SECTION 1

Time — 25 minutes
24 Questions
(1-24)

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, best fits the meaning of the sentence as a whole.

Example:

Hoping to ------- the dispute, negotiators proposed a compromise that they felt would be ------- to both labor and management.

(A) enforce . . useful
(B) end . . divisive
(C) overcome . . unattractive
(D) extend . . satisfactory
(E) resolve . . acceptable

(A) (B) (C) (D) ●

1. Election to Hawaii's House of Representatives in 1956 was the first milestone in Patsy Takemoto Mink's career as a -------.

(A) philosopher (B) commentator (C) financier
(D) legislator (E) negotiator

[annotation: lawmaker]

2. The essay was notably ------: every paragraph was a mere restatement of a commonplace.

[annotation: Colon signals an idea and an example thereof — ordinary]

(A) murky (B) comprehensive (C) unoriginal
(D) jumbled (E) groundbreaking

3. When Susan, the manager of the clothing store where Nathan shopped, ------- his complaints, he became so ------- that he resolved to take his business to a competing retailer.

[annotation: "that" signals cause and effect]

(A) exaggerated . . exhilarated
(B) disregarded . . gratified
(C) heeded . . despondent
(D) ridiculed . . unscrupulous
(E) trivialized . . exasperated

[annotation: treat as unimportant]

4. There has been a recent ------- of interest in the art of painter Yayoi Kusama: once at the ------- of critical consciousness, her work is now very near the center.

[annotation: colon signals idea and an example thereof; "recent," "now" ←→ "once" are opposites; "periphery" ←→ "center" are opposites]

(A) restoration . . hub
(B) subsidence . . boundary
(C) resurgence . . periphery
(D) renewal . . core
(E) deterioration . . edge

5. When we act unselfishly toward others, our ------- is rewarded by the release of pleasure-inducing chemicals in the brain.

[annotation: generosity]

(A) duplicity (B) altruism (C) discernment
(D) effusiveness (E) subservience

6. Although scientists occasionally receive reports of snowflakes the size of dinner plates falling from the sky, the accounts are always ------- because of the ------- nature of snowflakes.

[annotation: "because" signals effect of a cause; unsupported; disappearing]

(A) circumstantial . . complicated
(B) definitive . . unreliable
(C) uncorroborated . . ephemeral
(D) substantive . . intrinsic
(E) anecdotal . . precipitous

7. Jules Verne's 1897 novel An Antarctic Mystery was ------: it foresaw the disastrous long-term consequences of the massive hunting of whales.

[annotation: colon signals idea and an example thereof]

(A) spurious (B) vitriolic (C) reminiscent
(D) prescient (E) presumptuous

[annotation: knowing beforehand]

8. Although the authoritarian regime accorded significant rights to the ------- of the opposition parties, their rank-and-file members still had only minimal ------- to engage in political activity.

(A) commoners . . opportunity
(B) dissidents . . cause
(C) adversaries . . inclination
(D) elites . . latitude
(E) stalwarts . . compensation

[annotation: freedom; "Although" signals opposite ideas — "elites" ←→ "rank-and-file" are opposites]

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The passages below are followed by questions based on their content; questions following a pair of related passages may also be based on the relationship between the paired passages. Answer the questions on the basis of what is stated or implied in the passages and in any introductory material that may be provided.

Questions 9-10 are based on the following passage.

I came back from Africa with ideas for a new piece of art, more primitive than any I had ever done before. "Primitive" is a word I use in a positive way to explain the completeness of a concept in art. I like to layer and pattern and embellish my art in the manner of tribal art, and then, like a blues singer, I like to repeat and repeat it again. Fragmented, understated, or minimalist art forms frustrate me. I want to finish them. In the 1960s there was a minimalist aesthetic advocating "Less is more." To me, less is even less and more is still not quite enough.

ine 5 ... *10*

9. The primary purpose of the passage is to

   (A) describe a creative philosophy *especially lines 9-10*
   (B) explain the origins of a concept
   (C) spark an artistic impulse
   (D) provide a historical overview
   (E) offer a technical lesson

10. The mention of the "blues singer" (line 6) serves primarily to

   (A) suggest a possible audience for a type of artwork
   (B) indicate the widespread popularity of a certain kind of vocalist
   (C) identify a possible artistic collaboration
   (D) draw a parallel between a style of art and a style of music *"like a blues singer"*
   (E) express admiration for a particular musical form

Questions 11-12 are based on the following passage.

Rain had fallen all week, especially at night, and even though the weather forecasters had noted repeatedly that these rains were beneficial, Benny Meyuhas was beside himself. It seemed to him that the head of the studio's Production Department himself had ordered this rain, to prevent Benny from night filming *Iddo and Eynam*, or to force Benny, as the department head put it, "to finish up already with that thing that's eaten up our entire budget for Israeli drama." Just when Benny had lost all hope of completing these last scenes, which he had been filming secretly, the rain suddenly let up, and the Moon appeared.

Line 5 ... *10*

11. The passage indicates that Benny "was beside himself" (lines 3-4) because

   (A) his film might be the only Israeli drama produced that year
   (B) the rain might stop soon, ruining the moody atmosphere of his night scenes
   (C) the production executive might replace him with another director
   (D) he was afraid that he would not be able to finish the film in the way he wished
   (E) he was worried that he might not get paid for his work

(B) lines 4-10

12. The passage focuses primarily on

   (A) examining the complex psychology of an artist
   (B) depicting a filmmaker who is under pressure to complete a project
   (C) lampooning a studio executive who is being manipulated
   (D) condemning the way film studios exert control over directors
   (E) illustrating how destiny favors creative geniuses

(B) lines 7-9

Questions 13-24 are based on the following passages.

These passages discuss hydrogen fuel cells, which use electrodes to unite hydrogen and oxygen to produce electricity, heat, and water. Both passages are adapted from works published in 2003.

Passage 1

Four decades ago, the United States faced a creeping menace to national security. The Soviet Union had lobbed the first satellite into space in 1957. Then, on
5 April 12, 1961, Russian cosmonaut Yuri Gagarin blasted off in Vostok 1 and became the first human in orbit. President Kennedy understood that dominating space could mean the difference between a country able to defend itself and one at the mercy of its rivals. In a May 1961 address to Congress, President Kennedy
10 unveiled Apollo—a 10-year program of federal subsidies aimed at "landing a man on the Moon and returning him safely to the Earth." Congress appropriated the funds, scientists and engineers put their noses to the launchpad, and Neil Armstrong stepped onto the Moon eight years
15 later.

The country now faces a similar situation: reliance on foreign oil. Just as we responded to Soviet space superiority with a bold commitment, so now the United States must respond to the clout of foreign oil by making energy independence a national priority. *[important point]* Conventional wisdom
20 indicates two ways for the United States to reduce dependence on foreign oil: increase domestic production or decrease demand. Either way, though, the country would remain hostage to overseas producers. Consider plans to drill in the Arctic National Wildlife Refuge.
25 For all the political wrangling and backlash, that area's productivity isn't likely to offset declining output from larger United States oil fields, let alone increase the total supply from domestic sources. As for reducing demand,
30 the levers available are small and ineffectual. Moreover, the dynamism at the heart of the United States economy depends on energy.

There's only one way to insulate the United States from the corrosive power of oil—develop an alternative energy
35 resource that's readily available domestically. Of hydrogen, coal, natural gas, wind, water, solar, and nuclear, hydrogen is the only energy resource that can provide a wholesale substitute for foreign oil within a decade. *[important point]* Hydrogen stores energy more effectively than current batteries do, burns
40 twice as efficiently in a fuel cell as gasoline does in an internal-combustion engine (more than making up for the energy required to produce it), and leaves only water behind. It's plentiful, clean, and—critically—capable of powering cars. Like manned space flight in 1961,

45 hydrogen power is proven but primitive, a technology ripe for acceleration and then deployment. For that, thank the Apollo program itself, which spurred the development of early fuel cells.

Passage 2

Outside of science fiction, the hydrogen-fueled car is
50 probably the most radical reinvention of the automobile ever imagined. The fuel supply is inexhaustible, and the car produces no emissions except water, which, upon emerging from the tailpipe, is, in principle at least, clean enough to drink. The car can even serve as a source of electricity
55 when parked: a hydrogen-car owner can use it to light his or her home. Sometime in the past year or so, the hydrogen-fueled car moved out of the laboratory and, if not quite onto the road, into the bright showroom of public relations.

60 For a number of reasons—primary among them the inefficiency of the internal-combustion engine— automobiles represent a particularly promising fuel-cell application. Fuel cells produce electrical, rather than mechanical, energy—in this way, fuel-cell cars are similar
65 to battery-powered vehicles—and, using the same amount of energy, can propel a car nearly three times as far as an internal-combustion engine can. Yet cars represent a peculiar challenge: they require a great deal of power, are expected to travel long distances between refuelings,
70 and are called on to last for ten years or more. Among the many obstacles to commercial production of automotive fuel cells are cost, durability, and fuel storage. There are also concerns about safety, although fuel-cell advocates maintain that the dangers of hydrogen have been greatly
75 exaggerated. In a recent paper, physicist Amory Lovins argues that hydrogen is "at least as safe as natural gas or LPG (liquefied petroleum gas) and arguably is inherently safer than gasoline."

Although it is the most plentiful element in the universe,
80 hydrogen on Earth exists almost exclusively in combination with other substances; therefore, it must be extracted, a process that can itself require a considerable amount of energy. Hydrogen can be produced using renewable energy sources, like wind, but it can just as easily—in fact,
85 perhaps more easily—be extracted by less environmentally benign means. A prototype for a fuel-cell truck, since abandoned, extracted hydrogen from gasoline through a process known as "reforming." This approach obviates the need for a whole new hydrogen-delivery infrastructure, but
90 since it produces substantial amounts of carbon dioxide, it also obviates much of the reason for switching to fuel cells. Similarly, hydrogen can be produced from coal; once all the emissions of that process are taken into account, it's debatable whether fuel-cell cars yield any environmental
95 benefit at all.

[lines 67-95 All of the negatives!]

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13. Which best describes the relationship between the two passages?

(A) ~~Passage 2 fully endorses the proposal advanced in Passage 1.~~ *NO!*

(B) ~~Passage 2 suggests a solution~~ to a problem described in Passage 1.

(C) Passage 2 points out potential benefits and drawbacks of an idea raised in Passage 1.

(D) Passage 2, ~~like Passage 1,~~ indicates the practical challenges of implementing an idea.

(E) ~~Passage 2,~~ like Passage 1, discusses the potential ~~cost savings of a proposal.~~ *NO!*

14. Lines 1-2 ("Four . . . security") depict a situation best described as

(A) chaotic

(B) threatening *"creeping menace"*

(C) noble

(D) humorous

(E) rebellious

15. Lines 12-15 ("Congress . . . later") indicate that the response to the program introduced in President Kennedy's address was

(A) excited but cautious

(B) determined and focused *lines 12-15 especially*

(C) supportive ~~yet fearful~~ *"noses to the launchpad"*

(D) ~~doubtful~~ and concerned

(E) ~~uncertain~~ but willing

16. Lines 16-32 suggest that the author of Passage 1 would most likely respond to the assessment in lines 92-95, Passage 2 ("once . . . all"), by pointing out that

(A) ~~there is more environmental benefit~~ in using hydrogen extracted from coal than in using hydrogen from other sources

(B) such reasoning could be used to defend drilling in the Arctic National Wildlife Refuge, even though doing so will bring little real benefit

(C) as a substitute for foreign oil, ~~coal can currently be exploited more easily than hydrogen~~ can

(D) energy independence is a critical need for the United States, even if the use of coal does not yield environmental benefits *lines 18-20*

(E) attempts to ~~increase coal production,~~ like attempts to increase oil production, are likely to ~~result in political wrangling.~~

17. The tone of lines 33-38 ("There's . . . decade") suggests that the author's attitude is

(A) unequivocal *-definite, explicit*

(B) accusatory

(C) impartial

(D) defiant

(E) nonchalant

(A) especially "only energy resource"

18. In line 45, "ripe" most nearly means

(A) mature *Just plug in all five*

(B) ready *answer choices-*

(C) fortunate *must be a fit with*

(D) mellow *the context*

(E) spoiled

19. In lines 63-67 ("Fuel . . . can"), the author of Passage 2 is concerned primarily with

(A) ~~explaining how fuel cells generate energy~~ *NO!*

(B) comparing battery-powered automobiles with gasoline-powered automobiles

(C) describing one reason that the automobile represents a promising use of fuel cells

(D) indicating that fuel-cell cars can travel ~~faster~~ than gasoline-powered cars *farther-*

(E) ~~mentioning some of the design challenges~~ of *not faster* manufacturing a fuel-cell car

20. The sentence in lines 67-70 ("Yet . . . more") serves to

(A) ~~substantiate an earlier generalization~~ by introducing an example

(B) ~~reiterate~~ the author's previous claim

(C) ~~offer~~ several ~~possible solutions~~ to a problem

(D) signal a transition in the author's argument *"YET"!*

(E) question why a particular course of action has been undertaken

21. The author of Passage 1 would most likely respond to the statement in lines 79-83, Passage 2 ("Although . . . energy"), by claiming that the

(A) relative efficiency of hydrogen compensates for the energy expended to extract it

(B) commercial exploitation of hydrogen is unnecessary because it is so readily available

(C) ~~extraction of hydrogen often has a significant negative impact on the environment~~

(D) efficient production of hydrogen must be a top priority of those advocating fuel-cell cars

(E) ~~concerns raised about the safety of hydrogen are legitimate and justified~~

(A) lines 38-43

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22. Lines 88-91 ("This . . . cells") indicate that the author of Passage 2 considers "reforming" (line 88) to be

(A) a significant breakthrough
(B) promising but untested
(C) of doubtful value *"obviates...reason for*
(D) impossible to evaluate *switching to fuel cells"*
(E) potentially dangerous

"obviate"- remove

23. In line 94, "yield" most nearly means

(A) reward *Just plug in all five*
(B) submit *answer choices –*
(C) concede *must be a fit with*
(D) produce *the context*
(E) withdraw

24. Compared with the author of Passage 2, the author of Passage 1 is *Identify the subject*

(A) less anxious about the urgency of finding an alternative energy source
(B) less worried about how to market hydrogen fuel-cell cars to the public
(C) more enthusiastic about the prospect of hydrogen serving as an alternative source of energy
(D) more concerned about the safety of using hydrogen as a fuel
(E) more dubious about the role of Apollo in the development of alternative fuel sources

(C) especially last paragraph of Passage 1

STOP

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

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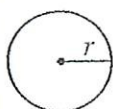## SECTION 2
Time — 25 minutes
20 Questions
(1-20)

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratch work.
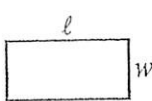
Notes

1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.
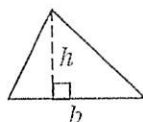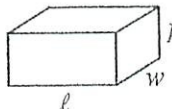
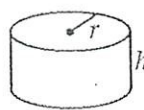**Reference Information**

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

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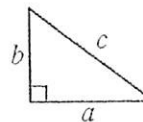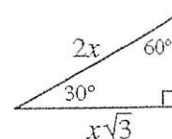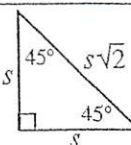
$A = \frac{1}{2}bh$

$V = \ell wh$

$V = \pi r^2 h$

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

Special Right Triangles

The number of degrees of arc in a circle is 360.
The sum of the measures in degrees of the angles of a triangle is 180.

---

1. A lawn service can cut 45 lawns in 12 hours. At this rate, how many lawns can the lawn service cut in 8 hours?

   (A) 25
   (B) 27
   (C) 30
   (D) 33
   (E) 41

   [handwritten] $\frac{45 \text{ lawns}}{12 \text{ hours}} = \frac{X \text{ lawns}}{8 \text{ hours}}$

   Cross multiply and divide

   $\frac{12X}{12} = \frac{360}{12}$

   $X = 30$

[handwritten above figure] 12   6

$P \qquad Q \quad R$

2. In the figure above, point Q lies on $\overline{PR}$. The length of $\overline{QR}$ is 6, and the length of $\overline{PQ}$ is twice the length of $\overline{QR}$. What is the length of $\overline{PR}$?

   (A) 6
   (B) 12
   (C) 18
   (D) 24
   (E) 36

   [handwritten] $QR + PQ = PR$
   $6 + 12 = PR$
   $18 = PR$

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$$\frac{6}{n}, \frac{12}{n}, \frac{4}{n}$$

3. For which of the following values of n will the fractions above all be integers?

(A) 8
(B) 6
(C) 4
(D) 3
(E) 2

The integers are the counting numbers, their opposites, and zero.

$$\frac{6}{2} = 3, \quad \frac{12}{2} = 6, \quad \frac{4}{2} = 2$$

4. A box contains a red marble, a green marble, a yellow marble, a blue marble, and no other marbles. Two marbles are to be chosen at random from the box without replacement. If the first marble chosen is green, what is the probability that the second marble chosen will be blue?

(A) $\frac{1}{4}$

(B) $\frac{1}{3}$

(C) $\frac{1}{2}$

(D) $\frac{2}{3}$

(E) 1

original total = 4
original - green = 3
blue out of new total =
$$\frac{blue}{3} = \frac{1}{3}$$
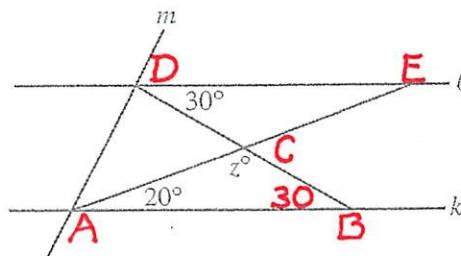
5. In the figure above, lines ℓ and k are parallel. What is the value of z?

(A) 130
(B) 120
(C) 100
(D) 80
(E) 70

$m\angle DBA = 30$ If two lines are parallel, alternate interior angles are equal.

$m\angle CAB + m\angle ACB + m\angle CBA = 180$
The sum of the measures of the angles of a triangle equals 180.

$$20 + z + 30 = 180$$
$$z + 50 = 180$$
$$-50 \qquad -50$$
$$z = 130$$

6. If $4x - 2 = 14$, what is the value of $2x - 1$?

(A) 8
(B) 7
(C) 6
(D) 5
(E) 4

$4x - 2 = 14$
Divide both sides of the equation by 2.

$$\frac{4x - 2}{2} = \frac{14}{2}$$
$$2x - 1 = 7$$

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| Plan 1: $20 per day plus $0.30 per mile driven |
| Plan 2: $10 per day plus $0.35 per mile driven |

7. Ramón wants to rent a car for a day and can choose from the two rental plans above. For how many miles driven would the two plans cost the same?

(A) 50 $\text{Let } m = \text{miles driven}$
(B) 100 $20 + .3m = 10 + .35m$
(C) 150 $-20 \qquad\qquad -20$
(D) 200
(E) 250 $.3m = -10 + .35m$
$\qquad -.35m \qquad\qquad -.35m$
$\qquad -.05m = -10$

Divide both sides of the equation by $-.05$
$$\frac{-.05m}{-.05} = \frac{-10}{-.05}$$
$$m = 200$$

y-axis with line through O and A (1, 2)
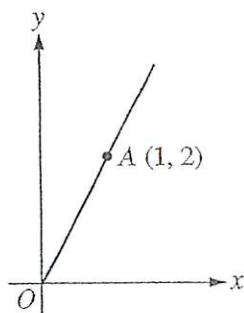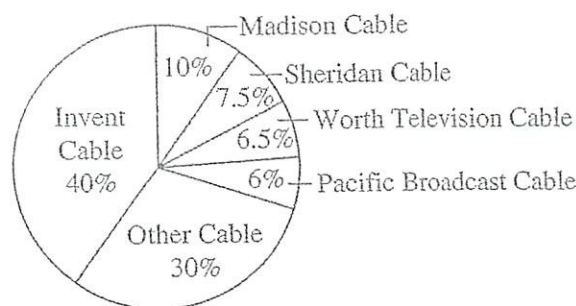
8. In the xy-coordinate system above, which of the following points lies on the line that passes through points O and A?

(A) (0, 1) $\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$
(B) (1, 3) $\frac{2-0}{1-0} = 2$
(C) (2, 1)
(D) (2, 4) Now use the answers to find the same slope.
(E) (4, 2)
(D) $\frac{y_2 - y_1}{x_2 - x_1} = \frac{4-0}{2-0} = \frac{4}{2} = 2$

WYLIE CITY CABLE SUBSCRIBERS

Madison Cable — 10%
Sheridan Cable — 7.5%
Worth Television Cable — 6.5%
Pacific Broadcast Cable — 6%
Invent Cable 40%
Other Cable 30%

9. The circle graph above shows the distribution of cable service subscribers in Wylie City. If Wylie City has 5,000,000 cable subscribers, how many subscribe to cable services other than Invent Cable?

(A) 3,000,000 $100\% - 40\% = 60\%$
(B) 2,000,000 $60\% = .6$
(C) 1,000,000 $.6 \times 5,000,000 =$
(D) 300,000 $\qquad 3,000,000$
(E) 200,000

b	$g(b)$
−3	7
−2	4
−1	0
0	−1
1	5

10. Some values of the function g are given in the table above. For which of the following values of b does g(b) equal $|2b| + 1$?

(A) −3 $g(b) = |2b| + 1$
(B) −2 Now use the chart.
(C) −1 (A) $g(b) = |2b| + 1$
(D) 0 $\qquad 7 = |2 \cdot -3| + 1$
(E) 1 $\qquad 7 = |-6| + 1$
$\qquad 7 = 6 + 1$
$\qquad 7 = 7$

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11. If $x + x + x = m - m - m$, and $m = 3$, what is the value of x?

(A) -3
(B) -1
(C) 0
(D) 1
(E) 3

[handwritten] $x+x+x = m - m - m$ and $m = 3$
$3x = -m$
$3x = -3$
Divide both sides of the equation by 3
$\frac{3x}{3} = \frac{-3}{3}$
$x = -1$

Twice the sum of x and y is decreased by three times the product of x and $2y$.

12. Which of the following algebraic expressions represents the statement above?

(A) $2(x + y) - 3x(2y)$
(B) $2(x + y) - 3(x + 2y)$
(C) $2x + y - 3x(2y)$
(D) $2xy - 3(x + 2y)$
(E) $2xy - 3x(2y)$

[handwritten] Just translate!
$2(x+y) - 3(2xy)$
$2(x+y) - 3 \cdot 2 \cdot x \cdot y$
$2(x+y) - 3x(2y)$

13. If the surface area of a cube is 48 square inches, what is the area, in square inches, of one of the faces?

(A) 6
(B) 8
(C) 9
(D) 10
(E) 12

[handwritten] Surface area = area of the faces
$SA = 6\ell^2$
$48 = 6\ell^2$
Divide both sides of the equation by 6
$\frac{48}{6} = \frac{6\ell^2}{6}$
$8 = \ell^2$

14. For which of the following values of x is the value of $\frac{1}{\sqrt{x}}$ least?

(A) $\frac{1}{16}$
(B) $\frac{1}{4}$
(C) 1
(D) 4
(E) 16

[handwritten]
(A) $\frac{1}{\sqrt{\frac{1}{16}}} = \frac{1}{\frac{1}{4}} = 4$
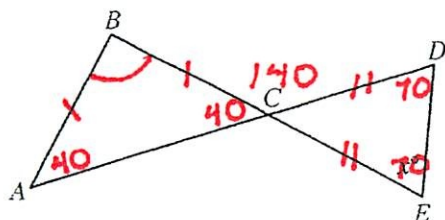(B) $\frac{1}{\sqrt{\frac{1}{4}}} = \frac{1}{\frac{1}{2}} = 2$
(C) $\frac{1}{\sqrt{1}} = \frac{1}{1} = 1$
(D) $\frac{1}{\sqrt{4}} = \frac{1}{2}$
(E) $\frac{1}{\sqrt{16}} = \frac{1}{4}$

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B *D* *C* *A* *E*

140 40 70 40 70

Note: Figure not drawn to scale.

15. In the figure above, $AB = BC$, $CE = CD$, and $x = 70$. What is the measure of $\angle ABC$?

(A) 40°
(B) 70°
(C) 100°
(D) 110°
(E) 140°

Handwritten annotations:
$m\angle CDE = 70$ Base ∠s of an isosceles △ are equal.
$m\angle BCD = 140$ Exterior angle theorem.
$m\angle BCA = 40$ Sum of the measures of supplementary ∠s = 180
$m\angle BAC = 40$ Base ∠s of an isosceles △ are equal.
$m\angle ABC = 100$ Exterior angle theorem.

[Graph with points P(–5, 3), B(1,3), A(1,0), O, V(–2, –3), with markings "3" and "3"]
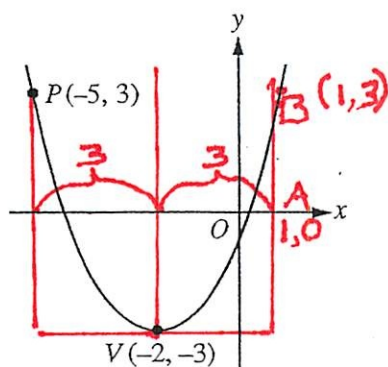
16. In the *xy*-plane above, the parabola with vertex *V* is the graph of a quadratic function. Which of the following must be the coordinates of another point on the parabola?

(A) (1, 1)
(B) (1, 2)
(C) (1, 3)
(D) (2, 2)
(E) (2, 3)

Handwritten annotations:
Distance from –2 to –5 = $-2-(-5) = -2+5 = 3$
Distance from A to –2 = $A-(-2) = 3$
$A + 2 = 3$
$A = 1$
Distance from B to A = $B - A = 3$
$B - 0 = 3$
$B = 3$

| Number	Frequency
80	*x*
88	*y*
89	15
90	19
100	11

Handwritten: } 45 numbers

17. The table above shows the only five numbers that appear in a data set containing 91 numbers. It also shows the frequency with which each number appears in the data set. If 80 is the only mode and 88 is the median, what is the greatest possible value of *y*?

(A) 26
(B) 24
(C) 23
(D) 22
(E) 20

Handwritten annotations:
88 is the median or the middle number so the sum of $x+y$ must equal $91-45 = 46$
Just use the answers—
(A) If $y=26$, $x=20$ NOT a mode
(B) If $y=24$, $x=22$ NOT a mode
(C) If $y=23$, $x=23$ NOT a mode
(D) If $y=22$, $x=24$ A mode or most frequently appearing number would be 80 because 80 would appear 24 times, more than any of the other numbers

[Number line with tick marks labeled 1, x, y]
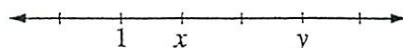
18. On the number line above, the tick marks are equally spaced. Which of the following expresses *y* in terms of *x*?

(A) $x + 2$
(B) $2x + 1$
(C) $2x + 2$
(D) $3x - 2$
(E) $3x$

Handwritten annotations:
$x-1$ = distance between tick marks, found using subtraction
distance from y to x equals two spaces
$y - x = x-1 + x-1$
$y - x = 2x - 2$
$+x \quad +x$
$y = 3x - 2$

-13-

C
A
D
E
B
Room R   Room S   Room T
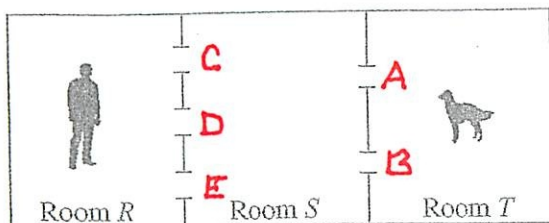
19. The figure above shows the layout of three rooms, and the spaces in the walls indicate the locations of five doors. Starting from room T, a dog will travel through the rooms to greet his owner in room R and will return to room T without passing through the same door twice. How many different routes through the doors can the dog take?

(A) 5
(B) 6
(C) 8
(D) 10
(E) 12

Leaving Room T through Door A and returning through Door B, the dog can take six different routes.

A C D B
A C E B
A D E B
A D C B
A E D B
A E C B

Leaving Room T through Door B and returning through Door A, the dog can take six different routes.

$6 + 6 = 12$

20. Which of the following must be true for all values of x?

I. $(x + 1)^2 \geq x^2$

II. $(x - 2)^2 \geq 0$

III. $x^2 + 1 \geq 2x$

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

I. $(x+1)^2 \geq x^2$
$(x+1)(x+1) \geq x^2$
$x^2 + 2x + 1 \geq x^2$
$-x^2 \qquad\qquad -x^2$
$2x + 1 \geq 0$
Let $x = -1$
$2(-1) + 1 \geq 0$
$-2 + 1 \geq 0$
$-1 \geq 0$ NO

II. $(x-2)^2 \geq 0$ YES
A quantity "squared" will always equal a positive number or zero

III. $x^2 + 1 \geq 2x$
$\quad -2x \quad -2x$
$x^2 - 2x + 1 \geq 0$
$(x-1)(x-1) \geq 0$
$(x-1)^2 \geq 0$ YES
A quantity "squared" will always equal a positive number or zero

STOP

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

SECTION 3
Time — 25 minutes
24 Questions
(25-48)

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labeled A through E. Choose the word or set of words that, when inserted in the sentence, <u>best</u> fits the meaning of the sentence as a whole.

Example:

Hoping to ------- the dispute, negotiators proposed a compromise that they felt would be ------- to both labor and management.

(A) enforce . . useful
(B) end . . divisive
(C) overcome . . unattractive
(D) extend . . satisfactory
(E) resolve . . acceptable

(A) (B) (C) (D) ●

25. The ancient Greeks so firmly believed in the ------- power of music that physicians prescribed it as an antidote to snakebites. *[handwritten: signals a positive]* *[handwritten: "that" as a conjunction signals cause and effect]*

(A) limited   (B) social   (C) healing
(D) educational   (E) subjective

6. The eloquence and clarity of Barbara Jordan's keynote address at the 1976 Democratic National Convention confirmed Jordan's reputation as ------- public speaker. *[handwritten: signals a positive attitude]*

(A) a frustrated   (B) a humorous
(C) an effective   (D) an unhurried
(E) a tentative *[handwritten: positive]*

27. Architectural structures can sometimes ------- the spread of plant species by ------- the normal dispersal of seeds. *[handwritten: "by" indicates an action and the agent to make it happen]*

(A) facilitate . . preventing
(B) ensure . . stratifying
(C) disrupt . . obstructing
(D) hinder . . circulating
(E) accentuate . . highlighting

28. Although Albert Collins ------- the styles of other blues guitarists, he was clearly -------, playing without a pick and using unorthodox minor tunings. *[handwritten: "Although" signals opposite ideas. The participial phrases describe.]*

(A) flaunted . . an extrovert
(B) rejected . . a maverick
(C) decried . . an apprentice
(D) imitated . . a classicist
(E) emulated . . an original

29. Some mistook Josh's ------- for detachment; because he was shy and reserved, they assumed he was -------. *[handwritten: aloofness]* *[handwritten: colon signals idea and an example thereof]*

(A) reticence . . pensive
(B) exuberance . . standoffish
(C) modesty . . humble
(D) quirkiness . . arrogant
(E) diffidence . . aloof *[handwritten: shyness]*

GO ON TO THE NEXT PAGE

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The passages below are followed by questions based on their content; questions following a pair of related passages may also be based on the relationship between the paired passages. Answer the questions on the basis of what is <u>stated</u> or <u>implied</u> in the passages and in any introductory material that may be provided.

Questions 30-33 are based on the following passages.

Passage 1

Last New Year's Eve, many of you doubtlessly resolved to be better, wiser, stronger, and richer in the coming months and years. After all, we're free humans, not robots doomed to repeat the same boring mistakes
Line 5 over and over again, right? As William James wrote in 1890, the whole "sting and excitement" of life comes from "our sense that in it things are *really being decided* from one moment to another, and that it is not the dull rattling off of a chain that was forged innumerable ages ago." Get
10 over it, Dr. James. A bevy of experiments in recent years suggests that the conscious mind is like a monkey riding a tiger of subconscious decisions and actions in progress, frantically making up stories about being in control.

Passage 2

It is safe to say that neuroscience these days views
15 brain chemistry and anatomy as having a greater impact on human behavior and the formation of character than free will does. But every serious creative writer, of course, must come down on the side of free will. You might ask, what choice have we? Without free will there would be
20 no literature in the first place: no drama, no insights into human nature, little, really, but the drab playing out of the hands we have been dealt. Artists are the natural opponents of determinism.

30. The <u>author of Passage 1</u> would <u>argue</u> that the "<u>bevy of experiments</u>" (line 10) <u>suggests which</u> of the following <u>about the writers</u> mentioned in <u>Passage 2</u> ?

(A) They are deluding themselves.
(B) They must overcome long odds.
(C) They are not as important as they think.
(D) They need not work to develop their talents.
(E) They come from all walks of life.

(A) "deluding"—fooling themselves if they believe they have free will to create

31. The <u>proponents</u> of "<u>neuroscience</u>" (line 14, Passage 2) would probably <u>argue</u> that the <u>New Year's resolutions</u> mentioned in the first sentence of <u>Passage 1 are</u>

(A) an effective means of self-improvement
(B) a reflection of a basic human desire to seek perfection
(C) unlikely to be the cause of a great change in anyone's character *lines 15-17*
(D) proof of the decisive role played by brain chemistry
(E) evidence of the ongoing tension between the rational mind and subconscious desires

32. The reference to the "<u>playing out of the hands</u>" (lines 21-22, Passage 2) <u>most closely echoes</u> <u>which</u> of the following <u>from Passage 1</u> ? *NO free will*

(A) The "'sting and excitement' of life" (line 6)
(B) The "'rattling off of a chain'" (lines 8-9)
(C) The "bevy of experiments" (line 10)
(D) The "monkey riding a tiger" (lines 11-12)
(E) The "making up stories about being in control" (line 13)

(13) "...forged innumerable ages ago"

33. Which <u>best describes</u> the <u>relationship between the two passages</u>?

(A) Passage 2 relates a personal anecdote that exemplifies the conclusion drawn in Passage 1.
(B) Passage 2 offers evidence that disproves the central hypothesis advanced in Passage 1.
(C) Passage 2 presents a possible solution to the set of problems described in Passage 1.
(D) Passage 2 calls attention to people who <u>deny</u> a <u>fundamental claim made in Passage 1</u>.
(E) Passage 2 carries to its logical conclusion the position advocated in Passage 1.

(D) "people" = "writer"... and "artists"

Questions 34-39 are based on the following passage.

The narrator of this passage from a twentieth-century novel is a seventy-six-year-old writer from England. Her recollections often return to her brother, Gordon, and her daughter, Lisa.

Today language abandoned me. I could not find the word for a simple object—a commonplace familiar furnishing. For an instant, I stared into a void. Language

Line tethers us to the world; without it we spin like atoms.

5 Later, I made an inventory of the room—a naming of parts: bed, chair, table, picture, vase, cupboard, window, curtain. Curtain. And I breathed again.
We open our mouths and out flow words whose ancestries we do not even know. We are walking lexicons.

10 In a single sentence of idle chatter we preserve Latin, Anglo-Saxon, Norse; we carry a museum inside our heads, each day commemorating people of whom we have never heard. More than that, we speak volumes—our language is the language of everything we have not read. Shakespeare

15 and the Authorised Version[1] surface in supermarkets, on buses, in chatter on radio and television. I find this miraculous. I never cease to wonder at it. That words are more durable than anything, that they blow with the wind, hibernate and reawaken, shelter parasitic on the most

20 unlikely hosts, survive and survive and survive.
I can remember the lush spring excitement of language in childhood. Sitting in church, rolling it around my mouth like marbles—tabernacle and parable, trespasses and Babylon and covenant. Learning by heart, chanting at the

25 top of my voice—"Lars Porsena of Clusium, By the Nine Gods he swore, That the great House of Tarquin, Should suffer wrong no more . . ."[2] Gloating over Gordon who could not spell ANTIDISESTABLISHMENTARIANISM, the longest word in the dictionary. Rhyming and

30 blaspheming and marvelling. I collected the names of stars and of plants: Arcturus and Orion and Betelgeuse, melilot and fumitory and toadflax. There was no end to it, apparently—it was like the grains of sand on the shore, the leaves on the great ash outside my bedroom window,

35 immeasurable and unconquerable. "Does anyone know all the words in the world?" I ask Mother. "*Anyone*?"
"I expect very clever men do," says Mother vaguely.
Lisa, as a child, most interested me when I watched her struggle with language. I was not a good mother, in any

40 conventional sense. Babies I find faintly repellent; young children are boring and distracting. When Lisa began to talk I listened to her. I corrected the inanities encouraged by her grandmothers. "Dog," I said. "Horse. Cat. There are

no such things as bow-wows and gee-gees." "Horse," said

45 Lisa, thoughtfully, tasting the word. For the first time we communicated. "Gee-gee gone?" enquired Lisa. "That's right," I said. "Gone. Clever girl." And Lisa took a step toward maturity.

[1] Influential translation of the Bible, first published in 1611
[2] The beginning of Thomas B. Macaulay's poem "Horatius"

34. The primary purpose of the passage is to
   (A) explain the narrator's interest in the origins of Modern English
   (B) detail the narrator's difficulty mastering language as a child
   (C) show the narrator's appreciation of language
   (D) demonstrate the narrator's knowledge of esoteric words
   (E) show how the narrator increased her language skills as she grew up

(C) line 7, lines 17-20, line 21, lines 29-30

35. The tone of the sentence in line 7 ("And . . . again") is best characterized as one of
   (A) joy
   (B) relief *The narrator could name*
   (C) puzzlement *what she couldn't before*
   (D) frustration
   (E) anger

36. Lines 10-13 ("In a . . . heard") most directly emphasize which point?
   (A) The English language is quite difficult to learn.
   (B) Ancient languages are perpetuated in everyday English speech. *. . . "we preserve . . ."*
   (C) The narrator is unaware of her pretentious use of language.
   (D) The general public prefers to be ignorant of the heritage of English.
   (E) Languages whose ancestries the narrator does not know are as complex as English.

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37. The passage suggests that the narrator was most likely fascinated by the words in lines 23-24 ("tabernacle . . . covenant") because of their

(A) clarity of meaning
(B) religious significance
(C) frequency in conversation
(D) sensory qualities *"...rolling it around my mouth..."*
(E) rich history

38. In line 33, "grains of sand" primarily serves as an image of something

(A) very small
(B) essentially weak
(C) highly insignificant
(D) strikingly homogeneous
(E) seemingly infinite — *"immeasurable and unconquerable"*

39. The dialogue in lines 43-47 suggests that for the narrator, Lisa's question signals a recognition that

(A) imaginary creatures do not exist
(B) childish vocabulary should be abandoned
(C) fascination with animals is immature
(D) adults should not be trusted
(E) words can be aesthetically pleasing

(B) "...I corrected the inanities..."

GO ON TO THE NEXT PAGE

-519-

Questions 40-48 are based on the following passage.

This passage is adapted from a 1988 book that examines the influence of Native American cultures on other world cultures. Here, the author discusses Machu Picchu, the ruins of an ancient Incan city located on a remote and steeply terraced mountainside in South America.

There is only one Machu Picchu, but it guards many mysteries. The ruins of this ancient Peruvian city sit perched 8,000 feet above sea level on a mountain overlooking the Urubamba River. Even though in size
[line] 5 Machu Picchu barely surpasses a village, the ruins show a complexity indicative of a much more important place: precision-crafted buildings with neat regular lines, beveled edges, and mortarless seams that characterize the best of Incan architecture. The spectacular setting combined with
10 the exquisitely wrought buildings have evoked much speculation and much romantic rubbish about the purpose of the city. The explorer Hiram Bingham who "discovered" Machu Picchu erroneously assumed that he had found the capital of the Incan empire. Many other people assumed
15 that its purpose was religious, thus dubbing it the "sacred city of the Incas."

None of this agrees with what we know about the Incas. They did not build large pyramids to please their gods. They did not build observatories to watch the patterns of the stars. Indeed, they displayed an austere practicality in every aspect of their lives and showed little hint of religious fervor and no tendency toward either the sentimental or the superstitious.

In light of this practicality, the existence of Machu
25 Picchu seems all the more puzzling. Why would the Incas build a city and line the mountain with terraces even though there was very little soil there? The builders used the best techniques known to them to make terraces that would last for eternity. Then the workers added layers of rock and clay
30 as subsoil, and from the river below hauled up rich dirt over steep embankments half a mile high. This task would be the equivalent of hauling dirt from the Colorado River to plant crops on top of the Grand Canyon.

The Incas built hundreds of these terraces, all of them
35 quite small for any kind of extensive agriculture. Some of them narrow to as little as six inches in width. Such an arrangement makes no more sense than if people today decided to start farming using large flower boxes.

A hint of the possible function of Machu Picchu came
40 to me while hiking there with a friend who is a botanist. We had approached via a trail perched high in the saddle of the mountain dividing the Machu Picchu side of the mountain from a dry inland valley. Standing in this gateway one sees two worlds: the brown and lifeless valley

45 and the lush emerald-green valley watered by the thick fogs of the Urubamba River. As we descended toward the city from this high pass, I stared out at the spectacular landscape. While I looked up and down the long vistas of the Urubamba, my friend was looking at the vegetation and
50 naming everything growing along the path. I found this distracting from the big picture but, as we descended and passed from one terrace to another, the plant names changed. We were passing through a series of ecological layers, as one does on many mountains in the Andes. The
55 mountainside is laid out in strips of vegetation and microzones. The place is a scientist's dream—the perfect location for all kinds of controlled experiments. Viewed in that context, the small terraces took on new meaning as experimental patches at a range of altitudes and built
60 at so many different angles, facing the morning sun, the evening sun, constant sun, or no sun.

In my mind, Machu Picchu suddenly became an agricultural station. And in that sense it was indeed a sacred spot, because agriculture was a sacred activity for the Incas.
65 They had been among the world's great experimenters with agriculture, and they built numerous experimental areas where crops could be grown in different ways. It would not be surprising if the Incas devoted a place such as Machu Picchu to just such an activity.

40. In context, lines 7-9 ("precision-crafted . . . architecture") serve primarily to

(A) suggest that Machu Picchu was built to withstand forceful military assaults
(B) provide details supporting the claim that Machu Picchu was a significant place
(C) show how conflicting architectural styles contribute to the mysteriousness of Machu Picchu
(D) present an argument about Incan architecture that challenges established theories
(E) compare Incan structures designed for political and for religious purposes

(B) lines 5-9 A colon signals an idea and an example thereof

41. The author uses the term "romantic rubbish" (line 11) to imply that many previous theories about the purpose of Machu Picchu were excessively

(A) softhearted
(B) ambitious
(C) fanciful — *imaginary, farfetched — fits with "speculation"*
(D) pessimistic
(E) archaic

42. The passage as a whole suggests that the author would most likely give which answer to the question in lines 25-27 ("Why would . . . there") ?

(A) To provide a secure and remote location for a capital city

(B) To encourage religious reflection in an ascetic setting

(C) To study various types of plants in a controlled setting *lines 53-69*

(D) To provide meaningful labor for workers hauling up rocks and soil

(E) To inspire people to move from more crowded parts of the empire

43. In lines 31-33 ("This . . . Canyon"), the author attempts to clarify an idea by

(A) citing an authority

(B) making a comparison *with planting crops "on top of the Grand Canyon"*

(C) defining a term

(D) providing a solution

(E) offering an overview

44. In line 39, the focus of the passage shifts from a

(A) description of an enigma to a hypothesis about its purpose

(B) chronicle of an event to a suggestion about its repercussions

(C) discussion of an argument to an analysis of its weakness

(D) portrayal of a mystery to a criticism of one proposed explanation

(E) consideration of an achievement to a speculation about how it was accomplished

(A) enigma → mystery
line 2 - "mysteries"
hypothesis → theory
line 39 - "possible function"

45. In line 45, "watered" most nearly means

(A) cleansed *Plug in the five answer choices*
(B) diluted
(C) consumed *Must be a fit with the context*
(D) secreted
(E) moistened *"lush...valley watered by the thick fogs..."*

46. The author implies that the "layers" (line 54) are noteworthy primarily because they

(A) suggest an artistic purpose

(B) reflect centuries of habitation

(C) conceal unexpected resources

(D) include multiple zones of plant life *lines 52-61*

(E) reveal the order of a formal garden

47. In line 59, "patches" most nearly means

(A) materials *Plug in the five answer choices*
(B) scraps
(C) decorations *Must be a fit with the context —*
(D) plots
(E) repairs *Passage speaks a lot about agriculture*

48. The primary purpose of the passage as a whole is to

(A) report known facts

(B) challenge previous data

(C) present a personal theory

(D) compare ancient cultures

(E) describe a mysterious location

(C) "...came to me..."-lines 39-40
"In my mind..."-line 62

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.
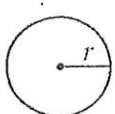
SECTION 4
Time — 25 minutes
18 Questions
(21-38)

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 21-28, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratch work.
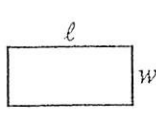
Notes

1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.
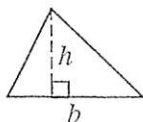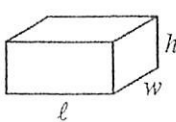
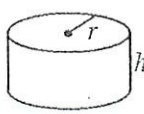Reference Information

$A = \pi r^2$
$C = 2\pi r$
$A = \ell w$
$A = \frac{1}{2}bh$
$V = \ell wh$
$V = \pi r^2 h$
$c^2 = a^2 + b^2$
Special Right Triangles

The number of degrees of arc in a circle is 360.
The sum of the measures in degrees of the angles of a triangle is 180.

21. If $6xyz = 72$ and $xy = 3$, what is the value of z?

(A) 3
(B) 4
(C) 9
(D) 12
(E) 36

$6xyz = 72$ $xy = 3$
Combine the equations using substitution
$6 \cdot 3 \cdot z = 72$
$18z = 72$
Divide both sides of the equation by 18
$\frac{18z}{18} = \frac{72}{18}$
$z = 4$

RESULTS OF A 10-QUESTION QUIZ
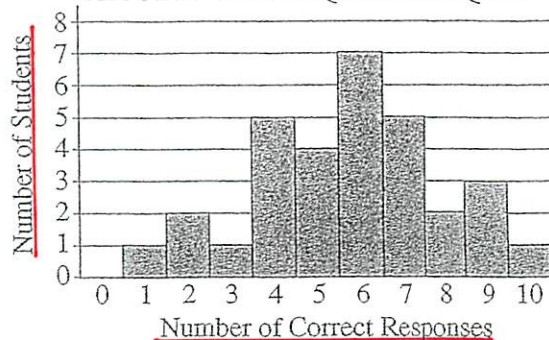
22. The graph above shows the distribution of the number of correct responses on a 10-question quiz for a class of students. How many students had more than 7 correct responses on the quiz?

(A) None
(B) Two
(C) Three
(D) Five
(E) Six

8 responses - 2 students
9 responses - 3 students
10 responses = 1 student
6 students

GO ON TO THE NEXT PAGE

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23. N is the set of all positive multiples of 3, and W is the set of all squares of integers. Which of the following numbers belongs to both sets?

(A) 3
(B) 16
(C) 25
(D) 36
(E) 72

Just use the answers

$\frac{36}{3} = 12$

3 is a factor of 36, so 36 is a multiple of 3

$6 \times 6 = 36$, so 36 is a square of an integer

$$y = 3(x + 2)$$
$$z = 3(x + 3)$$

25. If the equations above are true, then z is how much greater than y?

(A) 1
(B) 3
(C) 6
(D) 7
(E) 9

$z - y = 3(x+3) - 3(x+2)$
$z - y = 3x + 9 - 3x - 6$
$z - y = 9 - 6 = 3$
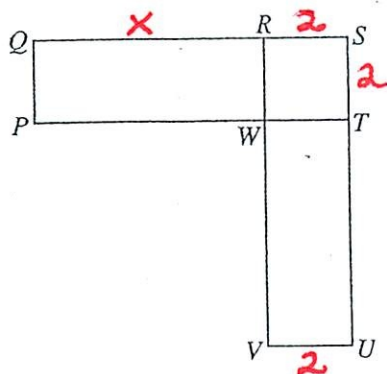
Note: Figure not drawn to scale.

24. In the figure above, *PQST* and *VRSU* are rectangles with the same dimensions. If the length of segment $\overline{RS}$ is 2 and the area of *PQST* is 14, what is the length of segment $\overline{QR}$?

(A) 5
(B) 7
(C) 8
(D) 10
(E) 12

Area PQST = 14
$A = 14$
$lw = 14$
$(x + 2)(2) = 14$
$2x + 4 = 14$
$\quad -4 \quad -4$
$2x = 10$

Divide both sides of the equation by 2
$\frac{2x}{2} = \frac{10}{2}$
$x = 5$

GO ON TO THE NEXT PAGE

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26. In $\triangle ABC$, $AB = 5$ and $BC = 7$. Which of the following CANNOT be the length of side $\overline{AC}$?

(A) 1
(B) 3
(C) 5
(D) 7
(E) 9

[handwritten: triangle diagram labeled 5, 7, B, A, X, C]

[handwritten annotation:] Third side theorem — the length of a side of a triangle must be less than the sum of the lengths of the other two sides and greater than their difference.

$7 - 5 < X < 7 + 5$
$2 < X < 12$

Therefore, of the answer choices given, AC can be a length of 3, 5, 7 and 9
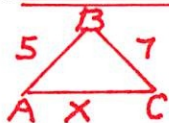
27. A drawer contains 6 red socks, 6 white socks, 6 blue socks, and no other socks. If socks are selected at random from the drawer, what is the least number of socks that must be selected to ensure that two socks of the same color are selected?

(A) 2
(B) 3
(C) 4
(D) 6
(E) 7

[handwritten annotation:] Consider the worst possible scenario —
Draw from the drawer a red sock, then a white sock and then a blue sock. On the next selection — the fourth one — a matching sock to one of the first three must be selected

[handwritten: circle diagram with points B, C, E, A, D and angles 40°, 40°, 140°]
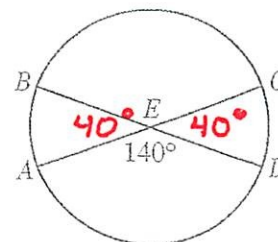
28. In the figure above, $\overline{AC}$ and $\overline{BD}$ are diameters of the circle, which has a radius of 9. What is the sum of the lengths of arcs $\overset{\frown}{AB}$ and $\overset{\frown}{CD}$?

(A) 2π
(B) 3π
(C) 4π
(D) 6π
(E) 8π

[handwritten annotation:] length of an arc = portion of the circumference
∠s CED and BEA each equal 40°
Degrees around a point equals 360 so half way around a point must equal 180°

$40 + 40 = 80$
$\dfrac{80}{360} = \dfrac{2}{9}$

The relationship — ratio — of the sum of the two 40° angles to 360° is $\dfrac{2}{9}$

Therefore, the portion of the circumference cut off by those two angles' rays must equal $\dfrac{2}{9}$ of the circumference

radius = 9, diameter = 18
$C = \pi d$
$C = 18\pi$
$\dfrac{2}{9}C = \dfrac{2}{9}(18\pi) = 4\pi$

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Directions for Student-Produced Response Questions

Each of the remaining 10 questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratch work.

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

Answer: 2.5

Answer: 201
Either position is correct.

Write answer → in boxes.

← Fraction line

← Decimal point

Grid in → result.

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one circle in any column.

- Because the answer sheet will be machine-scored, **you will receive credit only if the circles are filled in correctly.**

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.

- Some problems may have more than one correct answer. In such cases, grid only one answer.

- No question has a negative answer.

- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as

  3.5 or 7/2. (If $3\,1\,/\,2$ is gridded, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)

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

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

29. If $x°$, $3x°$, and $20°$ are the measures of the three angles of a triangle, what is the value of x?
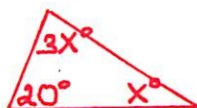
$$X + 3X + 20 = 180$$
$$4X + 20 = 180$$
$$-20 \quad\quad -20$$
$$4X = 160$$

Divide both sides of the equation by 4

$$\frac{4X}{4} = \frac{160}{4}$$
$$X = 40$$

Answer: 40

30. There are 1200 students at Jones High School. If 10 percent of them did not read any novels last semester, how many read at least one novel last semester?

$$100\% - 10\% = 90\%$$
$$90\% \text{ of } 1200 = .9 \times 1200 = 1080$$

Answer: 1080 students

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31. If $y = 2^a \cdot 2^b$ and $a + b = 4$, what is the value of y?

$y = 2^a \cdot 2^b$ or 2^{a+b}

$y = 2^{a+b}$ and $a+b = 4$

Combine the two equations using substitution

$y = 2^4 = 16$

Answer: 16

32. The cost, in dollars, of a t-year membership package in a professional organization is given by the function C, defined by $C(t) = 100(t + k)$, where k is a constant. If the cost of a 2-year membership package is $500, what is the cost, in dollars, of a 3-year membership package? (Disregard the $ sign when gridding your answer.)

First find "k" using the information given about the 2-year membership

$C = 100(t + k)$

$\dfrac{500}{100} = \dfrac{100(2 + k)}{100}$ Divide both sides of the equation by 100

$5 = 2 + k$

$-2 \quad -2$

$3 = k$

Now find the cost of a three year membership

$C = 100(t + k)$

$C = 100(3 + 3) = 100 \cdot 6 = 600$

Answer: 600

33. A square with sides of length 6 is divided into nine smaller squares of equal size. What is the perimeter of one of the smaller squares?
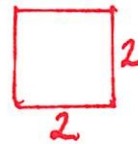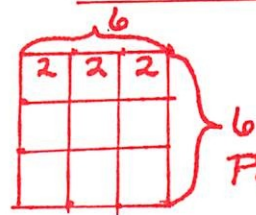
Perimeter of a square = 4 × length of a side

$P = 4(2) = 8$

Answer: 8

34. If a represents the greatest prime number less than 100 and b represents the least prime number greater than 10, what is the value of $a + b$?

A prime number is a number with only two factors – itself and one

greatest prime number less than 100 is 97

least prime number greater than 10 is 11

$a + b = 97 + 11 = 108$

Answer: 108

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CHANGE IN DEPTH OF
LAKE ALEXANDER

Year	Change in meters
1996	+150
1997	−125
1998	+75
1999	−125
2000	+75

35. The table above shows the change in the depth of Lake Alexander from the beginning to the end of each year. At the beginning of 1996, the depth of Lake Alexander was 400 meters. The depth of Lake Alexander at the beginning of 2000 was what fraction of its depth at the end of 2000 ?

beginning of 2000 = 400 + 150 − 125 + 75 − 125 = 625 − 250 = 375
end of 2000 = 375 + 75 = 450
$\frac{375}{450} = \frac{15}{18} = \frac{5}{6}$

Answer: $\frac{5}{6}$ or .833

2, 12, 72, 432, . . .

36. In the sequence above, the first term is 2 and each term after the first is k times the preceding term, where k is a constant. What is the value of the 52nd term divided by the 50th term?

52nd term = 2×6^{51}
50th term = 2×6^{49}

$\frac{2 \times 6^{51}}{2 \times 6^{49}} = 6^{51-49} = 6^2 = 36$

Answer: 36

37. If x and y are numbers whose average (arithmetic mean) is 1 and whose difference is 1, what is the product of x and y ?

The sum of a set of numbers equals the number of numbers times the average of the numbers - S=NA
S=NA
$x + y = 2 \cdot 1 = 2$
$x - y = 1$
_____
$2x = 3$
$x = 1.5$
$y = 2 - 1.5 = .5$
$xy = (1.5)(.5) = .75$

Answer: $\frac{3}{4}$ or .75
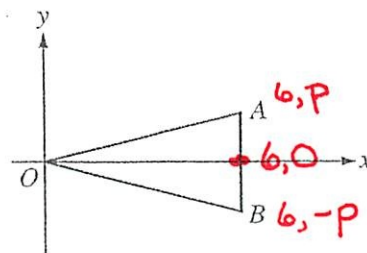
38. In the xy-plane above, points O, A, and B are the three vertices of a triangle. The coordinates of A and B are $(6, p)$ and $(6, -p)$, respectively, where p is a positive number. If the area of $\triangle OAB$ is greater than 9 but less than 10, what is one possible value of p ?

Just TRANSLATE!
9 < Area of $\triangle OAB$ < 10
9 < $\frac{1}{2}bh$ < 10   Multiply all terms by 2
18 < bh < 20
18 < 6b < 20   Divide all terms by 6
3 < b < $3\frac{2}{3}$
3 < AB < $3\frac{1}{3}$ Divide all terms by 2
$\frac{3}{2} < \frac{1}{2}AB < \frac{5}{3}$ $\frac{1}{2}AB = p$

Answer: $\frac{3}{2} < p < \frac{5}{3}$

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

SECTION 5
Time — 30 minutes
39 Questions
(1-39)

Directions: For each question in this section, select the best answer from among the choices given and fill in the corresponding circle on the answer sheet.

The following sentences test correctness and effectiveness of expression. Part of each sentence or the entire sentence is underlined; beneath each sentence are five ways of phrasing the underlined material. Choice A repeats the original phrasing; the other four choices are different. If you think the original phrasing produces a better sentence than any of the alternatives, select choice A; if not, select one of the other choices.

In making your selection, follow the requirements of standard written English; that is, pay attention to grammar, choice of words, sentence construction, and punctuation. Your selection should result in the most effective sentence—clear and precise, without awkwardness or ambiguity.

EXAMPLE:

Laura Ingalls Wilder published her first book and she was sixty-five years old then.

(A) and she was sixty-five years old then
(B) when she was sixty-five
(C) at age sixty-five years old
(D) upon the reaching of sixty-five years
(E) at the time when she was sixty-five

Ⓐ ● Ⓒ Ⓓ Ⓔ

1. The graduation speaker advised the [plural] students to devote yourself to a few passions and to seek excellence in those specific areas.

(A) to devote yourself
(B) to devote themselves *plural*
(C) to all devote oneself
(D) that each devote yourself
(E) for them to devote themselves *redundancy*

(A, C and D) mixture of personal pronoun points of view

2. In 1865, abolitionist minister Henry Highland Garnet became the first African American to address the House of Representatives when he speaks about the nation's obligation to protect the rights of the newly emancipated.

(A) when he speaks about the nation's obligation
(B) when he spoke about the nation's obligation
(C) where speaking about the nation's obligation *"where"*
(D) where he speaks about the nation is obligated *not an adverb of time*
(E) where he has spoken about the obligation by the nation

(A, D and E) incorrect tense

3. Although cats have nocturnal vision that is far superior to that of humans, objects in total darkness cannot be seen by them.

(A) objects in total darkness cannot be seen by them
(B) objects cannot be seen in total darkness by cats
(C) their seeing of objects in total darkness cannot be done
(D) cats' seeing objects in total darkness cannot be done *awkward phrasing*
(E) they cannot see objects in total darkness

(A-D) examples of passive voice

4. George started saving money when he was six years old, so by the time of his becoming a teenager he had enough to pay for a trip to Japan to visit his grandparents.

(A) so by the time of his becoming *incorr use of gerund*
(B) so that by the time when he became
(C) so by the time he became
(D) and by the time he would become
(E) and by the time when he had become

(B) incorrect use of subordinate clause
(D and E) incorrect tense

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5. The great sixteenth-century Mughal ruler Jalaluddin Muhammad Akbar turning his city into a center of learning and inviting holy men from all of India's different religions to come to discuss metaphysics. *[red: 2 participles - NOT verbs]*

   (A) turning his city into a center of learning and inviting *[red: fragments - lack of independent clauses]*
   (B) turning his city into a center of learning, and he invited *[red: one fragment plus one independent clause]*
   (C) turning his city into a center of learning by inviting *[red: ALL participles]*
   (D) turned his city into a center of learning, he invited *[red: comma splice]*
   (E) turned his city into a center of learning by inviting *[red: E circled]*

6. In her autobiography, Edith Wharton, who was a close friend of fellow novelist Henry James, included observations about he and other writers.

   (A) included observations about he *[red: "him"-object of prep]*
   (B) included observations about him *[red: B circled]*
   (C) including observations about him *[red: lack of independent clause]*
   (D) she included observations about he
   (E) she had included observations about him
   [red: (D and E) superfluous subject]

7. Primatologist Janis Carter arrived in West Africa in 1977 for what she expected to be a stay of only three weeks, so she remained there to this day.

   (A) so she remained there *[red: so circled; NOT cause and effect]*
   (B) there she was to remain *[red: incorrect tense and comma splice]*
   (C) there she is remaining
   (D) where she had remained
   (E) but she has remained there *[red: E circled; correct use of present perfect tense]*

8. Although natural changes account for the extinction of some bird species, human actions such as excessive hunting, habitats being destroyed, and predators being introduced are more common causes.

   (A) excessive hunting, habitats being destroyed, and predators being introduced
   (B) excessive hunting, the destruction of habitats, and the introduction of predators *[red: B circled]*
   (C) excesses in hunting, in destroying habitats, and introducing predators
   (D) hunting was excessive, habitats were destroyed, and predators introduced
   (E) the fact that they hunted excessively, destroyed habitats, and introduced predators *[red: "the fact" struck; wordiness]*
   [red: (A, C and D) lack of parallel construction]

9. By having allergies that flare up in the fall and the spring causes many students to miss classes at critical periods of the semester.

   (A) By having allergies that flare up in the fall and the spring causes many students
   (B) By allergies flaring up in the fall and the spring causes many students *[red: (A and B) lack of subject]*
   (C) Many students, having allergies that flare up in the fall and the spring, are caused *[red: non standard English]*
   (D) Flaring up in the fall and the spring, many students have allergies that cause them
   (E) Allergies that flare up in the fall and the spring cause many students *[red: E circled]*
   [red: (D) dangling modifier - "flaring students"]

10. Our parents' friends have been going to the same place for their summer vacation every year for the past fifteen years.

    (A) have been going *[red: A circled]*
    (B) who have been going *[red: lack of independent clause]*
    (C) had went
    (D) are going *[red: incorrect tense]*
    (E) go
    [red: (A) correct use of present perfect tense]

[red: smiley face]

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participle

11. After serving ten years as foreign minister, they elected Golda Meir prime minister of Israel in 1969.

   (A) they elected Golda Meir prime minister of Israel
   (B) Israel elected Golda Meir their prime minister
   (C) Israel elected Golda Meir prime minister
   (D) Golda Meir was elected prime minister of Israel
   (E) Golda Meir's election as Israel's prime minister was

(A, B, C and E) examples of sentences containing a dangling modifier

12. Because of the murkiness of copyright law and the extension of copyright protections in 1998, the status of a work whose author has died is often difficult to determine.

   (A) of a work whose author has died
   (B) of a work with the author having died
   (C) of a work where the author's death
   (D) when a work's author had died → *incorrect tense*
   (E) when the author of a work was dead

(B-E) weird modification!

13. Senator Garcia has four children, two of whom have decided to follow their father into public service.

   (A) children, two of whom have
   (B) children, and two of whom have → *lack of sentence combining*
   (C) children, whereas two of them have → *signals opposite ideas*
   (D) children, of them, two having → *incorrect use of semicolon*
   (E) children; however, two having

14. Long thought to be a fruit unfit for eating, they did not cultivate the tomato widely in North America until the early twentieth century.

   (A) they did not cultivate the tomato widely in North America
   (B) North Americans did not cultivate tomatoes widely
   (C) North America did not see widespread cultivation of the tomato
   (D) the tomato was not widely cultivated in North America
   (E) tomatoes have not been widely cultivated in North America → *incorrect tense*

(A-C) examples of dangling modifier

15. The changes in the city council's recycling policy has frustrated city residents. who feel that curbside pickup of recyclables should occur weekly, not biweekly.

   (A) The changes in the city council's recycling policy has frustrated city residents; → *subject-verb disagreement*
   (B) The changes in the city council's recycling policy, they have frustrated city residents; → *superfluous subject*
   (C) The changes in the city council's recycling policy have frustrated city residents,
   (D) Frustrated by changes in the city council's recycling policy, city residents → *lack of indep cl*
   (E) City residents were frustrated by the change in the city council's recycling policy and

16. The president of the publishing company said that her firm sold more electronic books in the first four months of 2008 as they sold in all of 2007.

   (A) as they sold → *"as" is used to note similarities*
   (B) as it did
   (C) than was sold → *"were"*
   (D) than they have → *ambiguous pronoun*
   (E) than it did

17. In addition to racing rocket-powered vehicles, Kitty O'Neil worked as a stuntwoman, she performed physical feats called for in shows such as *The Bionic Woman*.

   (A) stuntwoman, she performed physical feats called for → *comma splice*
   (B) stuntwoman, performing physical feats that is being called for → *plural singular*
   (C) stuntwoman, who performed physical feats they called for → *ambiguous pronoun*
   (D) stuntwoman, performing the physical feats called for
   (E) stuntwoman, and she was performing called-for physical feats → *lack of sentence combining*

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18. The [success] of *Dracula*, Bram Stoker's novel about a Transylvanian vampire, <u>far surpassing any of his</u> <u>other novels dealing with</u> supernatural themes. *singular*

    (A) far surpassing any of his other novels dealing with *plural*
    (B) far surpassing those of any of his other novels that dealt with
    (C) far surpassed that of any of his other novels dealing with *singular*
    (D) far surpassed any of his other novels dealing with
    (E) surpassing by far those other novels of his that dealt with

    (A, D and E) incorrect comparison of "success" with "novels"

19. Exhibitions of some works by modern artists have spurred political controversy <u>over</u> <u>should they</u> <u>continue federal support of art</u>.

    (A) should <u>they</u> continue federal support of art *ambiguous pronoun*
    (B) should federal support of art continue
    (C) continued federal <u>support</u> of art *preposition "over" with object "support"*
    (D) whether art should be continued to be supported federally *wordy!*
    (E) federal support of art and continuing (it)?

20. <u>Lily Dale</u>, the heroine of Anthony Trollope's serialized novel *The Small House at Allington*, <u>captivated readers</u> <u>to where</u> they deluged the author with letters pleading that he have her marry her admirer, Johnny Eames.

    (A) captivated readers to where
    (B) so captivated readers that
    (C) because she captivated readers,
    (D) who captivated readers so that *lack of indep. cl.*
    (E) she was so captivating to readers that *superfluous subject*

    (C) "Lily Dale..." is left high + dry! ☺

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The following sentences test your ability to recognize grammar and usage errors. Each sentence contains either a single error or no error at all. No sentence contains more than one error. The error, if there is one, is underlined and lettered. If the sentence contains an error, select the one underlined part that must be changed to make the sentence correct. If the sentence is correct, select choice E. In choosing answers, follow the requirements of standard written English.

EXAMPLE:

The other delegates and him immediately
   A   B   C
accepted the resolution drafted by the
                                D
neutral states. No error
                    E

(A) ● (C) (D) (E)

21. All along the highway **was** vacant new office
     were
     plural (subject-verb agreement)
                          (A)
buildings, evidence that the economic boom the area
                                                    B
had experienced was proving to be short-lived.
        C   D

No error
    E

22. Many of the novels and short stories written by
    A
Sarah Orne Jewett were inspired by everyday life
                          B
in the seaport town in Maine where she had grew up.
                                    C   D
                                              had grown

(past participle form of
No error **irregular verb "grow")**
    E

23. Farmers who face droughts, tornadoes, and
              A
falling prices
have falling prices for their crops must often work
        B   D
      C
(parallel construction)
long hours seven days a week. No error
                                E

24. *singular-gerund as a subject*
   (subject-verb agreement)
Leaving his beloved science fiction books at home
                A
                                         was
when he went to camp last summer were among the
              B   C
most difficult things that Marek had ever done.
        D

No error
    E

25. *plural*
Both of the candidates running for governor had
                            A
          teachers
been a teacher before going into politics, yet
        B   C
(associated nouns agree in number)
they disagreed about many issues related to
                                    D
public education. No error
                    E

26. Her latest novel, depicting a young girl's coming
                        A
of age in Harlem during the 1940s, is even
                      B   C
livelier
more livelier than her earlier books. No error
        D   E
(two syllable adjectives ending
with a "y" add "er" to form
the comparative degree)

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27. The history of science has more than their
    A ~~their~~ *its*
    (pronoun-antecedent agreement)

    share of underdog stories, but few of them are
    C

    as remarkable as the story of Shuji Nakamura,
    D

    inventor of the blue laser diode. No error
    E

singular (history)

28. Dr. Sandford said that astronomers will

    soon be able to measure distances between the
    A   B

    stars with an accuracy that ten years ago would seem
    C   D *seemed*

    impossible. No error
    E

    (correction to simple past tense)

29. The word "lanyard" describes a cord to which an
    A

    employee might attach an identification card, but
    B

    the word seems sinister when one learns that it is
    C

    derived by an Old French word for "noose." No error
    D *derived from*   E

    (correct idiomatic usage)

30. Humans have long been inventing tools, and this
    A

    film documents the amazing creativity with which
    B   C

    tools have been developed through the ages. No error
    D   (E)

31. Viewing it from Earth, the planet Mars seems
    A *When one views it*   *subject*
    (correction of a dangling modifier)
    L, participle

    to be rushing eastward through the constellations,
    B

    as if in a futile effort to escape from the Sun.
    C   D

    No error
    E

32. A casual observer might mistake a viola for a violin,
    A

    since they are very similar in appearance, but the
    B

    tone of a viola is deeper than a violin. No error
    C   D *that of a violin* E

    (comparing similar items –
    tone of viola with tone of violin)

33. At the site of a royal tomb in Shaanxi Province, China,

    archaeologists have unearthed thousands of life-size
    A

    terra-cotta statues of soldiers, no two of which are
    B   C

    exactly alike. No error
    D   (E)

34. Though *The Second World War*, a book by
    A

    Sir Winston Churchill, was respectively received
    respectfully   B
    (correct word usage)

    when it was first published, it is not highly
    C   D

    regarded by historians today. No error
    E

GO ON TO THE NEXT PAGE

Directions: The following passage is an early draft of an essay. Some parts of the passage need to be rewritten.

Read the passage and select the best answers for the questions that follow. Some questions are about particular sentences or parts of sentences and ask you to improve sentence structure or word choice. Other questions ask you to consider organization and development. In choosing answers, follow the requirements of standard written English.

Questions 35-39 refer to the following passage.

(1) We usually think of facial expressions as outward signs of feelings people are experiencing. (2) A feeling, we assume, causes a corresponding expression. (3) However, groundbreaking research by psychologist Paul Ekman has shown that the opposite is sometimes true. (4) Making a particular kind of face, it turns out, can actually cause someone to experience the emotion associated with that expression.

[handwritten: mentions research]

(5) Ekman needed a precise way of identifying common facial expressions. (6) He painstakingly catalogued the muscle movements that pull our facial features into various configurations, giving each of these "Action Units" a distinct numerical designation. (7) Ekman's Action Units vary in complexity. (8) A wink, for example, involves the twitch of a single muscle that wraps around the eye. (9) A smile, therefore, is quite complex. (10) Ekman identified 19 kinds of smiles, each engaging a slightly different combination of many muscles.

[handwritten: first steps of research]

(11) Ekman catalogued the various facial expressions. (12) He began to study their physical and emotional effects. (13) Participants in the study were asked not to express specific emotions but rather to produce particular Action Units. (14) Ekman found that when subjects produced an Action Unit associated with anger, their heart rates increased and their fingers became warmer. (15) When they produced an Action Unit associated with fear, their fingers became colder. (16) For that reason, Ekman concluded that a facial expression can be the cause, as well as the effect, of an emotion and its associated physical state.

35. Where in the passage would the following sentence most appropriately be inserted?

[handwritten: Therefore]

Accordingly, a furrowed brow is identified as Action Unit 4, a dropped jaw as Action Unit 26, and so forth.

[handwritten: "distinct numerical designations"]

(A) Immediately after sentence 3
(B) Immediately after sentence 5
(C) Immediately after sentence 6
(D) Immediately after sentence 12
(E) Immediately after sentence 14

36. Which of the following phrases, if inserted at the beginning of sentence 5 (reproduced below), would best link the first and second paragraphs?

Ekman needed a precise way of identifying common facial expressions.

(A) It was now obvious that
(B) Because of these limitations,
(C) For similar reasons,
(D) In order to conduct his research,
(E) Based on those results,

37. In context, which of the following revisions to sentence 9 (reproduced below) is most needed?

A smile, therefore, is quite complex.

(A) Changing "A" to "This kind of "
(B) Changing "therefore" to "by comparison"
(C) Changing "is" to "can be"
(D) Deleting "quite"
(E) Changing "complex" to "complicated"

[handwritten: (B) "quite complex" compared with "single"]

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38. In context, which is the most effective revision of the underlined portion of sentences 11 and 12 (reproduced below) ?

Ekman catalogued the various facial expressions. He began to study their physical and emotional effects.

(A) Ekman catalogued the various facial expressions, and he began

(B) Ekman ~~instead~~ catalogued the various facial expressions before beginning

(C) ~~Because~~ he catalogued the various facial expressions, Ekman began

(D) ~~Although he had already catalogued the~~ various facial expressions, Ekman began

(E) Once he had catalogued the various facial expressions, Ekman began

[Handwritten: Combine sentences in a way to express a sequence of events.]

39. In context, which of the following phrases would most appropriately be inserted at the beginning of sentence 15 (reproduced below) ?

When they produced an Action Unit associated with fear, their fingers became colder.

(A) In contrast,
(B) In other words,
(C) Meanwhile,
(D) Unfortunately,
(E) Above all,

[Handwritten: (A) "colder" is a contrast to "warmer" ☺]

STOP

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