), water ice (line 35), and space dirt (line 44). The author of Passage 2, on the other hand, recognizes the possible benefits of space mining but also states that space mining should be thoughtfully considered before being implemented. Therefore, the author of Passage 2 expresses some concerns about a concept discussed in Passage 1.

Choice A is incorrect because the author of Passage 2 does not refute the central claim of Passage 1; both authors agree there are possible benefits to space mining. Choice B is incorrect because the author of Passage 1 does not describe space mining in more general terms than does the author of Passage 2. Choice C is incorrect because the author of Passage 2 is not suggesting that the space mining proposals stated in Passage 1 are impractical.

QUESTION 50

Choice B is the best answer. In lines 18-28, the author of Passage 1 describes many of the possible economic benefits of space mining, including the building of “an off-planet economy” (line 25). The author of Passage 2 warns that there may be ramifications to implementing space mining and building an “emerging off-world economy” (line 73) without regulation: “But miners have much to gain from a broad agreement on the for-profit exploitation of space. Without consensus, claims will be disputed, investments risky, and the gains made insecure” (lines 83-87).

Choices A, C, and D are incorrect because the author of Passage 2 does not suggest that the benefits to space mining mentioned in lines 18-28 of Passage 1 are unsustainable, unachievable, or will negatively affect Earth’s economy. Rather, the author recognizes the benefits of space mining but advocates for the development of regulation procedures.

QUESTION 51

Choice D is the best answer. In lines 85-87, the author of Passage 2 states that the future of space mining will prove difficult without regulations because “claims will be disputed, investments risky, and the gains made insecure.”

Choices A, B, and C are incorrect because they do not provide the best evidence for the answer to the previous question. Choice A is incorrect because lines 60-63 present some environmental concerns toward space mining. Choice B is incorrect because lines 74-76 focus on how space mining may discover valuable resources that are different from the ones found on Earth. Choice C is incorrect because lines 81-83 simply describe one person’s objections to the regulation of the space mining industry.

QUESTION 52

Choice A is the best answer because both Passage 1 and Passage 2 indicate a belief that the resources most valued in space may differ from those most valued on our planet. Passage 2 says this explicitly in lines 74-76: “The resources that are valuable in orbit and beyond may be very different to those we prize on Earth.” Meanwhile Passage 1 suggests that water mined from space may be more valuable than metals or other earth elements when creating an “off-plant economy” (lines 25-30).

Choice B is incorrect because neither passage discusses, either implicitly or explicitly, the need for space mining to be inexpensive. Choice C is incorrect because Passage 2 does not specifically identify precious metals or rare earth elements but instead focuses on theoretical problems with space mining. Choice D is incorrect because diminishing resources on Earth is not discussed in Passage 2.

Section 2: Writing and Language Test

QUESTION 1

Choice D is the best answer because “outweigh” is the only choice that appropriately reflects the relationship the sentence sets up between “advantages” and “drawbacks.”

Choices A, B, and C are incorrect because each implies a competitive relationship that is inappropriate in this context.

QUESTION 2

Choice B is the best answer because it offers a second action that farmers can undertake to address the problem of acid whey disposal, thus supporting the claim made in the previous sentence (“To address the problem of disposal, farmers have found a *number of uses* for acid whey”).

Choices A, C, and D are incorrect because they do not offer examples of how farmers could make use of acid whey.

QUESTION 3

Choice A is the best answer because it results in a sentence that is grammatically correct and coherent. In choice A, “waterways,” the correct plural form of “waterway,” conveys the idea that acid whey could impact multiple bodies of water. Additionally, the compound verb “can pollute” suggests that acid whey presents an ongoing, potential problem.

Choices B and D are incorrect because both use the possessive form of “waterway.” Choice C is incorrect because it creates an unnecessary shift in verb tense. The present tense verb “can pollute” should be used instead, as it is consistent with the other verbs in the paragraph.

QUESTION 4

Choice C is the best answer because it utilizes proper punctuation for items listed in a series. In this case those items are nouns: “Yogurt manufacturers, food scientists, and government officials.”

Choices A and B are incorrect because both fail to recognize that the items are a part of a series. Since a comma is used after “manufacturers,” a semicolon or colon should not be used after “scientists.” Choice D is incorrect because the comma after “and” is unnecessary and deviates from grammatical conventions for presenting items in a series.

QUESTION 5

Choice C is the best answer because sentence 5 logically links sentence 2, which explains why Greek yogurt production yields large amounts of acid whey, and sentence 3, which mentions the need to dispose of acid whey properly.

Choices A, B, and D are incorrect because each would result in an illogical progression of sentences for this paragraph. If sentence 5 were left where it is or placed after sentence 3, it would appear illogically after the discussion of “the problem of disposal.” If sentence 5 were placed after sentence 1, it would illogically discuss “acid-whey runoff” before the mention of acid whey being “difficult to dispose of.”

QUESTION 6

Choice D is the best answer because the paragraph includes several benefits of consuming Greek yogurt, particularly in regard to nutrition and satisfying hunger, to support the sentence’s claim that the conservation efforts are “well worth the effort.” This transition echoes the passage’s earlier claim that “the advantages of Greek yogurt outweigh the potential drawbacks of its production.”

Choices A, B, and C are incorrect because they inaccurately describe the sentence in question.

QUESTION 7

Choice B is the best answer because it provides a grammatically standard preposition that connects the verb “serves” and noun “digestive aid” and accurately depicts their relationship.

Choice A is incorrect because the infinitive form “to be” yields a grammatically incorrect verb construction: “serves to be.” Choices C and D are incorrect because both present options that deviate from standard English usage.

QUESTION 8

Choice C is the best answer because it presents a verb tense that is consistent in the context of the sentence. The choice is also free of the redundant “it.”

Choice A is incorrect because the subject “it” creates a redundancy. Choices B and D are incorrect because they present verb tenses that are inconsistent in the context of the sentence.

QUESTION 9

Choice A is the best answer because it properly introduces an additional health benefit in a series of sentences that list health benefits. “Also” is the logical and coherent choice to communicate an addition.

Choices B, C, and D are incorrect because none of the transitions they offer logically fits the content that precedes or follows the proposed choice.

QUESTION 10

Choice A is the best answer because “satiated” is the only choice that communicates effectively that Greek yogurt will satisfy hunger for a longer period of time.

Choices B, C, and D are incorrect because each is improper usage in this context. A person can be “fulfilled” spiritually or in other ways, but a person who has eaten until he or she is no longer hungry cannot be described as fulfilled. Neither can he or she be described as being “complacent” or “sufficient.”

QUESTION 11

Choice B is the best answer because it provides a syntactically coherent and grammatically correct sentence.

Choices A and C are incorrect because the adverbial conjunctions “therefore” and “so,” respectively, are unnecessary following “Because.” Choice D is incorrect because it results in a grammatically incomplete sentence (the part of the sentence before the colon must be an independent clause).

QUESTION 12

Choice B is the best answer because the graph clearly indicates that, on March 5, average low temperatures are at their lowest point: 12 degrees Fahrenheit.

Choice A is incorrect because the phrase “as low as” suggests that the temperature falls no lower than 20 degrees Fahrenheit, but the chart shows that in January, February, and March, the temperature frequently falls below that point. Choices C and D are incorrect because the information each provides is inconsistent with the information on the chart.

QUESTION 13

Choice A is the best answer because it concisely combines the two sentences while maintaining the original meaning.

Choices B, C, and D are incorrect because each is unnecessarily wordy, thus undermining one purpose of combining two sentences: to make the phrasing more concise.

QUESTION 14

Choice B is the best answer because it provides a conjunctive adverb that accurately represents the relationship between the two sentences. “However” signals an exception to a case stated in the preceding sentence.

Choices A, C, and D are incorrect because each provides a transition that does not accurately represent the relationship between the two sentences, and as a result each compromises the logical coherence of these sentences.

QUESTION 15

Choice C is the best answer because it provides commas to offset the nonrestrictive modifying clause “an associate professor of geology at Ohio State.”

Choices A, B, and D are incorrect because each provides punctuation that does not adequately separate the nonrestrictive modifying clause about Jason Box from the main clause.

QUESTION 16

Choice C is the best answer because the colon signals that the other factor that contributed to the early thaw is about to be provided.

Choice A is incorrect because it results in a sentence that deviates from grammatical standards: a semicolon should be used to separate two independent clauses, but in choice A the second clause only has a subject, not a verb. Choice B is incorrect because it is unnecessarily wordy. Choice D is incorrect because “being” is unnecessary and creates an incoherent clause.

QUESTION 17

Choice C is the best answer because it provides the correct preposition (“of”) and relative pronoun (“which”) that together create a dependent clause following the comma.

Choices A, B, and D are incorrect because each results in a comma splice. Two independent clauses cannot be joined with only a comma.

QUESTION 18

Choice A is the best answer because the verb tense is consistent with the preceding past tense verbs in the sentence, specifically “produced” and “drifted.”

Choices B, C, and D are incorrect because each utilizes a verb tense that is not consistent with the preceding past tense verbs in the sentence.

QUESTION 19

Choice D is the best answer because “their” is the possessive form of a plural noun. In this case, the noun is plural: “snow and ice.”

Choices A and B are incorrect because the possessive pronoun must refer to a plural noun, “snow and ice,” rather than a singular noun. Choice C is incorrect because “there” would result in an incoherent sentence.

QUESTION 20

Choice D is the best answer. The preceding sentences in the paragraph have established that a darker surface of soot-covered snow leads to more melting because this darker surface absorbs heat, whereas a whiter surface, free of soot, would deflect heat. As the passage points out, exposed land and water are also dark and cannot deflect heat the way ice and snow can. Only choice D reflects the self-reinforcing cycle that the preceding sentences already imply.

Choices A, B, and C are incorrect because the information each provides fails to support the previous claim that the “result” of the soot “is a self-reinforcing cycle.”

QUESTION 21

Choice B is the best answer because it is free of redundancies.

Choices A, C, and D are incorrect because each of the three presents a redundancy: Choice A uses “repeat” and “again”; Choice C uses “damage” and “harmful effects”; and Choice D uses “may” and “possibly.”

QUESTION 22

Choice D is the best answer because sentence 5 describes the information Box seeks: “to determine just how much the soot is contributing to the melting of the ice sheet.” Unless sentence 4 comes after sentence 5, readers will not know what the phrase “this crucial information” in sentence 4 refers to.

Choices A, B, and C are incorrect because each results in an illogical sentence progression. None of the sentences that would precede sentence 4 provides details that could be referred to as “this crucial information.”

QUESTION 23

Choice D is the best answer because it is free of redundancies and offers the correct form of the verb “wear” in this context.

Choices A, B, and C are incorrect because all three contain a redundancy. Considering that “quickly” is a fixed part of the sentence, choice A’s “soon” and choice B and C’s “promptly” all result in redundancies. Choices A and B are also incorrect because each uses an incorrect form of the verb.

QUESTION 24

Choice D is the best answer because it is the only choice that provides a grammatically standard and coherent sentence. The participial phrase “Having become frustrated. . .” functions as an adjective modifying “I,” the writer.

Choices A, B, and C are incorrect because each results in a dangling modifier. The participial phrase “Having become frustrated . . .” does not refer to choice A’s “no colleagues,” choice B’s “colleagues,” or choice C’s “ideas.” As such, all three choices yield incoherent and grammatically incorrect sentences.

QUESTION 25

Choice B is the best answer because it provides the correct preposition in this context, “about.”

Choices A, C, and D are incorrect because each provides a preposition that deviates from correct usage. One might read an article “about” coworking spaces but not an article “into,” “upon,” or “for” coworking spaces.

QUESTION 26

Choice A is the best answer because it provides the correct punctuation for the dependent clause that begins with the phrase “such as.”

Choices B, C, and D are incorrect because each presents punctuation that deviates from the standard way of punctuating the phrase “such as.” When “such as” is a part of a nonrestrictive clause, as it is here, only one comma is needed to separate it from the main independent clause.

QUESTION 27

Choice B is the best answer because it provides a transitional phrase, “In addition to equipment,” that accurately represents the relationship between the two sentences connected by the transitional phrase. Together, the sentences describe the key features of coworking spaces, focusing on what the spaces offer (equipment and meeting rooms).

Choices A, C, and D are incorrect because each provides a transition that does not accurately represent the relationship between the two sentences.

QUESTION 28

Choice C is the best answer because the sentence is a distraction from the paragraph’s focus. Nothing in the paragraph suggests that the cost of setting up a coworking business is relevant here.

Choices A and D are incorrect because neither accurately represents the information in the paragraph. Choice B is incorrect because it does not accurately represent the information in the next paragraph.

QUESTION 29

Choice B is the best answer because it logically follows the writer’s preceding statement about creativity and accurately represents the information in the graph.

Choices A, C, and D are incorrect because they present inaccurate and unsupported interpretations of the information in the graph. In addition, none of these choices provides directly relevant support for the main topic of the paragraph.

QUESTION 30

Choice D is the best answer because it provides a relative pronoun and verb that create a standard and coherent sentence. The relative pronoun “who” refers to the subject “the people,” and the plural verb “use” corresponds grammatically with the plural noun “people.”

Choices A and B are incorrect because “whom” is the relative pronoun used to represent an object. The noun “people” is a subject performing an action (using the coworking space). Choices B and C are also incorrect because they display a form of the verb “to use” that does not correspond to the plural noun “people.”

QUESTION 31

Choice C is the best answer because the proposed sentence offers a necessary and logical transition between sentence 2, which introduces the facility the writer chose, and sentence 3, which tells what happened at the facility “Throughout the morning.”

Choices A, B, and D are incorrect because each would result in an illogical progression of sentences.

QUESTION 32

Choice A is the best answer because the punctuation it provides results in a grammatically standard and coherent sentence. When an independent clause is followed by a list, a colon is used to link the two.

Choice B is incorrect because the punctuation creates a fragment (a semicolon should be used to link two independent clauses).

Choice C is incorrect because its use of the comma creates a series in which “several of my coworking colleagues” are distinguished from the “website developer” and others, although the logic of the sentence would suggest that they are the same. Choice D is incorrect because it lacks the punctuation necessary to link the independent clause and the list.

QUESTION 33

Choice A is the best answer because it provides a phrase that is consistent with standard English usage and also maintains the tone and style of the passage.

Choice B is incorrect because “give some wisdom” deviates from standard English usage and presents a somewhat colloquial phrase in a text that is generally free of colloquialisms. Choices C and D are incorrect because both are inconsistent with the tone of the passage as well as its purpose. The focus of the paragraph is on sharing, not on proclaiming opinions.

QUESTION 34

Choice A is the best answer because it offers a phrase that introduces a basic definition of philosophy and thereby fits the sentence.

Choices B, C, and D are incorrect because each offers a transition that does not suit the purpose of the sentence.

QUESTION 35

Choice A is the best answer because it offers the most succinct comparison between the basic definition of philosophy and the fact that students can gain specific, practical skills from the study of philosophy. There is no need to include the participle “speaking” in this sentence, as it is clear from context that the writer is offering a different perspective.

Choices B, C, and D are incorrect because they provide options that are unnecessarily wordy.

QUESTION 36

Choice B is the best answer because it provides a verb that creates a grammatically complete, standard, and coherent sentence.

Choices A, C, and D are incorrect because each results in a grammatically incomplete and incoherent sentence.

QUESTION 37

Choice D is the best answer because it most effectively sets up the information in the following sentences, which state that (according to information from the 1990s) “only 18 percent of American colleges required at least one philosophy course,” and “more than 400 independent philosophy departments were eliminated” from colleges. These details are most logically linked to the claim that “colleges have not always supported the study of philosophy.”

Choices A, B, and C are incorrect because none of these effectively sets up the information that follows, which is about colleges’ failure to support the study of philosophy.

QUESTION 38

Choice C is the best answer because it provides a transition that logically connects the information in the previous sentence to the information in this one. Both sentences provide evidence of colleges’ lack of support of philosophy programs, so the adverb “Moreover,” which means “In addition,” accurately captures the relationship between the two sentences.

Choices A, B, and D are incorrect because each presents a transition that does not accurately depict or support the relationship between the two sentences. The second sentence is not a result of the first (“Therefore,” “Thus”), and the sentences do not provide a contrast (“However”).

QUESTION 39

Choice A is the best answer because it succinctly expresses the idea that “students who major in philosophy often do better . . . as measured by standardized test scores.”

Choices B and D are incorrect because they introduce a redundancy and a vague term, “results.” The first part of the sentence mentions a research finding or conclusion but does not directly address any “results,” so it is confusing to refer to “these results” and indicate that they “can be” or “are measured by standardized test scores.” The best way to express the idea is simply to say that some students “often do better” than some other students “in both verbal reasoning and analytical writing as measured by standardized test scores.” Choice C is incorrect because there is no indication that multiple criteria are used to evaluate students’ “verbal reasoning and analytical writing”: test scores and something else. Only test scores are mentioned.

QUESTION 40

Choice B is the best answer because it provides subject-verb agreement and thus creates a grammatically correct and coherent sentence.

Choice A is incorrect because the verb “has scored” does not correspond with the plural subject “students.” Similarly, Choice C is incorrect because the verb “scores” would correspond with a singular subject, but not the plural subject present in this sentence. Choice D is incorrect because it results in a grammatically incomplete and incoherent sentence.

QUESTION 41

Choice B is the best answer because it provides a coherent and grammatically standard sentence.

Choices A and D are incorrect because both present “students” in the possessive form, whereas the sentence establishes “students” as the subject (“many students . . . have”). Choice C is incorrect because the verb form it proposes results in an incomplete and incoherent sentence.

QUESTION 42

Choice C is the best answer because it accurately depicts how inserting this sentence would affect the overall paragraph. The fact that Plato used the dialogue form has little relevance to the preceding claim about the usefulness of a philosophy background.

Choices A and B are incorrect because the proposed sentence interrupts the progression of reasoning in the paragraph. Choice D is incorrect because, as with Choice A, Plato’s works have nothing to do with “the employability of philosophy majors.”

QUESTION 43

Choice D is the best answer because it creates a complete and coherent sentence.

Choices A, B, and C are incorrect because each inserts an unnecessary relative pronoun or conjunction, resulting in a sentence without a main verb.

QUESTION 44

Choice D is the best answer because it provides a possessive pronoun that is consistent with the sentence’s plural subject “students,” thus creating a grammatically sound sentence.

Choices A, B, and C are incorrect because each proposes a possessive pronoun that is inconsistent with the plural noun “students,” the established subject of the sentence.

Section 3: Math Test – No Calculator

QUESTION 1

Choice D is correct. Since $k = 3$, one can substitute 3 for k in the equation $\frac{x-1}{3} = k$, which gives $\frac{x-1}{3} = 3$. Multiplying both sides of $\frac{x-1}{3} = 3$ by 3 gives $x - 1 = 9$ and then adding 1 to both sides of $x - 1 = 9$ gives $x = 10$.

Choices A, B, and C are incorrect because the result of subtracting 1 from the value and dividing by 3 is not the given value of k , which is 3.

QUESTION 2

Choice A is correct. To calculate $(7 + 3i + (-8 + 9i))$, add the real parts of each complex number, $7 + (-8) = -1$, and then add the imaginary parts, $3i + 9i = 12i$. The result is $-1 + 12i$.

Choices B, C, and D are incorrect and likely result from common errors that arise when adding complex numbers. For example, choice B is the result of adding $3i$ and $-9i$, and choice C is the result of adding 7 and 8.

QUESTION 3

Choice C is correct. The total number of text messages sent by Armand can be found by multiplying his rate of texting, in number of text messages sent per hour, by the total number of hours he spent sending them; that is m texts/hour \times 5 hours $= 5m$ texts. Similarly, the total number of text messages sent by Tyrone is his hourly rate of texting multiplied by the 4 hours he spent texting: p texts/hour \times 4 hours $= 4p$ texts. The total number of text messages sent by Armand and Tyrone is the sum of the total number of messages sent by Armand and the total number of messages sent by Tyrone: $5m + 4p$.

Choice A is incorrect and arises from adding the coefficients and multiplying the variables of $5m$ and $4p$. Choice B is incorrect and is the result of multiplying $5m$ and $4p$. The total number of messages sent by Armand and Tyrone should be the sum of $5m$ and $4p$, not the product of these terms. Choice D is incorrect because it multiplies Armand’s number of hours spent texting by Tyrone’s hourly rate of

texting, and vice versa. This mix-up results in an expression that does not equal the total number of messages sent by Armand and Tyrone.

QUESTION 4

Choice B is correct. The value 108 in the equation is the value of P in $P = 108 - 23d$ when $d = 0$. When $d = 0$, Kathy has worked 0 days that week. In other words, 108 is the number of phones left before Kathy has started work for the week. Therefore, the meaning of the value 108 in the equation is that Kathy starts each week with 108 phones to fix.

Choice A is incorrect because Kathy will complete the repairs when $P = 0$. Since $P = 108 - 23d$, this will occur when $0 = 108 - 23d$ or when $d = \frac{108}{23}$, not when $d = 108$. Therefore, the value 108 in the equation

does not represent the number of days it will take Kathy to complete the repairs. Choices C and D are incorrect because the number 23 in $P = 108 - 23d$ indicates that the number of phones left will decrease by 23 for each increase in the value of d by 1; in other words, Kathy is repairing phones at a rate of 23 per day, not 108 per hour (choice C) or 108 per day (choice D).

QUESTION 5

Choice C is correct. Only like terms, with the same variables and exponents, can be combined to determine the answer as shown here:

$$\begin{aligned} & (x^2y - 3y^2 + 5xy^2 - (-x^2y + 3xy^2 - 3y^2)) \\ &= (x^2y - (-x^2y) + (-3y^2 - (-3y^2)) + (5xy^2 - 3xy^2)) \\ &= 2x^2y + 0 + 2xy^2 \\ &= 2x^2y + 2xy^2 \end{aligned}$$

Choices A, B, and D are incorrect and are the result of common calculation errors or of incorrectly combining like and unlike terms.

QUESTION 6

Choice A is correct. In the equation $h = 3a + 28.6$, if a , the age of the boy, increases by 1, then h becomes $h = 3(a + 1) + 28.6 = 3a + 3 + 28.6 = 3a + 28.6 + 3$. Therefore, the model estimates that the boy's height increases by 3 inches each year.

Alternatively: The height, h , is a linear function of the age, a , of the boy. The coefficient 3 can be interpreted as the rate of change of the function; in this case, the rate of change can be described as a change of 3 inches in height for every additional year in age.

Choices B, C, and D are incorrect and are likely the result of dividing 28.6 by 5, 3, and 2, respectively. The number 28.6 is the estimated height, in inches, of a newborn boy. However, dividing 28.6 by 5, 3, or 2 has no meaning in the context of this question.

QUESTION 7

Choice B is correct. Since the right-hand side of the equation is

P times the expression $\frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1}$, multiplying both

sides of the equation by the reciprocal of this expression results

in $\frac{\left(1 + \frac{r}{1,200}\right)^N - 1}{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N} m = P$.

Choice A is incorrect and is the result of multiplying both sides of the

equation by the rational expression $\frac{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}{\left(1 + \frac{r}{1,200}\right)^N - 1}$ rather than

by the reciprocal of this expression $\frac{\left(1 + \frac{r}{1,200}\right)^N - 1}{\left(\frac{r}{1,200}\right)\left(1 + \frac{r}{1,200}\right)^N}$. Choices C

and D are incorrect and are likely the result of errors while trying to solve for P .

QUESTION 8

Choice C is correct. Since $\frac{a}{b} = 2$, it follows that $\frac{b}{a} = \frac{1}{2}$. Multiplying both

sides of the equation by 4 gives $4\left(\frac{b}{a}\right) = 4\left(\frac{1}{2}\right)$, or $\frac{4b}{a} = 2$.

Choice A is incorrect because if $\frac{4b}{a} = 0$, then $\frac{a}{b}$ would be undefined.

Choice B is incorrect because if $\frac{4b}{a} = 1$, then $\frac{a}{b} = 4$. Choice D is

incorrect because if $\frac{4b}{a} = 4$, then $\frac{a}{b} = 1$.

QUESTION 9

Choice B is correct. Adding x and 19 to both sides of $2y - x = -19$ gives $x = 2y + 19$. Then, substituting $2y + 19$ for x in $3x + 4y = -23$ gives $3(2y + 19) + 4y = -23$. This last equation is equivalent to $10y + 57 = -23$. Solving $10y + 57 = -23$ gives $y = -8$. Finally, substituting -8 for y in $2y - x = -19$ gives $2(-8) - x = -19$, or $x = 3$. Therefore, the solution (x, y) to the given system of equations is $(3, -8)$.

Choices A, C, and D are incorrect because when the given values of x and y are substituted in $2y - x = -19$, the value of the left side of the equation does not equal -19 .

QUESTION 10

Choice A is correct. Since g is an even function, $g(-4) = g(4) = 8$.

Alternatively: First find the value of a , and then find $g(-4)$.

Since $g(4) = 8$, substituting 4 for x and 8 for $g(x)$ gives

$8 = a(4)^2 + 24 = 16a + 24$. Solving this last equation gives $a = -1$.

Thus $g(x) = -x^2 + 24$, from which it follows that

$g(-4) = -(-4)^2 + 24$; $g(-4) = -16 + 24$; and $g(-4) = 8$.

Choices B, C, and D are incorrect because g is a function and there can only be one value of $g(-4)$.

QUESTION 11

Choice D is correct. To determine the price per pound of beef when it was equal to the price per pound of chicken, determine the value of x (the number of weeks after July 1) when the two prices were equal. The prices were equal when $b = c$; that is, when $2.35 + 0.25x = 1.75 + 0.40x$. This last equation is equivalent to $0.60 = 0.15x$, and so $x = \frac{0.60}{0.15} = 4$. Then to determine b , the price per pound of beef, substitute 4 for x in $b = 2.35 + 0.25x$, which gives $b = 2.35 + 0.25(4) = 3.35$ dollars per pound.

Choice A is incorrect. It results from substituting the value 1, not 4, for x in $b = 2.35 + 0.25x$. Choice B is incorrect. It results from substituting the value 2, not 4, for x in $b = 2.35 + 0.25x$. Choice C is incorrect. It results from substituting the value 3, not 4, for x in $c = 1.75 + 0.40x$.

QUESTION 12

Choice D is correct. In the xy -plane, all lines that pass through the origin are of the form $y = mx$, where m is the slope of the line. Therefore, the equation of this line is $y = \frac{1}{7}x$, or $x = 7y$. A point with coordinates (a, b) will lie on the line if and only if $a = 7b$. Of the given choices, only choice D, $(14, 2)$, satisfies this condition: $14 = 7(2)$.

Choice A is incorrect because the line determined by the origin $(0, 0)$ and $(0, 7)$ is the vertical line with equation $x = 0$; that is, the y -axis.

The slope of the y -axis is undefined, not $\frac{1}{7}$. Therefore, the point $(0, 7)$ does not lie on the line that passes the origin and has slope $\frac{1}{7}$.

Choices B and C are incorrect because neither of the ordered pairs has a y -coordinate that is $\frac{1}{7}$ the value of the corresponding x -coordinate.

QUESTION 13

Choice B is correct. To rewrite $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$, multiply by $\frac{(x+2)(x+3)}{(x+2)(x+3)}$. This results in the expression $\frac{(x+2)(x+3)}{(x+2) + (x+3)}$, which is equivalent to the expression in choice B.

Choices A, C, and D are incorrect and could be the result of common algebraic errors that arise while manipulating a complex fraction.

QUESTION 14

Choice A is correct. One approach is to express $\frac{8^x}{2^y}$ so that the numerator and denominator are expressed with the same base. Since 2 and 8 are both powers of 2, substituting 2^3 for 8 in the numerator

of $\frac{8^x}{2^y}$ gives $\frac{(2^3)^x}{2^y}$, which can be rewritten as $\frac{2^{3x}}{2^y}$. Since the numerator and denominator of $\frac{2^{3x}}{2^y}$ have a common base, this expression can be rewritten as 2^{3x-y} . It is given that $3x - y = 12$, so one can substitute 12 for the exponent, $3x - y$, given that the expression $\frac{8^x}{2^y}$ is equal to 2^{12} .

Choice B is incorrect. The expression $\frac{8^x}{2^y}$ can be rewritten as $\frac{2^{3x}}{2^y}$, or 2^{3x-y} . If the value of 2^{3x-y} is 4^4 , which can be rewritten as 28, then $2^{3x-y} = 2^8$, which results in $3x - y = 8$, not 12. Choice C is incorrect. If the value of $\frac{8^x}{2^y}$ is 8^2 , then $2^{3x-y} = 8^2$, which results in $3x - y = 6$, not 12. Choice D is incorrect because the value of $\frac{8^x}{2^y}$ can be determined.

QUESTION 15

Choice D is correct. One can find the possible values of a and b in $(ax + 2)(bx + 7)$ by using the given equation $a + b = 8$ and finding another equation that relates the variables a and b . Since $(ax + 2)(bx + 7) = 15x^2 + cx + 14$, one can expand the left side of the equation to obtain $abx^2 + 7ax + 2bx + 14 = 15x^2 + cx + 14$. Since ab is the coefficient of x^2 on the left side of the equation and 15 is the coefficient of x^2 on the right side of the equation, it must be true that $ab = 15$. Since $a + b = 8$, it follows that $b = 8 - a$. Thus, $ab = 15$ can be rewritten as $a(8 - a) = 15$, which in turn can be rewritten as $a^2 - 8a + 15 = 0$. Factoring gives $(a - 3)(a - 5) = 0$. Thus, either $a = 3$ and $b = 5$, or $a = 5$ and $b = 3$. If $a = 3$ and $b = 5$, then $(ax + 2)(bx + 7) = (3x + 2)(5x + 7) = 15x^2 + 31x + 14$. Thus, one of the possible values of c is 31. If $a = 5$ and $b = 3$, then $(ax + 2)(bx + 7) = (5x + 2)(3x + 7) = 15x^2 + 41x + 14$. Thus, another possible value for c is 41. Therefore, the two possible values for c are 31 and 41.

Choice A is incorrect; the numbers 3 and 5 are possible values for a and b , but not possible values for c . Choice B is incorrect; if $a = 5$ and $b = 3$, then 6 and 35 are the coefficients of x when the expression $(5x + 2)(3x + 7)$ is expanded as $15x^2 + 35x + 6x + 14$. However, when the coefficients of x are 6 and 35, the value of c is 41 and not 6 and 35. Choice C is incorrect; if $a = 3$ and $b = 5$, then 10 and 21 are the coefficients of x when the expression $(3x + 2)(5x + 7)$ is expanded as $15x^2 + 21x + 10x + 14$. However, when the coefficients of x are 10 and 21, the value of c is 31 and not 10 and 21.

QUESTION 16

The correct answer is 2. To solve for t , factor the left side of $t^2 - 4 = 0$, giving $(t - 2)(t + 2) = 0$. Therefore, either $t - 2 = 0$ or $t + 2 = 0$. If $t - 2 = 0$, then $t = 2$, and if $t + 2 = 0$, then $t = -2$. Since it is given that $t > 0$, the value of t must be 2.

Another way to solve for t is to add 4 to both sides of $t^2 - 4 = 0$, giving $t^2 = 4$. Then, taking the square root of the left and the right side of the equation gives $t = \pm\sqrt{4} = \pm 2$. Since it is given that $t > 0$, the value of t must be 2.

QUESTION 17

The correct answer is 1600. It is given that $\angle AEB$ and $\angle CDB$ have the same measure. Since $\angle ABE$ and $\angle CBD$ are vertical angles, they have the same measure. Therefore, triangle EAB is similar to triangle DCB because the triangles have two pairs of congruent corresponding angles (angle-angle criterion for similarity of triangles). Since the triangles are similar, the corresponding sides are in the same proportion; thus $\frac{CD}{x} = \frac{BD}{EB}$. Substituting the given values of 800 for CD , 700 for BD , and 1400 for EB in $\frac{CD}{x} = \frac{BD}{EB}$ gives $\frac{800}{x} = \frac{700}{1400}$. Therefore, $x = \frac{800(1400)}{700} = 1600$.

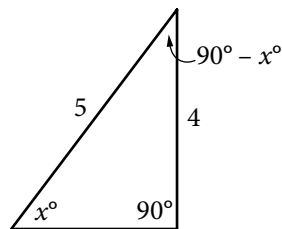
QUESTION 18

The correct answer is 7. Subtracting the left and right sides of $x + y = -9$ from the corresponding sides of $x + 2y = -25$ gives $(x + 2y) - (x + y) = -25 - (-9)$, which is equivalent to $y = -16$. Substituting -16 for y in $x + y = -9$ gives $x + (-16) = -9$, which is equivalent to $x = -9 - (-16) = 7$.

QUESTION 19

The correct answer is $\frac{4}{5}$ or 0.8. By the complementary angle relationship for sine and cosine, $\sin(x^\circ) = \cos(90^\circ - x^\circ)$. Therefore, $\cos(90^\circ - x^\circ) = \frac{4}{5}$. Either the fraction $\frac{4}{5}$ or its decimal equivalent, 0.8, may be gridded as the correct answer.

Alternatively, one can construct a right triangle that has an angle of measure x° such that $\sin(x^\circ) = \frac{4}{5}$, as shown in the figure below, where $\sin(x^\circ)$ is equal to the ratio of the length of the side opposite the angle measuring x° to the length of the hypotenuse, or $\frac{4}{5}$.



Since two of the angles of the triangle are of measure x° and 90° , the third angle must have the measure $180^\circ - 90^\circ - x^\circ = 90^\circ - x^\circ$. From the figure, $\cos(90^\circ - x^\circ)$, which is equal to the ratio of the length of the side adjacent to the angle measuring $90^\circ - x^\circ$ to the hypotenuse, is also $\frac{4}{5}$.

QUESTION 20

The correct answer is 100. Since $a = 5\sqrt{2}$, one can substitute $5\sqrt{2}$ for a in $2a = \sqrt{2x}$, giving $10\sqrt{2} = \sqrt{2x}$. Squaring each side of $10\sqrt{2} = \sqrt{2x}$ gives $(10\sqrt{2})^2 = (\sqrt{2x})^2$, which simplifies to $(10)^2(\sqrt{2})^2 = (\sqrt{2x})^2$, or $200 = 2x$. This gives $x = 100$. To verify, substitute 100 for x and $5\sqrt{2}$ for a in the equation $2a = \sqrt{2x}$, which yields $2(5\sqrt{2}) = \sqrt{2(100)}$; this is true since $2(5\sqrt{2}) = 10\sqrt{2}$ and $\sqrt{2(100)} = \sqrt{2}\sqrt{100} = 10\sqrt{2}$.

Section 4: Math Test – Calculator

QUESTION 1

Choice B is correct. On the graph, a line segment with a positive slope represents an interval over which the target heart rate is strictly increasing as time passes. A horizontal line segment represents an interval over which there is no change in the target heart rate as time passes, and a line segment with a negative slope represents an interval over which the target heart rate is strictly decreasing as time passes. Over the interval between 40 and 60 minutes, the graph consists of a line segment with a positive slope followed by a line segment with a negative slope, with no horizontal line segment in between, indicating that the target heart rate is strictly increasing then strictly decreasing.

Choice A is incorrect because the graph over the interval between 0 and 30 minutes contains a horizontal line segment, indicating a period in which there was no change in the target heart rate. Choice C is incorrect because the graph over the interval between 50 and 65 minutes consists of a line segment with a negative slope followed by a line segment with a positive slope, indicating that the target heart rate is strictly decreasing then strictly increasing. Choice D is incorrect because the graph over the interval between 70 and 90 minutes contains horizontal line segments and no segment with a negative slope.

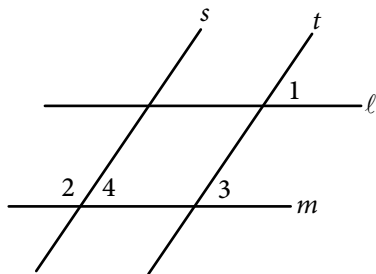
QUESTION 2

Choice C is correct. Substituting 6 for x and 24 for y in $y = kx$ gives $24 = (k)(6)$, which gives $k = 4$. Hence, $y = 4x$. Therefore, when $x = 5$, the value of y is $(4)(5) = 20$. None of the other choices for y is correct because y is a function of x , and so there is only one y -value for a given x -value.

Choices A, B, and D are incorrect. Choice A is the result of substituting 6 for y and substituting 5 for x in the equation $y = kx$, when solving for k . Choice B results from substituting 3 for k and 5 for x in the equation $y = kx$, when solving for y . Choice D results from using $y = k + x$ instead of $y = kx$.

QUESTION 3

Choice D is correct. Consider the measures of $\angle 3$ and $\angle 4$ in the figure below.



The measure of $\angle 3$ is equal to the measure of $\angle 1$ because they are corresponding angles for the parallel lines l and m intersected by the transversal line t . Similarly, the measure of $\angle 3$ is equal to the measure of $\angle 4$ because they are corresponding angles for the parallel lines s and t intersected by the transversal line m . Since the measure of $\angle 1$ is 35° , the measures of $\angle 3$ and $\angle 4$ are also 35° . Since $\angle 4$ and $\angle 2$ are supplementary angles, the sum of the measures of these two angles is 180° . Therefore, the measure of $\angle 2$ is $180^\circ - 35^\circ = 145^\circ$.

Choice A is incorrect because 35° is the measure of $\angle 1$, and $\angle 1$ is not congruent to $\angle 2$. Choice B is incorrect because it is the measure of the complementary angle of $\angle 1$, and $\angle 1$ and $\angle 2$ are not complementary angles. Choice C is incorrect because it is double the measure of $\angle 1$, which cannot be inferred from the information given.

QUESTION 4

Choice C is correct. The description “ $16 + 4x$ is 10 more than 14” can be written as the equation $16 + 4x = 10 + 14$, which is equivalent to $16 + 4x = 24$. Subtracting 16 from each side of $16 + 4x = 24$ gives $4x = 8$. Since $8x$ is 2 times $4x$, multiplying both sides of $4x = 8$ by 2 gives $8x = 16$. Therefore, the value of $8x$ is 16.

Choice A is incorrect because it is the value of x , not $8x$. Choices B and D are incorrect and may be the result of errors made when solving the equation $16 + 4x = 10 + 14$ for x . For example, choice D could be the result of subtracting 16 from the left side of the equation and adding 16 to the right side of the equation $16 + 4x = 10 + 14$, giving $4x = 40$ and $8x = 80$.

QUESTION 5

Choice D is correct. A graph with a strong negative association between d and t would have the points on the graph closely aligned with a line that has a negative slope. The more closely the points on a graph are aligned with a line, the stronger the association between d and t , and a negative slope indicates a negative association. Of the four graphs, the points on graph D are most closely aligned with a line with a negative slope. Therefore, the graph in choice D has the strongest negative association between d and t .

Choice A is incorrect because the points are more scattered than the points in choice D, indicating a weaker negative association between d and t . Choice B is incorrect because the points are aligned to either a curve or possibly a line with a small positive slope. Choice C is incorrect because the points are aligned to a line with a positive slope, indicating a positive association between d and t .

QUESTION 6

Choice D is correct. Since there are 10 grams in 1 decagram, there are $2 \times 10 = 20$ grams in 2 decagrams. Since there are 1,000 milligrams in 1 gram, there are $20 \times 1,000 = 20,000$ milligrams in 20 grams. Therefore, 20,000 1-milligram doses of the medicine can be stored in a 2-decagram container.

Choice A is incorrect; 0.002 is the number of grams in 2 milligrams. Choice B is incorrect; it could result from multiplying by 1,000 and dividing by 10 instead of multiplying by both 1,000 and 10 when converting from decagrams to milligrams. Choice C is incorrect; 2,000 is the number of milligrams in 2 grams, not the number of milligrams in 2 decagrams.

QUESTION 7

Choice C is correct. Let x represent the number of installations that each unit on the y -axis represents. Then $9x$, $5x$, $6x$, $4x$, and $3.5x$ are the number of rooftops with solar panel installations in cities A, B, C, D, and E, respectively. Since the total number of rooftops is 27,500, it follows that $9x + 5x + 6x + 4x + 3.5x = 27,500$, which simplifies to $27.5x = 27,500$. Thus, $x = 1,000$. Therefore, an appropriate label for the y -axis is "Number of installations (in thousands)."

Choices A, B, and D are incorrect and may result from errors when setting up and calculating the units for the y -axis.

QUESTION 8

Choice D is correct. If the value of $|n - 1| + 1$ is equal to 0, then $|n - 1| + 1 = 0$. Subtracting 1 from both sides of this equation gives $|n - 1| = -1$. The expression $|n - 1|$ on the left side of the equation is the absolute value of $n - 1$, and the absolute value of a quantity can never be negative. Thus $|n - 1| = -1$ has no solution. Therefore, there are no values for n for which the value of $|n - 1| + 1$ is equal to 0.

Choice A is incorrect because $|0 - 1| + 1 = 1 + 1 = 2$, not 0. Choice B is incorrect because $|1 - 1| + 1 = 0 + 1 = 1$, not 0. Choice C is incorrect because $|2 - 1| + 1 = 1 + 1 = 2$, not 0.

QUESTION 9

Choice A is correct. Subtracting 1,052 from both sides of the equation $a = 1,052 + 1.08t$ gives $a - 1,052 = 1.08t$. Then dividing both sides of $a - 1,052 = 1.08t$ by 1.08 gives $t = \frac{a - 1,052}{1.08}$.

Choices B, C, and D are incorrect and could arise from errors in rewriting $a = 1,052 + 1.08t$. For example, choice B could result if 1,052 is added to the left side of $a = 1,052 + 1.08t$ and subtracted from the right side, and then both sides are divided by 1.08.

QUESTION 10

Choice B is correct. The air temperature at which the speed of a sound wave is closest to 1,000 feet per second can be found by substituting 1,000 for a and then solving for t in the given formula. Substituting 1,000 for a in the equation $a = 1,052 + 1.08t$ gives $1,000 = 1,052 + 1.08t$. Subtracting 1,052 from both sides of the equation $1,000 = 1,052 + 1.08t$ and then dividing both sides of the equation by 1.08 yields

$$t = \frac{-52}{1.08} \approx -48.15. \text{ Of the choices given, } -48^\circ\text{F is closest to } -48.15^\circ\text{F.}$$

Choices A, C, and D are incorrect and might arise from errors made when substituting 1,000 for a or solving for t in the equation $a = 1,052 + 1.08t$ or in rounding the result to the nearest integer. For example, choice C could be the result of rounding -48.15 to -49 instead of -48 .

QUESTION 11

Choice A is correct. Subtracting $3x$ and adding 3 to both sides of $3x - 5 \geq 4x - 3$ gives $-2 \geq x$. Therefore, x is a solution to $3x - 5 \geq 4x - 3$ if and only if x is less than or equal to -2 and x is NOT a solution to $3x - 5 \geq 4x - 3$ if and only if x is greater than -2 . Of the choices given, only -1 is greater than -2 and, therefore, cannot be a value of x .

Choices B, C, and D are incorrect because each is a value of x that is less than or equal to -2 and, therefore, could be a solution to the inequality.

QUESTION 12

Choice C is correct. The average number of seeds per apple is the total number of seeds in the 12 apples divided by the number of apples, which is 12. On the graph, the horizontal axis is the number of seeds per apple and the height of each bar is the number of apples with the corresponding number of seeds. The first bar on the left indicates that 2 apples have 3 seeds each, the second bar indicates that 4 apples have 5 seeds each, the third bar indicates that 1 apple has 6 seeds, the fourth bar indicates that 2 apples have 7 seeds each, and the fifth bar indicates that 3 apples have 9 seeds each. Thus, the total number of seeds for the 12 apples is

$$2 \times 3 + (4 \times 5) + (1 \times 6) + (2 \times 7) + (3 \times 9) = 73, \text{ and the average number of seeds per apple is } \frac{73}{12} = 6.08. \text{ Of the choices given, } 6 \text{ is closest to } 6.08.$$

Choice A is incorrect; it is the number of apples represented by the tallest bar but is not the average number of seeds for the 12 apples. Choice B is incorrect; it is the number of seeds per apple corresponding to the tallest bar, but is not the average number of seeds for the 12 apples. Choice D is incorrect; a student might choose this value by correctly calculating the average number of seeds, 6.08, but incorrectly rounding up to 7.

QUESTION 13

Choice C is correct. From the table, there was a total of 310 survey respondents, and 19% of all survey respondents is equivalent to $\frac{19}{100} \times 310 = 58.9$ respondents. Of the choices given, 59, the number of males taking Geometry, is closest to 58.9 respondents.

Choices A, B, and D are incorrect because the number of males taking Geometry is closer to 58.9 (which is 19% of 310) than the number of respondents in each of these categories.

QUESTION 14

Choice C is correct. The range of the lengths of the 21 fish represented in the table is $24 - 8 = 16$ inches, and the range of the remaining 20 lengths after the 24-inch measurement is removed is $16 - 8 = 8$ inches. Therefore, after the 24-inch measurement is removed, the change in range, 8 inches, is much greater than the change in the mean or median.

Choice A is incorrect. Let m be the mean of the lengths, in inches, of the 21 fish. Then the sum of the lengths, in inches, of the 21 fish is $21m$. After the 24-inch measurement is removed, the sum of the lengths, in inches, of the remaining 20 fish is $21m - 24$, and the mean length, in inches, of these 20 fish is $\frac{21m - 24}{20}$, which is a change of $\frac{24 - m}{20}$ inches. Since m must be between the smallest and largest measurements of the 21 fish, it follows that $8 < m < 24$, from which it can be seen that the change in the mean, in inches, is between $\frac{24 - 24}{20} = 0$ and $\frac{24 - 8}{20} = \frac{4}{5}$, and so must be less than the change in the range, 8 inches. Choice B is incorrect because the median length of the 21 fish represented in the table is 12, and after the 24-inch measurement is removed, the median of the remaining 20 lengths is also 12. Therefore, the change in the median (0) is less than the change in the range (8). Choice D is incorrect because the changes in the mean, median, and range of the measurements are different.

QUESTION 15

Choice A is correct. The total cost C of renting a boat is the sum of the initial cost to rent the boat plus the product of the cost per hour and the number of hours, h , that the boat is rented. The C -intercept is the point on the C -axis where h , the number of hours the boat is rented, is 0. Therefore, the C -intercept is the initial cost of renting the boat.

Choice B is incorrect because the graph represents the cost of renting only one boat. Choice C is incorrect because the total number of hours of rental is represented by h -values, each of which corresponds to the first coordinate of a point on the graph not the C -intercept of the graph. Choice D is incorrect because the increase in cost for each additional hour is given by the slope of the line, not by the C -intercept.

QUESTION 16

Choice C is correct. If m is the slope and b is the C -intercept of the line, the relationship between h and C can be represented by $C = mh + b$. The C -intercept of the line is 5. Since the points $(0, 5)$ and $(1, 8)$ lie on the line, the slope of the line is $\frac{8-5}{1-0} = \frac{3}{1} = 3$. Therefore, the relationship between h and C can be represented by $C = 3h + 5$, the slope-intercept equation of the line.

Choices A and D are incorrect because each of these equations represents a line that passes through the origin $(0, 0)$. However, C is not equal to zero when $h = 0$. Choice B is incorrect and may result from errors made when reading the scale on each axis as related to calculating the slope.

QUESTION 17

Choice B is correct. The minimum value of the function corresponds to the y -coordinate of the point on the graph that has the smallest y -coordinate on the graph. Since the smallest y -coordinate belongs to the point with coordinates $(-3, -2)$, the minimum value of the graph is $f(-3) = -2$. Therefore, the minimum value of $f(x)$ is at $x = -3$.

Choice A is incorrect; -5 is the least value for an x -coordinate, not the y -coordinate, of a point on the graph of $y = f(x)$. Choice C is incorrect; it is the minimum value of f , not the value of x that corresponds to the minimum of f . Choice D is incorrect; it is the value of x for which the value of $f(x)$ has its maximum, not minimum.

QUESTION 18

Choice A is correct. Since $(0, 0)$ is a solution to the system of inequalities, substituting 0 for x and 0 for y in the given system must result in two true inequalities. After this substitution, $y < -x + a$ becomes $0 < a$, and $y > x + b$ becomes $0 > b$. Hence, a is positive and b is negative. Therefore, $a > b$.

Choice B is incorrect because $b > a$ cannot be true if b is negative and a is positive. Choice C is incorrect because it is possible to find an example where $(0, 0)$ is a solution to the system, but $|a| < |b|$; for example, if $a = 6$ and $b = -7$. Choice D is incorrect because the equation $a = -b$ doesn't have to be true; for example, $(0, 0)$ is a solution to the system of inequalities if $a = 1$ and $b = -2$.

QUESTION 19

Choice B is correct. To determine the number of salads sold, write and solve a system of two equations. Let x equal the number of salads sold and let y equal the number of drinks sold. Since a total of 209 salads and drinks were sold, the equation $x + y = 209$ must hold. Since salads cost \$6.50 each, drinks cost \$2.00 each, and the total revenue from selling x salads and y drinks was \$836.50,

the equation $6.50x + 2.00y = 836.50$ must also hold. The equation $x + y = 209$ is equivalent to $2x + 2y = 418$, and subtracting $(2x + 2y)$ from the left-hand side and subtracting 418 from the right-hand side of $6.50x + 2.00y = 836.50$ gives $4.5x = 418.50$. Therefore, the number of salads sold, x , was $x = \frac{418.50}{4.50} = 93$.

Choices A, C, and D are incorrect and could result from errors in writing the equations and solving the system of equations. For example, choice C could have been obtained by dividing the total revenue, \$836.50, by the total price of a salad and a drink, \$8.50, and then rounding up.

QUESTION 20

Choice D is correct. Let x be the original price of the computer, in dollars. The discounted price is 20 percent off the original price, so $x - 0.2x = 0.8x$ is the discounted price, in dollars. The sales tax is 8 percent of the discounted price, so $0.08(0.8x)$ represents the sales tax Alma paid. The price p , in dollars, that Alma paid the cashiers is the sum of the discounted price and the tax: $p = 0.8x + (0.08)(0.8x)$ which can be rewritten as $p = 1.08(0.8x)$. Therefore, the original price, x , of the computer, in dollars, can be written as $\frac{p}{0.8(1.08)}$ in terms of p .

Choices A, B, and C are incorrect. The expression in choice A represents 88% of the amount Alma paid to the cashier, and can be obtained by subtracting the discount of 20% from the original price and adding the sales tax of 8%. However, this is incorrect because 8% of the tax is over the discounted price, not the original one. The expression in choice B is the result of adding the factors associated with the discount and sales tax, 0.8 and .08, rather than multiplying them. The expression in choice C results from assigning p to represent the original price of the laptop, rather than to the amount Alma paid to the cashier.

QUESTION 21

Choice C is correct. The probability that a person from Group Y who recalled at least 1 dream was chosen at random from the group of all people who recalled at least 1 dream is equal to the number of people in Group Y who recalled at least 1 dream divided by the total number of people in the two groups who recalled at least 1 dream. The number of people in Group Y who recalled at least 1 dream is the sum of the 11 people in Group Y who recalled 1 to 4 dreams and the 68 people in Group Y who recalled 5 or more dreams: $11 + 68 = 79$. The total number of people who recalled at least 1 dream is the sum of the 79 people in Group Y who recalled at least 1 dream, the 28 people in Group X who recalled 1 to 4 dreams, and the 57 people in Group X who recalled 5 or more dreams: $79 + 28 + 57 = 164$. Therefore, the probability is $\frac{79}{164}$.

Choice A is incorrect; it is the probability of choosing at random a person from Group Y who recalled 5 or more dreams. Choice B is incorrect; it is the probability of choosing at random a person from Group Y who recalled at least 1 dream. Choice D is incorrect; it is

the probability of choosing at random a person from the two groups combined who recalled at least 1 dream.

QUESTION 22

Choice B is correct. The amounts given in the table are in thousands of dollars. Therefore, the amount in the annual budget for agriculture/natural resources is actually \$488,106,000 in 2010 and \$358,708,000 in 2008. Therefore, the change in the budgeted amount is $\$488,106,000 - \$358,708,000 = \$129,398,000$. Hence, the average change in the annual budget for agriculture/natural resources from 2008 to 2010 is $\frac{\$129,398,000}{2} = \$64,699,000$ per year. Of the options given, this average rate of change is closest to \$65,000,000 per year.

Choices A and C are incorrect and may result from errors in setting up or calculating the average rate of change. Choice D is incorrect; \$130,000,000 is the approximate total change in the annual budget for agriculture/natural resources from 2008 to 2010, not the average rate of change from 2008 to 2010.

QUESTION 23

Choice B is correct. The human resources budget in 2007 was 4,051,050 thousand dollars, and the human resources budget in 2010 was 5,921,379 thousand dollars. Therefore, the ratio of the 2007 budget to the 2010 budget is slightly greater than $\frac{4}{6} = \frac{2}{3}$. Similar estimates for agriculture/natural resources give a ratio of the 2007 budget to the 2010 budget of slightly greater than $\frac{3}{4}$; for education, a ratio of slightly greater than $\frac{2}{3}$; for highways and transportation, a ratio of slightly less than $\frac{5}{6}$; and for public safety, a ratio of slightly greater than $\frac{5}{9}$.

Therefore, of the given choices, education's ratio of the 2007 budget to the 2010 budget is closest to that of human resources.

Choices A, C, and D are incorrect because the ratio of the 2007 budget to 2010 budget for each of the programs given in these choices is further from the corresponding ratio for human resources than the corresponding ratio for education.

QUESTION 24

Choice A is correct. The equation of a circle can be written as $(x - h)^2 + (y - k)^2 = r^2$ where (h, k) are the coordinates of the center of the circle and r is the radius of the circle. Since the coordinates of the center of the circle are $(0, 4)$, the equation of the circle is $x^2 + (y - 4)^2 = r^2$. The radius of the circle is the distance from the center, $(0, 4)$, to the given endpoint of a radius, $(\frac{4}{3}, 5)$. By the distance formula, $r^2 = (\frac{4}{3} - 0)^2 + (5 - 4)^2 = \frac{25}{9}$. Therefore, an equation of the given circle is $x^2 + (y - 4)^2 = \frac{25}{9}$.

Choices B and D are incorrect. The equations given in these choices represent a circle with center $(0, -4)$, not $(0, 4)$. Choice C is incorrect; it results from using r instead of r^2 in the equation for the circle.

QUESTION 25

Choice D is correct. When the ball hits the ground, its height is 0 meters. Substituting 0 for h in $h = -4.9t^2 + 25t$ gives $0 = -4.9t^2 + 25t$, which can be rewritten as $0 = t(-4.9t + 25)$. Thus, the possible values of t are $t = 0$ and $t = \frac{25}{4.9} \approx 5.1$. The time $t = 0$ seconds corresponds to the time the ball is launched from the ground, and the time $t \approx 5.1$ seconds corresponds to the time after launch that the ball hits the ground. Of the given choices, 5.0 seconds is closest to 5.1 seconds, so the ball returns to the ground approximately 5.0 seconds after it is launched.

Choice A, B, and C are incorrect and could arise from conceptual or computation errors while solving $0 = -4.9t^2 + 25t$ for t .

QUESTION 26

Choice B is correct. Let x represent the number of pears produced by the Type B trees. Type A trees produce 20 percent more pears than Type B trees, or x , which can be represented as $x + 0.20x = 1.20x$ pears. Since Type A trees produce 144 pears, it follows that $1.20x = 144$. Thus $x = \frac{144}{1.20} = 120$. Therefore, the Type B trees produced 120 pears.

Choice A is incorrect because while 144 is reduced by approximately 20 percent, increasing 115 by 20 percent gives 138, not 144. Choice C is incorrect; it results from subtracting 20 from the number of pears produced by the Type A trees. Choice D is incorrect; it results from adding 20 percent of the number of pears produced by Type A trees to the number of pears produced by Type A trees.

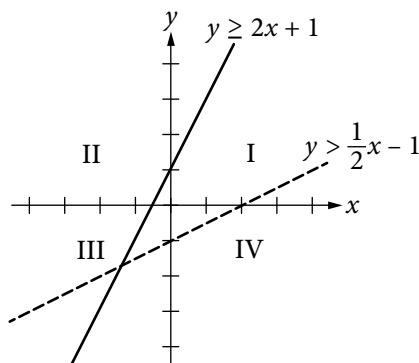
QUESTION 27

Choice C is correct. The area of the field is 100 square meters. Each 1-meter-by-1-meter square has an area of 1 square meter. Thus, on average, the earthworm counts to a depth of 5 centimeters for each of the regions investigated by the students should be about $\frac{1}{100}$ of the total number of earthworms to a depth of 5 centimeters in the entire field. Since the counts for the smaller regions are from 107 to 176, the estimate for the entire field should be between 10,700 and 17,600. Therefore, of the given choices, 15,000 is a reasonable estimate for the number of earthworms to a depth of 5 centimeters in the entire field.

Choice A is incorrect; 150 is the approximate number of earthworms in 1 square meter. Choice B is incorrect; it results from using 10 square meters as the area of the field. Choice D is incorrect; it results from using 1,000 square meters as the area of the field.

QUESTION 28

Choice C is correct. To determine which quadrant does not contain any solutions to the system of inequalities, graph the inequalities. Graph the inequality $y \geq 2x + 1$ by drawing a line through the y -intercept $(0, 1)$ and the point $(1, 3)$, as shown. The solutions to this inequality are all points contained on and above this line. Graph the inequality $y > \frac{1}{2}x - 1$ by drawing a dashed line through the y -intercept $(0, -1)$ and the point $(2, 0)$, as shown. The solutions to this inequality are all points above this dashed line.



The solution to the system of inequalities is the intersection of the regions above the graphs of both lines. It can be seen that the solutions only include points in quadrants I, II, and III and do not include any points in quadrant IV.

Choices A and B are incorrect because quadrants II and III contain solutions to the system of inequalities, as shown in the figure above. Choice D is incorrect because there are no solutions in quadrant IV.

QUESTION 29

Choice D is correct. If the polynomial $p(x)$ is divided by $x - 3$, the result can be written as $\frac{p(x)}{x-3} = q(x) + \frac{r}{x-3}$, where $q(x)$ is a polynomial and r is the remainder. Since $x - 3$ is a degree 1 polynomial, the remainder is a real number. Hence, $p(x)$ can be written as $p(x) = (x - 3)q(x) + r$, where r is a real number. It is given that $p(3) = -2$ so it must be true that $-2 = p(3) = (3 - 3)q(3) + r = (0)q(3) + r = r$. Therefore, the remainder when $p(x)$ is divided by $x - 3$ is -2 .

Choice A is incorrect because $p(3) = -2$ does not imply that $p(5) = 0$. Choices B and C are incorrect because the remainder -2 or its opposite, 2 , need not be a root of $p(x)$.

QUESTION 30

Choice D is correct. Any quadratic function q can be written in the form $q(x) = a(x - h)^2 + k$, where a , h , and k are constants and (h, k) is the vertex of the parabola when q is graphed in the coordinate plane. This form can be reached by completing the square in the expression that defines q . The equation of the graph is $y = x^2 - 2x - 15$.

Since the coefficient of x is -2 , this equation can be written in terms of $(x - 1)^2 = x^2 - 2x + 1$ as follows: $y = x^2 - 2x - 15 = (x^2 - 2x + 1) - 16 = (x - 1)^2 - 16$. From this form of the equation, the coefficients of the vertex can be read as $(1, -16)$.

Choices A and C are incorrect because the coordinates of the vertex A do not appear as constants in these equations. Choice B is incorrect because it is not equivalent to the given equation.

QUESTION 31

The correct answer is any number between 4 and 6, inclusive. Since Wyatt can husk at least 12 dozen ears of corn per hour, it will take him no more than $\frac{72}{12} = 6$ hours to husk 72 dozen ears of corn. On the other hand, since Wyatt can husk at most 18 dozen ears of corn per hour, it will take him at least $\frac{72}{18} = 4$ hours to husk 72 dozen ears of corn.

Therefore, the possible times it could take Wyatt to husk 72 dozen ears of corn are 4 hours to 6 hours, inclusive. Any number between 4 and 6, inclusive, can be gridded as the correct answer.

QUESTION 32

The correct answer is 107. Since the weight of the empty truck and its driver is 4500 pounds and each box weighs 14 pounds, the weight, in pounds, of the delivery truck, its driver, and x boxes is $4500 + 14x$. This weight is below the bridge's posted weight limit of 6000 pounds if $4500 + 14x < 6000$. Subtracting 4500 from both sides of this inequality and then dividing both sides by 14 yields $x < \frac{1500}{14}$ or $x < 107\frac{1}{7}$. Since the number of packages must be an integer, the maximum possible value for x that will keep the combined weight of the truck, its driver, and the x identical boxes below the bridge's posted weight limit is 107.

QUESTION 33

The correct answer is $\frac{5}{8}$ or .625. Based on the line graph, the number of portable media players sold in 2008 was 100 million, and the number of portable media players sold in 2011 was 160 million. Therefore, the number of portable media players sold in 2008 is $\frac{100 \text{ million}}{160 \text{ million}}$ of the portable media players sold in 2011. This fraction reduces to $\frac{5}{8}$. Either $\frac{5}{8}$ or its decimal equivalent, .625, may be gridded as the correct answer.

QUESTION 34

The correct answer is 96. Since each day has a total of 24 hours of time slots available for the station to sell, there is a total of 48 hours of time slots available to sell on Tuesday and Wednesday. Each time slot is a 30-minute interval, which is equal to a $\frac{1}{2}$ -hour interval. Therefore,

there are $\frac{48 \text{ hours}}{\frac{1}{2} \text{ hours/time slot}} = 96$ time slots of 30 minutes for the station

to sell on Tuesday and Wednesday.

QUESTION 35

The correct answer is 6. The volume of a cylinder is $\pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. Since the storage silo is a cylinder with volume 72π cubic yards and height 8 yards, it follows that $72\pi = \pi r^2(8)$, where r is the radius of the base of the cylinder, in yards. Dividing both sides of the equation $72\pi = \pi r^2(8)$ by 8π gives $r^2 = 9$, and so the radius of the base of the cylinder is 3 yards. Therefore, the diameter of the base of the cylinder is 6 yards.

QUESTION 36

The correct answer is 3. The function $h(x)$ is undefined when the denominator of $\frac{1}{(x-5)^2 + 4(x-5) + 4}$ is equal to zero. The expression $(x-5)^2 + 4(x-5) + 4$ is a perfect square: $(x-5)^2 + 4(x-5) + 4 = ((x-5) + 2)^2$, which can be rewritten as $(x-3)^2$. The expression $(x-3)^2$ is equal to zero if and only if $x = 3$. Therefore, the value of x for which $h(x)$ is undefined is 3.

QUESTION 37

The correct answer is 1.02. The initial deposit earns 2 percent interest compounded annually. Thus at the end of 1 year, the new value of the account is the initial deposit of \$100 plus 2 percent of the initial deposit: $\$100 + \frac{2}{100}(\$100) = \$100(1.02)$. Since the interest is compounded annually, the value at the end of each succeeding year is the sum of the previous year's value plus 2 percent of the previous year's value. This is again equivalent to multiplying the previous year's value by 1.02. Thus, after 2 years, the value will be $\$100(1.02)(1.02) = \$100(1.02)^2$; after 3 years, the value will be $\$100(1.02)^3$; and after t years, the value will be $\$100(1.02)^t$. Therefore, in the formula for the value for Jessica's account after t years, $\$100(x)^t$, the value of x must be 1.02.

QUESTION 38

The correct answer is 6.11. Jessica made an initial deposit of \$100 into her account. The interest on her account is 2 percent compounded annually, so after 10 years, the value of her initial deposit has been multiplied 10 times by the factor $1 + 0.02 = 1.02$. Hence, after 10 years, Jessica's deposit is worth $\$100(1.02)^{10} = \121.899 to the nearest tenth of a cent. Tyshaun made an initial deposit of \$100 into his account. The interest on his account is 2.5 percent compounded annually, so after 10 years, the value of his initial deposit has been multiplied 10 times by the factor $1 + 0.025 = 1.025$. Hence, after 10 years, Tyshaun's deposit is worth $\$100(1.025)^{10} = \128.008 to the nearest tenth of a cent. Hence, Jessica's initial deposit earned \$21.899 and Tyshaun's initial deposit earned \$28.008. Therefore, to the nearest cent, Tyshaun's initial deposit earned \$6.11 more than Jessica's initial deposit.