www.actexam.net

Form G19

(April 2024)

The ACT®

2023 | 2024

In response to your request for Test Information Release materials, this booklet contains the test questions, scoring keys, and conversion tables used in determining your ACT scores. Enclosed with this booklet is a report that lists each of your answers, shows whether your answer was correct, and, if your answer was not correct, gives the correct answer.

ACT owns the test questions and responses, and you may not share them with anyone in any form.

©2024 by ACT, Inc. All rights reserved.
NOTE: This test material is the confidential copyrighted property of ACT, Inc., and may not be copied, reproduced, sold, scanned, emailed, or otherwise transferred without the prior express written permission of ACT, Inc. Violators of ACT's copyrights are subject to civil and criminal penalties.

www.crackab.com

www.actexam.net

Directions

This booklet contains tests in English, mathematics, reading, and science. These tests measure skills and abilities highly related to high school course work and success in college. **Calculators may be used on the mathematics test only.**

The questions in each test are numbered, and the suggested answers for each question are lettered. On the answer document, the rows of ovals are numbered to match the questions, and the ovals in each row are lettered to correspond to the suggested answers.

For each question, first decide which answer is best. Next, locate on the answer document the row of ovals numbered the same as the question. Then, locate the oval in that row lettered the same as your answer. Finally, fill in the oval completely. Use a soft lead pencil and make your marks heavy and black. **Do not use ink or a mechanical pencil.**

Mark only one answer to each question. If you change your mind about an answer, erase your first mark thoroughly before marking your new answer. For each question, make certain that you mark in the row of ovals with the same number as the question.

Only responses marked on your answer document will be scored. Your score on each test will be based only on the number of questions you answer correctly during the time allowed for that test. You will **not** be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

You may work on each test **only** when the testing staff tells you to do so. If you finish a test before time is called for that test, you should use the time remaining to reconsider questions you are uncertain about in that test. You may **not** look back to a test on which time has already been called, and you may **not** go ahead to another test. To do so will disqualify you from the examination.

Lay your pencil down immediately when time is called at the end of each test. You may **not** for any reason fill in or alter ovals for a test after time is called for that test. To do so will disqualify you from the examination.

Do not fold or tear the pages of your test booklet.

DO NOT OPEN THIS BOOKLET
UNTIL TOLD TO DO SO.

www.crackab.com

www.actexam.net

ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

The Snowflake Man

Science can attribute the notion that no two snowflakes are alike, to the work of Vermont farmer [1] Wilson "Snowflake" Bentley. As early as 1610, scientists had begun studying the basic structure of the snowflake. But Bentley made history in 1885 [2] when he produced a "photomicrograph" of an individual flake. For the first time, the intricacies and variations of snowflake structure could be documented. [3]

1. **A.** NO CHANGE
B. alike, to the work of Vermont farmer,
C. alike to the work of Vermont farmer,
D. alike to the work of Vermont farmer

2. **F.** NO CHANGE
G. history in, 1885,
H. history in, 1885
J. history, in 1885

3. At this point, the writer is considering adding the following true statement:

> In the 1600s, Johannes Kepler published the treatise "On the Six-Cornered Snowflake."

Should the writer make this addition here?

A. Yes, because it establishes a timeline for the study of snowflakes throughout history.
B. Yes, because it establishes that Bentley was influenced by Kepler's work.
C. No, because it detracts from the essay's focus on Bentley and his photomicrographs.
D. No, because it detracts from the essay's focus on Bentley's farm in Vermont.

www.crackab.com

www.actexam.net

From the time he was fifteen, Bentley used a microscope and examining snowflakes during snowfalls, (4) finding seemingly infinite variations of their basic six-cornered structure. He tried to document the snowflakes by drawing them, (5) but they tended to melt before he could finish. He soon abandoned drawing in favoring (6) photography.

To take his photographs, Bentley used a bellows camera, that is (7) a portable camera with a pleated extension joining the lens and the film plane. "Dodging and burning" is a technique photographers use to lighten and darken (8) specific areas on a print. (8) The camera's accordion-like body allowed him to maneuver the lens so that it connected directly to the eyepiece of his microscope. Bentley would collect the snowflakes, putting them on a microscope slide and snap (9) a photo.

Collecting the snowflakes wasn't exactly simple. To cushion the snowflakes' fall, Bentley caught them (10) on a velvet-covered tray. Then, using a feather (11) to transfer each flake to a slide. After Bentley took a photo, he put the negative aside to develop later.

4. **F.** NO CHANGE
G. examining snowflakes during snowfalls and
H. to examine snowflakes during snowfalls and
J. to examine snowflakes during snowfalls,

5. **A.** NO CHANGE
B. and record the six-cornered snowflakes by drawing them by hand,
C. and record the six-cornered snowflakes by hand-drawing them,
D. the snowflakes, hand-drawing them by hand,

6. **F.** NO CHANGE
G. favor of
H. favor for
J. favored

7. **A.** NO CHANGE
B. camera; this being
C. camera—
D. camera;

8. The writer is considering deleting the underlined portion. Should the underlined portion be kept or deleted?
F. Kept, because it introduces a photographic technique of Bentley's that will be described later in the essay.
G. Kept, because it establishes that Bentley was an experienced photographer.
H. Deleted, because it detracts from the paragraph's focus on the quality of Bentley's photographs.
J. Deleted, because it interrupts the description of Bentley's camera.

9. **A.** NO CHANGE
B. putting them on a microscope slide, and snapping
C. put them on a microscope slide, and snapping
D. put them on a microscope slide, and snap

10. **F.** NO CHANGE
G. the flake
H. this
J. it

11. **A.** NO CHANGE
B. He then used a feather
C. Using a feather, then,
D. Then used a feather

www.crackab.com

www.actexam.net

Per snowfall, he could photograph

an impressive number of snowflakes.
12

Bentley, nothing if not meticulous, would later duplicate the original negative and scrape away the dark emulsion that surrounded the image of each flake. Then he would place the doctored duplicate onto a clear glass plate and print it. This method changed the background of the image from white to black, accentuating the details of the
13
photographed flake. Between 1885 and 1931, Bentley

repeated this painstaking process, nonetheless producing
14
about 5,000 photomicrographs of snowflakes. Of course, not one of Bentley's flakes looks exactly the same as another.

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

about seventy-five snowflakes.

Given that the information is accurate, should the writer make this revision?

F. Yes, because it provides specific information about the types of snowfalls Bentley was able to photograph while he lived in Vermont.
G. Yes, because it provides specific information that helps demonstrate Bentley's productivity during his snowflake photography sessions.
H. No, because although it provides specific information, it indicates that Bentley wasn't satisfied with the number of snowflakes he photographed.
J. No, because although it provides more information, it does not provide the exact number of snowflakes that Bentley photographed.

13. **A.** NO CHANGE
B. black and it accentuated
C. black, it accentuated
D. black accentuating

14. **F.** NO CHANGE
G. ultimately
H. otherwise
J. usually

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's primary purpose had been to write about a notable achievement in photography. Would this essay accomplish that purpose?

A. Yes, because it describes Bentley's innovative method for photographing an object that had never been captured on film.
B. Yes, because it focuses on the process of snowflake formation and the man who discovered it.
C. No, because it instead describes how scientists used Bentley's photomicrographs to study snowflakes.
D. No, because it instead focuses on Bentley's childhood accomplishments in photography.

PASSAGE II

Disco Clams

In the coral reefs off Indonesia, *Ctenoides ales*—

or the disco clam flickers a band of bright light—along
16
the fleshy lips where the two halves of its shell meet.

16. **F.** NO CHANGE
G. clam—flickers a band of bright light
H. clam flickers—a band of bright light
J. clam flickers a band—of bright light

www.crackab.com

www.actexam.net

Marine biologists long believed these light bands were the result of bioluminescence; a chemical reaction that (17)

17. **A.** NO CHANGE
B. bioluminescence, and a
C. bioluminescence, a
D. bioluminescence. A

produces light in a variety of deep-sea creatures. However, (18) in 2014, University of California, Berkeley, researcher Lindsey Dougherty discovered the disco clam possesses a far rarer ability. Its lips reflect ambient light.

18. **F.** NO CHANGE
G. makes luminosity happen in a whole multiplicity
H. generates luminescence in a diverse bunch
J. engenders light in a hodgepodge

Dougherty compares the disco clam's lips to a scarf, one side of which is covered in foil according to Dougherty's analogy. (19) As the clam furls and unfurls its lips, microscopic, mirror-like silica spheres (20) on the "foil" side reflects (21) all visible light, making this side appear white. [22] The lips' other side, which lacks the silica spheres, (23) reflects only longer wavelengths, making this side appear red.

19. **A.** NO CHANGE
B. in this parallelism with the disco clam's lips.
C. in her comparison.
D. DELETE the underlined portion and end the sentence with a period.

20. **F.** NO CHANGE
G. lips microscopic, mirror-like silica spheres,
H. lips microscopic, mirror-like, silica spheres,
J. lips, microscopic, mirror-like silica spheres,

21. **A.** NO CHANGE
B. has reflected
C. is reflecting
D. reflect

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

> Silica is used in the production of glass for windows and drinking cups.

Given that the sentence is accurate, should the writer make this addition here?

F. Yes, because it clarifies how the disco clam's silica spheres reflect light.
G. Yes, because it clarifies information about Dougherty's motivation for studying disco clams.
H. No, because it interrupts the paragraph's description of how the disco clam's lips reflect light.
J. No, because it interrupts the paragraph's explanation of the relationship between spheres and wavelengths.

23. If the writer were to delete the underlined portion (adjusting the punctuation as needed), the essay would primarily lose:

A. a description of how the disco clam utilizes the silica spheres.
B. a suggestion that one side of the disco clam's lips is less important than the other side.
C. a detail that helps explain why one side of the disco clam's lips appears red.
D. an estimation of how many silica spheres are on the disco clam's lips.

www.crackab.com

www.actexam.net

The clam's furling and unfurling—clocking in at, roughly speaking, 2.4 times per second—exposes the silica spheres and then conceals them in rapid succession. This creates the illusion of a strobing bright light.

[1] Dougherty strove not only to understand this mechanism but also to identify its purpose. [2] Some creatures use bioluminescence to ward off predators, Dougherty isolated a disco clam with a mantis shrimp—the clam's natural predator—in an aquarium. [3] Dougherty hypothesized that this increase signified a warning to the mantis shrimp. [4] Using a photometer, Dougherty measured the frequency of the disco clam's light bursts. [5] As the mantis shrimp approached the clam, its flashes increased in frequency from 1.5 to 2.5 hertz. [27]

In a subsequent experiment, she conceded the mantis shrimp to get closer to the clam. After its lips flashed with greater frequency, the disco clam secreted sulfuric acid, sending the mantis shrimp into a catatonic state. This discovery supports Dougherty's warning signal theory. If its flashes go unheeded, the disco clam's final defense is sulfuric acid—a potent weapon for staying alive.

24. **F.** NO CHANGE
G. taking place at a temporal calculation of
H. occurring at an average rate of
J. happening, more or less, about

25. Given that all the choices are accurate, which one most effectively concludes the paragraph?
A. NO CHANGE
B. The disco clam is also called the electric flame scallop and the electric clam.
C. The disco clam is the only bivalve known to have light displays.
D. Dougherty studied this mechanism using high-speed video cameras.

26. **F.** NO CHANGE
G. Dougherty knew some
H. She realized some
J. Knowing some

27. For the sake of the logic and cohesion of this paragraph, Sentence 3 should be placed:
A. where it is now.
B. after Sentence 1.
C. after Sentence 4.
D. after Sentence 5.

28. **F.** NO CHANGE
G. admitted
H. allowed
J. granted

29. Which of the following alternatives to the underlined portion would NOT be acceptable?
A. acid, which sent
B. acid. This sent
C. acid; sending
D. acid; it sent

www.crackab.com

www.actexam.net

Question 30 asks about the preceding passage as a whole.

30. Suppose the writer's primary purpose had been to discuss a particular behavior of a sea creature. Would this essay accomplish that purpose?

F. Yes, because it explains how the disco clam's lips reflect light and suggests a possibility for why this occurs.
G. Yes, because it provides a summary of Dougherty's research on the relationship between the disco clam and the mantis shrimp.
H. No, because it provides an overview of the differences between bioluminescent sea creatures and disco clams.
J. No, because it explains that Dougherty became interested in the disco clam while studying the mantis shrimp.

PASSAGE III

Marathon Drummers

In 1960s Japan, *kumi-daiko* or ensemble drumming, [31] became a phenomenon. They were inspired by [32] ancient Japanese rituals and modern jazz, the ensembles performed at festivals throughout Japan. The enormous *taiko* drums, some of which weigh nearly 900 pounds— [33] and the physically demanding routines of the performers astonished audiences. Using a full range of motion, the standing ensembles swung their *bachi* (drumsticks) onto the drums' deerskin surfaces. [34] They drummed with speed and force, always maintaining perfect rhythm.

For educator Den Tagayasu, the value of *kumi-daiko* was not only in its art, but also in the self-discipline needed to perform it. In 1969, Den started Ondekoza, a school on the Japanese island of Sado, and required that his students adopt the principle of *Sogakuron*.

31. A. NO CHANGE
B. Japan, *kumi-daiko*, or ensemble drumming,
C. Japan *kumi-daiko*, or ensemble drumming
D. Japan *kumi-daiko* or ensemble drumming,

32. F. NO CHANGE
G. The drummers' inspiration came from
H. They drew inspiration from
J. Inspired by

33. A. NO CHANGE
B. drums—some of which weigh nearly 900 pounds—
C. drums—some of which weigh nearly 900 pounds,
D. drums some of which weigh nearly 900 pounds

34. At this point, the writer is considering adding the following sentence to the essay:

> Hand drums like the *kotsuzumi* are more common in Japanese classical music than in *kumi-daiko*.

Given that the information is accurate, should the writer make this addition?

F. Yes, because it explains why the ensembles are able to drum with speed.
G. Yes, because it emphasizes that *bachi* are custom made to meet a specific drummer's style.
H. No, because it interrupts the description of *kumi-daiko* performances.
J. No, because it detracts from the description of the size of *taiko* drums.

www.crackab.com

www.actexam.net

Roughly translated, *Sogakuron* states that running and *kumi-daiko* is one, a union reflecting the drama and the energy of life. [35]

35. **A.** NO CHANGE
B. has been
C. are
D. was

Den was no easy taskmaster. He demanded his students begin and end each day by running long distances. In between, they practiced *kumi-daiko* for hours. To motivate them, his students were assured that their self-discipline would allow them to travel the world, glorifying Japanese culture. [36]

36. **F.** NO CHANGE
G. Den's students were assured
H. Den assured his students
J. they were assured

In 1975, Den made good on his promise. In its international debut, the Ondekoza ensemble gave a performance in Boston; immediately *after* the drummers had run the Boston Marathon. [37]

37. **A.** NO CHANGE
B. Boston, and
C. Boston: and
D. Boston—

Therefore, as they performed their signature piece, *Yatai-bayashi*, the drummers didn't seem to be even a tad bit drained. [38] [39]

38. **F.** NO CHANGE
G. For instance, as
H. Likewise, as
J. As

39. **A.** NO CHANGE
B. weren't looking like they were sapped.
C. betrayed no hint of exhaustion.
D. didn't appear tuckered out.

The dramatic drumming, coupled by the performers' staggering degree of endurance, inspired Japanese American communities to start their own *kumi-daiko* groups. [41] Through the decades, Ondekoza exhausted numerous "marathon tours." In 1998, [40] [42]

40. **F.** NO CHANGE
G. coupled with
H. doubled with
J. doubled by

41. At this point, the writer is considering dividing the paragraph into two. Should the writer begin or not begin a new paragraph here, and why?

A. Begin a new paragraph, because the essay shifts from a description of a specific event to a broader overview of events that followed.
B. Begin a new paragraph, because the essay moves from a description of a group of people to a profile of an individual.
C. DO NOT begin a new paragraph, because doing so would interrupt the discussion of specific pieces Ondekoza performed.
D. DO NOT begin a new paragraph, because doing so would disrupt the description of how Japanese Americans were inspired by Ondekoza.

42. **F.** NO CHANGE
G. completed
H. wrought
J. fulfilled

www.crackab.com

www.actexam.net

the members of Ondekoza while running over 7,500 miles
43

in China, stopping to perform their virtuoso percussion
44
pieces along the way. For Den, these marathon tours

brought him international recognition.
45

43. **A.** NO CHANGE
B. who ran
C. running
D. ran

44. The writer wants to emphasize the skill of the performers. Which choice best accomplishes that goal?
F. NO CHANGE
G. important
H. popular
J. reputable

45. Which choice would most effectively conclude the essay by referencing information about Den's teaching presented earlier in the essay?
A. NO CHANGE
B. reminded him of performances he had once seen in Japan.
C. served to further bolster Ondekoza's reputation.
D. represented the culmination of *Sogakuron*.

PASSAGE IV

Preserving Eatonville

The small town of Eatonville, Florida—the United
46
States' first incorporated African American township, had just celebrated its centennial in 1987 when unsettling news arrived. The county planned to turn Eatonville's main thoroughfare, a two-lane street into a major highway.
47
Citizens were concerned that the small-town feel of their historic community would be lost. They rallied to form a preservation association, whose initial efforts centered on launching a festival celebrating the town's
48
most famous resident—author and folklorist Zora Neale
48
Hurston.
48

Raised at the turn of the century in the culturally affirming environment of Eatonville, Hurston was uniquely positioned to grow up watching black citizens empowered to make unprecedented social and civil progress.

46. **F.** NO CHANGE
G. town of Eatonville, Florida,
H. town, of Eatonville Florida,
J. town of Eatonville, Florida

47. **A.** NO CHANGE
B. thoroughfare (a two-lane street),
C. thoroughfare, a two-lane street,
D. thoroughfare, (a two-lane street)

48. Given that all the choices are accurate, which one best introduces the focus of the essay?
F. NO CHANGE
G. were supported by local businesses as well as foundations such as the Florida Humanities Council.
H. motivated many volunteers from the community to become involved.
J. included completing a historical survey of the town.

www.crackab.com

www.actexam.net

Around her she saw people of color leading the local government [49], directing school curricula, and running businesses. This upbringing helped shape Hurston into an outspoken literary figure, arguably the most influential female voice of the Harlem Renaissance in the 1930s.

49. Given that all the following parenthetical statements are true, which one provides information that is most relevant at this point in the essay?

A. (the town was founded with twenty-seven families and grew over time)
B. (Hurston would later work as a screenwriter and a librarian)
C. (her father served as mayor)
D. (Hurston had seven siblings)

50. The writer is considering deleting the underlined portion (ending the sentence with a period). Should the writer make this deletion?

F. Yes, because the underlined portion adds general information about the time period that is unrelated to Hurston's life and work.
G. Yes, because the underlined portion suggests that Hurston is more appreciated today than she was in the 1930s.
H. No, because the underlined portion indicates that Hurston's work initiated the Harlem Renaissance.
J. No, because the underlined portion helps emphasize the level of Hurston's impact.

Eatonville residents hoped showcasing the town's rich cultural heritage would convince county officials regarding it's historic significance. Thus, the Zora Neale Hurston Festival of the Arts and Humanities were established. It focused on not only the author and her works as well as her fierce commitment to amplifying black voices through art. The inaugural festival, which featured such renowned speakers as novelist Alice Walker and while attracting thousands of attendees, was a resounding success.

51. **A.** NO CHANGE
B. residents had hope while
C. residents, hoping that
D. residents, who hoped

52. **F.** NO CHANGE
G. of its
H. about it's
J. toward its

53. **A.** NO CHANGE
B. Nonetheless,
C. Moreover,
D. Instead,

54. **F.** NO CHANGE
G. were brought into being.
H. have been created.
J. was born.

55. **A.** NO CHANGE
B. in addition to
C. but also
D. also

56. **F.** NO CHANGE
G. In the year the festival was launched, the
H. In that first year, the
J. The initial

57. **A.** NO CHANGE
B. attracted
C. attracting
D. having attracted

www.crackab.com

www.actexam.net

The county was effectively swayed; the highway plan was scrapped. Since then, the festival has continued to evolve, increasing in complexity and popularity each year. With events taking place in various locations throughout the area during the weeklong festival, organizers present an array of exhibitions, performances, and workshops each January. And, thanks in by and large to Hurston's legacy, Eatonville residents enjoy their victory in the form of a preserved two-lane road.

58. Given that all the choices are accurate, which one most effectively explains the overarching purpose that drives festival organizers today?

F. NO CHANGE
G. After spending months arranging events and coordinating with artists and vendors,
H. With the ongoing goal of promoting African American cultural arts,
J. Although some of the volunteers, like Hurston herself, were not born in Eatonville,

59. **A.** NO CHANGE
B. in the first month of every year, in January.
C. every January, on an annual basis.
D. annually each year in January.

60. **F.** NO CHANGE
G. large part
H. largely
J. partly

PASSAGE V

Memory Maps

Miss Lin, my high school art teacher, loved taking us on field trips around New York. We lived, she often exclaimed, in the world's greatest city. She believed not taking advantage of its resources was, in Miss Lin's mind, "a shameful act of shallowness."

By the time I graduated, I had seen the opera *Aida* at the Met, attended a de Kooning retrospective at the MoMA, and witnessed the beauty of Chinese porcelain at the Guggenheim. What I remember most, though was a less glamorous art show called *From Memory: Draw a Map of the United States*.

61. **A.** NO CHANGE
B. According to Miss Lin, not
C. Per Miss Lin, not
D. Not

62. **F.** NO CHANGE
G. their
H. it's
J. its'

63. **A.** NO CHANGE
B. was witness to
C. had witnessed
D. witnessing

64. **F.** NO CHANGE
G. though, was a less glamorous art show called
H. though was a less glamorous art show called,
J. though was a less glamorous art show, called,

www.crackab.com

www.actexam.net

On the train into Manhattan, Miss Lin gave us some background on the show. In 1971, Japanese-born artist Hisachika Takahashi immigrated to the United States, where he wished to explore the divergent visions American artists had of their country. Takahashi asked twenty-two artists to draw a map of the United States. The only stipulation Miss Lin emphasized, was they had to draw the map using only the aid of their memories and imaginations.

As we entered the Sean Kelly Gallery, Miss Lin left us with a question to guide our viewings: What is a map? Cartography is the science of drawing maps. Isn't it just a resource to help you get from here to there?

I began studying the artists' maps, though, I found myself intrigued. One of the maps were drawn with the intricate lines of state borders, rivers, and coastlines. Others, however, didn't look like maps at all. One artist imagined the states as cubes that, together, formed a larger cube representing the nation. Another artist carried a more satirical approach. He drew the United States as a check

65. Which choice provides the best introduction to the paragraph?
- **A.** NO CHANGE
- **B.** I wondered where Miss Lin learned about obscure art shows.
- **C.** I thought about all the art Miss Lin had taken us to see.
- **D.** Miss Lin took attendance before taking a seat.

66. Which of the following alternatives to the underlined portion would NOT be acceptable?
- **F.** States and
- **G.** States. He
- **H.** States, he
- **J.** States; he

67. The writer wants to make clear that Takahashi asked every artist to draw his or her own map of the United States. Which choice best accomplishes that goal?
- **A.** NO CHANGE
- **B.** to contribute to the project by drawing
- **C.** each to draw
- **D.** all to draw

68.
- **F.** NO CHANGE
- **G.** stipulation, Miss Lin emphasized,
- **H.** stipulation, Miss Lin emphasized
- **J.** stipulation Miss Lin, emphasized

69.
- **A.** NO CHANGE
- **B.** chaperone our examinations:
- **C.** advise our inspections:
- **D.** counsel our surveys:

70. Which choice provides the best transition from the first sentence to the last sentence of the paragraph?
- **F.** NO CHANGE
- **G.** Miss Lin sometimes asked us philosophical questions.
- **H.** There are many different kinds of maps.
- **J.** That seemed simple enough.

71.
- **A.** NO CHANGE
- **B.** While studying
- **C.** I was studying
- **D.** I studied

72.
- **F.** NO CHANGE
- **G.** have been
- **H.** was
- **J.** are

73.
- **A.** NO CHANGE
- **B.** took
- **C.** grabbed
- **D.** handled

www.crackab.com

www.actexam.net

made out to Takahashi from the "Fantastical National Bank of America." As I considered a map that included nothing but the cities of New York and Los Angeles; a thought occurred to me: What would my map look like? How would I represent my memories and impressions of my country?

74

And, seemingly on cue, Miss Lin crept up behind me. "So Josh," she said, "what do you think your homework's going to be tonight?"

74. **F.** NO CHANGE
G. Angeles, and a
H. Angeles. A
J. Angeles, a

Question 75 asks about the preceding passage as a whole.

75. Suppose the writer's primary purpose had been to document the life of an artist. Would this essay accomplish that purpose?

A. Yes, because the essay describes how Takahashi was influenced by his Japanese upbringing and his American experiences in conceptualizing *From Memory*.
B. Yes, because the essay describes Takahashi's relationships with artists in America while they collaborated on *From Memory*.
C. No, because the essay describes the unique method in which a teacher critiques her students' art projects.
D. No, because the essay describes a student's memory of an art show that resonated with him.

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

www.crackab.com

www.actexam.net

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

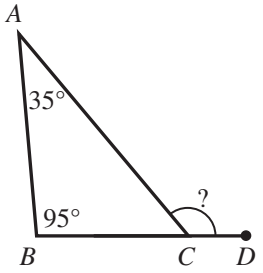
1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO YOUR FIGURING HERE.

1. A retail sales associate's daily commission during 1 week was \$20 on Monday and Tuesday and \$60 on Wednesday, Thursday, and Friday. What was the associate's average daily commission for these 5 days?

A. \$40
B. \$41
C. \$44
D. \$45
E. \$46

2. In the figure below, C is on $\overline{BD}$, $\angle BAC$ measures 35°, and $\angle ABC$ measures 95°. What is the measure of $\angle ACD$?



F. 95°
G. 125°
H. 130°
J. 140°
K. 145°

3. Wally buys dog collars online for \$4 each. The shipping and handling fee is \$5 total, regardless of the number of dog collars ordered. Which of the following equations represents the relationship between x, the number of dog collars ordered, and y, Wally's total bill in dollars?

A. $y = \frac{x}{5}$

B. $y = 4x$

C. $y = 9x$

D. $y = 4x + 5$

E. $y = 5x + 4$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

4. A certain rectangle has a width of 6 km and a length that is 4 km more than 2 times the width. What is the area, in square kilometers, of this rectangle?

F. 16
G. 24
H. 32
J. 60
K. 96

5. $|4 - 3| - |2 - 5| = ?$

A. −4
B. −2
C. 2
D. 4
E. 14

6. $(8p - 3q) - (2q + 6p)$ is equivalent to:

F. $2p - 5q$
G. $2p - q$
H. $5p - 8q$
J. $6p - 5q$
K. $6p - q$

7. How many *minutes* would it take an airplane to travel 300 miles at a constant speed of 400 miles per hour?

A. 45
B. 75
C. 80
D. 100
E. 133

8. The expression $(x^{10})^4$ is equivalent to:

F. x^{14}
G. x^{40}
H. $x^{10,000}$
J. $4x^6$
K. $4x^9$

9. Which of the following equations gives a function $f(x)$ that satisfies $f(4) = 9$?

A. $f(x) = x^2 - 7$
B. $f(x) = x^2 + 7$
C. $f(x) = x - 5$
D. $f(x) = 4x + 9$
E. $f(x) = 9x + 4$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

10. On the first day of school, Mr. Thibodeaux gave his third-grade students 9 new spelling words to learn. On each day of school after that, he gave the students 6 new spelling words. How many new spelling words had he given the students by the end of the 30th day of school?

F. 174
G. 180
H. 183
J. 189
K. 195

11. What is the solution to the equation $\frac{3x-6}{2} + 5 = 18$?

A. $\frac{16}{3}$

B. $\frac{32}{3}$

C. $\frac{37}{3}$

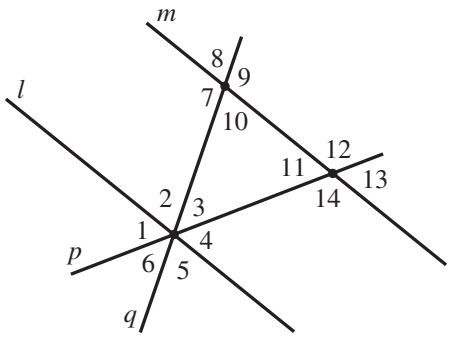
D. $\frac{38}{3}$

E. $\frac{52}{3}$

12. While her mother drives their car along the highway, Mia is noticing some of the mile marker signs. She sees mile marker 117 at noon, and exactly 20 minutes later she sees mile marker 97. What is the average speed, in miles per hour, of their car over these 20 minutes?

F. 23.4
G. 39
H. 60
J. 70
K. 100

13. Numbered below are the 14 angles formed by parallel lines l and m and transversals p and q. Lines l, p, and q intersect at a single point. Which of the following congruence statements *must* be true?



A. $\angle 1 \cong \angle 5$
B. $\angle 2 \cong \angle 1$
C. $\angle 3 \cong \angle 10$
D. $\angle 4 \cong \angle 2$
E. $\angle 5 \cong \angle 8$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

14. A section of highway is represented by a line segment with endpoints (30,50) and (90,100) in the standard (x,y) coordinate plane. Exactly halfway along this highway section is a road sign. What are the coordinates of the road sign?

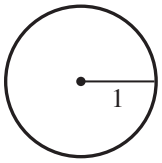
F. (30,25)
G. (60,50)
H. (60,75)
J. (70,65)
K. (75,60)

15. The Student Council is preparing a budget for an upcoming fund-raising dance. They have decided to spend $150 for a light and sound show, $400 for refreshments, and $50 for decorations. These are the only expenses. Given that the Student Council estimates 500 students will attend the dance, what should be the price, per student, for admission to the dance if the Student Council wants to raise as close as possible to $300 after paying expenses?

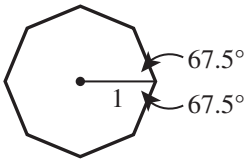
A. $0.60
B. $1.20
C. $1.67
D. $1.80
E. $3.33

16. The following shapes are a circle and some regular polygons that have their centers marked. All units are given in feet. Which of these shapes has the greatest area?

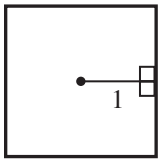
F.



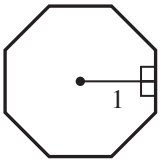
J.



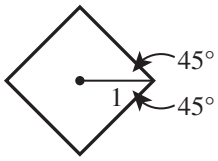
G.



K.



H.



www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

17. Last semester, each of the 4 students listed below took 6 classes worth 1 credit each. In the 1st matrix, the row corresponding to each student gives the counts of the letter grades earned by that student. The second matrix gives the point value of each letter grade.

$$\begin{array}{l} \\ \text{José} \\ \text{Dwayne} \\ \text{Ann} \\ \text{Maria} \end{array} \underbrace{\begin{array}{c} \text{A B C D F} \\ \begin{bmatrix} 0 & 3 & 2 & 1 & 0 \\ 2 & 3 & 1 & 0 & 0 \\ 1 & 3 & 2 & 0 & 0 \\ 4 & 2 & 0 & 0 & 0 \end{bmatrix} \end{array}}_{\text{Letter grades}} \qquad \underbrace{\begin{array}{c} \text{A} \\ \text{B} \\ \text{C} \\ \text{D} \\ \text{F} \end{array} \begin{bmatrix} 5 \\ 4 \\ 3 \\ 2 \\ 0 \end{bmatrix}}_{\text{Points per letter grade}}$$

The grade point average of each student is the total number of grade points earned by that student divided by that student's total number of class credits. To the nearest 0.01, what is Ann's grade point average?

A. 1.92
B. 2.00
C. 3.00
D. 3.83
E. 4.00

18. A circle with the equation $x^2 + y^2 = 16$ is graphed in the standard (x,y) coordinate plane. At what points does the circle intersect the x-axis?

F. $(-2,0)$ and $(2,0)$
G. $(-4,0)$ and $(4,0)$
H. $(-8,0)$ and $(8,0)$
J. $(-16,0)$ and $(16,0)$
K. $(-32,0)$ and $(32,0)$

19. JoAnna drives a route that is exactly 450 miles from Little Rock, Arkansas, to Mobile, Alabama. JoAnna has already driven 180 miles at an average speed of 60 miles per hour. What is the *minimum* average speed, in miles per hour, that JoAnna can drive for the remainder of the route and have a driving time of 9 hours for the entire trip?

A. 45
B. 50
C. 55
D. 60
E. Cannot be determined from the given information

20. What is the least positive number that has a remainder of 3 when divided by 5 and a remainder of 4 when divided by 6 ?

F. 18
G. 23
H. 28
J. 30
K. 39

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

Use the following information to answer questions 21–23.

Yesterday, there was no snow on the ground at 8:00 a.m. when snow began to fall. Snow fell from 8:00 a.m. to 8:00 p.m. at a constant rate of $\frac{3}{4}$ inch per hour. Kate built a snowman made of 2 spherical snowballs, with the smaller placed on top of the larger. When she built the snowman, the diameter of the larger snowball was 3 times the diameter of the smaller snowball. Today, the day after she built the snowman, there is a 50% chance of rain. If it rains today, then there is a 60% chance that the snowman will melt. If it does not rain today, then there is a 10% chance the snowman will melt.

21. Kate could not build the snowman until there was 6 inches of snow on the ground. At how many hours after 8:00 a.m. yesterday was there exactly 6 inches of snow on the ground?

A. 0.75
B. 4.5
C. 6
D. 6.75
E. 8

22. When Kate built the snowman, the circumference of the larger snowball was 36π inches. When Kate built the snowman, what was the diameter, in inches, of the smaller snowball?

F. 4
G. 6
H. 12
J. 54
K. 108

23. What is the probability that the snowman will melt today?

A. 30%
B. 35%
C. 50%
D. 60%
E. 70%

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

24. Biologists tagged and released 50 fish in a lake. From the same lake 3 weeks later, the biologists collected a random sample of 15 fish, 5 of which were tagged. Let p be the proportion of the fish in the lake that are tagged. What is $\hat{p}$, the sample proportion, for this sample?

F. $\frac{1}{3}$

G. $\frac{1}{5}$

H. $\frac{1}{10}$

J. $\frac{1}{13}$

K. $\frac{3}{10}$

25. One watch gains $2\frac{1}{2}$ minutes per hour while another watch loses $1\frac{1}{4}$ minutes per hour. If both watches are set correctly at noon, after how many hours will the times shown by the watches be exactly 1 hour apart?

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

B. 4

C. 16

D. 75

E. 225

26. The table below gives the lengths, widths, and heights, in feet, of 3 right rectangular prisms. The difference between the volume of Prism A and the volume of Prism B is how many times the volume of Prism C ?

Prism	Length	Width	Height
A	4	4	3
B	3	3	4
C	4	3	1

F. 0
G. 1
H. 5
J. 8
K. 12

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

27. Which of the following is the complex conjugate of $2 + 7i$?

A. -5
B. 9
C. $9i$
D. $\sqrt{53}$
E. $2 - 7i$

28. Given functions $f(x) = 3x + 4$ and $g(x) = x^2 - 2$, what is the value of $f(g(-3))$?

F. -29
G. -27
H. -20
J. 23
K. 25

29. Which of the following is equivalent to $\frac{21A^2B + 6AB^2}{3AB}$ for all nonzero real numbers A and B ?

A. $9AB$
B. $9A^2B^2$
C. $7A + 6AB^2$
D. $7A + 6B$
E. $7A + 2B$

30. Let n be a positive integer. Which of the following expressions is equivalent to 0.0002^n ?

F. 2^{-2n}
G. 2^{-3n}
H. $2^n \times 10^{-n}$
J. $2^n \times 10^{-3n}$
K. $2^n \times 10^{-4n}$

31. Which of the following lists gives the numbers below arranged in order from least to greatest?

$$0.6,\ 0.08,\ \frac{5}{8}$$

A. $\frac{5}{8}$, 0.6, 0.08

B. 0.6, $\frac{5}{8}$, 0.08

C. 0.6, 0.08, $\frac{5}{8}$

D. 0.08, $\frac{5}{8}$, 0.6

E. 0.08, 0.6, $\frac{5}{8}$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

32. A 2-digit number will be formed by randomly selecting each digit from the set {2, 3, 9}. What is the probability that the number formed will be 99 ?

F. $\frac{1}{27}$

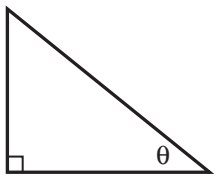
G. $\frac{1}{9}$

H. $\frac{1}{6}$

J. $\frac{1}{4}$

K. $\frac{1}{3}$

33. For the right triangle below, $\tan\theta = \frac{5}{\sqrt{39}}$. What is $\sin\theta$?



A. $\frac{25}{39}$

B. $\frac{5}{8}$

C. $\frac{\sqrt{39}}{8}$

D. $1 - \frac{5\sqrt{39}}{39}$

E. $\sqrt{1 - \left(\frac{5}{\sqrt{39}}\right)^2}$

34. Which of the following expressions is equivalent to $(y + 8)^3$?

F. $y^3 + 24y^2 + 192y + 512$

G. $y^3 + 16y + 512$

H. $y^3 + 16y + 64$

J. $y^3 + 512$

K. $y^3 + 24$

35. The average of a list of 4 numbers is 88.0. A new list of 4 numbers has the same first 3 numbers as the original list, but the fourth number in the original list is 50, and the fourth number in the new list is 70. What is the average of this new list of numbers?

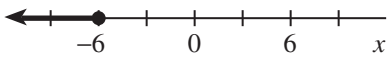
A. 83.5
B. 88.0
C. 93.0
D. 95.0
E. 96.8

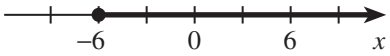
www.crackab.com

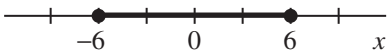
www.actexam.net

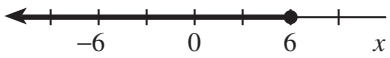
DO YOUR FIGURING HERE.

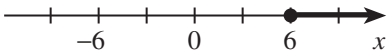
36. Which of the following number line graphs is that of the solution set to the inequality $-2x + 7 \geq 19$?

F. 

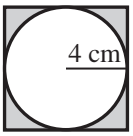
G. 

H. 

J. 

K. 

37. A circle with radius 4 centimeters is inscribed in a square, as shown below. Which of the following represents the area, in square centimeters, of the shaded region?



A. $32 - 8\pi$
B. $32 - 16\pi$
C. $32 + 16\pi$
D. $64 - 16\pi$
E. $64 + 16\pi$

38. The length of Rectangle A is equal to the length of Rectangle B. The width of Rectangle A is 3 inches less than the width of Rectangle B. If it can be determined, how many inches less is the perimeter of Rectangle A than the perimeter of Rectangle B ?

F. 3
G. 6
H. 9
J. 12
K. Cannot be determined from the given information

39. Which of the following is equivalent to $(x^4)^{\frac{5}{4}}(x^5)^{\frac{2}{5}}$?

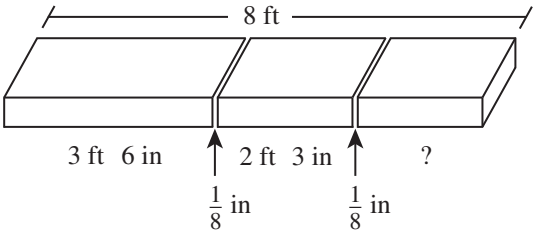
A. x^3
B. $x^{\frac{63}{20}}$
C. $x^{\frac{9}{2}}$
D. x^7
E. x^{10}

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

40. You have a piece of lumber that is exactly 8 feet long. You cut it into 3 pieces: one is exactly 3 feet 6 inches long and another is exactly 2 feet 3 inches long, as shown below. If each cut is exactly $\frac{1}{8}$ inch wide, how long, in feet and inches, is the third piece?



F. 2 ft 3 in

G. 2 ft $2\frac{3}{4}$ in

H. 2 ft $2\frac{5}{8}$ in

J. 2 ft $\frac{3}{4}$ in

K. 2 ft

41. During a promotion, a radio station gave every 35th caller a T-shirt and gave every 50th caller a concert ticket. Given that 1,000 people called during the promotion, how many callers received both a T-shirt *and* a concert ticket?

A. 2
B. 5
C. 35
D. 200
E. 350

42. Maria travels to Country A. Upon her arrival, she finds that 1 United States dollar is exchanged for x units of Country A's currency. How many units of Country A's currency will Maria receive when she exchanges y United States dollars?

F. xy

G. $100xy$

H. $\frac{100}{x}$

J. $\frac{x}{y}$

K. $\frac{100x}{y}$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

43. In the figure shown below, $\triangle ACB$ is a right triangle with a right angle at C. Point D is on $\overline{BC}$, $m\angle ADC = 60°$, $m\angle ABC = 30°$, and $BD = 100$ feet. What is the length, in feet, of $\overline{AC}$?

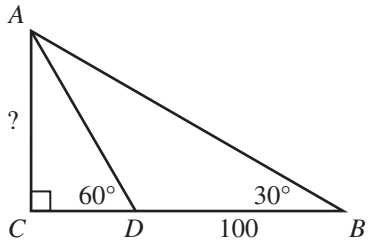
A. 50

B. $\frac{100}{3}$

C. $\frac{200}{3}$

D. $50\sqrt{3}$

E. $200\sqrt{3}$



44. A *relation* pairs elements in the domain with elements in the range. The table below defines a relation where the domain is represented by the x-values and the range is represented by the y-values.

x	y
3	6
7	9
1	5
3	4
4	5
2	8

Which of the following statements indicates whether this relation is a function of x and provides a valid reason?

F. It is, because the y-value is always greater than the x-value.
G. It is, because there are 5 distinct values in both the domain and the range.
H. It is not, because there are 2 different y-values paired with the x-value 3.
J. It is not, because there are 2 different x-values paired with the y-value 5.
K. It is not, because no equation can be written to model the relationship between x and y.

45. Only juniors and seniors are enrolled in Algebra III. There are 3 juniors for each senior. On an Algebra III test, 80% of the juniors and 70% of the seniors passed. What percent of the students enrolled in Algebra III did NOT pass the test?

A. $22\frac{1}{2}\%$

B. $24\frac{1}{6}\%$

C. 25%

D. $27\frac{1}{2}\%$

E. 50%

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

Use the following information to answer questions 46–48.

At a local pet store, 50 shoppers were polled to see if they owned cats or dogs. Among the polled shoppers, 31 owned at least 1 dog, 20 owned at least 1 cat, 7 owned at least 1 dog and at least 1 cat, and 6 owned neither a dog nor a cat.

46. How many of the 50 polled shoppers owned at least 1 dog but did NOT own at least 1 cat?

F. 11
G. 13
H. 23
J. 24
K. 25

47. One of the 50 polled shoppers will be selected at random. What is the probability that the selected shopper owned at least 1 dog or cat?

A. $\frac{7}{50}$

B. $\frac{13}{25}$

C. $\frac{27}{50}$

D. $\frac{19}{25}$

E. $\frac{22}{25}$

48. Every polled shopper was given at least 1 gift for taking part in the survey. Those who owned at least 1 dog were given 1 dog toy valued at \$4, those who owned at least 1 cat were given 1 cat toy valued at \$3, and those who owned neither were given a gift card with a dollar value of g. A total dollar value of t was given to the shoppers. Which of the following expressions gives the value of g in terms of t ?

F. $\frac{t}{6} - 177$

G. $\frac{t}{6} - 184$

H. $\frac{t - 135}{6}$

J. $\frac{t - 177}{6}$

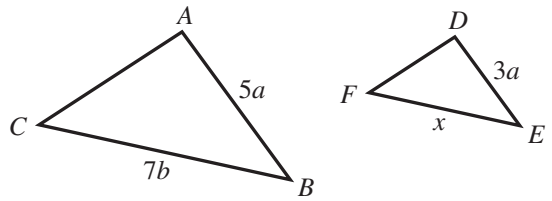
K. $\frac{t - 184}{6}$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

49. In the figure shown below, $\triangle ABC \sim \triangle DEF$, and the given lengths are in inches. Which of the following expressions gives the value of x in terms of b ?



A. b

B. $\frac{21}{5}b$

C. $5b$

D. $9b$

E. $\frac{35}{3}b$

50. Each student in Mrs. O'Malley's first-period Civics class draws 1 tag at random from each of 2 bowls to determine seating location in the class. The tag drawn from the first bowl is the row number of a student's seat; the 28 tags in the first bowl have an equal distribution of the numbers 1, 2, 3, 4, 5, 6, and 7. The tag drawn from the second bowl is the seat number within the row determined by the first tag; the 28 tags in the second bowl have an equal distribution of the numbers 1, 2, 3, and 4. What is the probability that the first student who draws will have a seating location that is in Row 5, but NOT in Seat 1 ?

F. $\frac{1}{28}$

G. $\frac{3}{28}$

H. $\frac{6}{28}$

J. $\frac{9}{28}$

K. $\frac{18}{28}$

51. What is the value of $\log_5 625$?

A. 3
B. 4
C. 6
D. 125
E. 436

52. The inequality $7x^2y < 0$ is true for 2 fixed real numbers x and y. Which of the following inequalities *must* be true?

F. $x > 0$
G. $y > 0$
H. $x < 0$
J. $y < 0$
K. $xy < 0$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

53. Given that $c \neq d$, what are all the real values of b that make the inequality $\frac{bc - bd}{6c - 6d} < 0$ true?

A. 6 only

B. $\frac{1}{6}$ only

C. $-\frac{1}{6}$ only

D. All positive real numbers

E. All negative real numbers

54. For all negative values of k, what is the range of values of 2^k ?

F. All negative numbers
G. All numbers less than 1
H. All rational numbers less than 1
J. All positive numbers less than 1
K. All positive numbers less than 2

55. For all triangles with sides of length a, b, and c opposite angles of measure A, B, and C, respectively, which of the following equations *must* be true?

A. $\frac{a}{A} = \frac{b}{B}$

B. $\frac{\sin a}{A} = \frac{\sin b}{B}$

C. $\frac{a}{\cos A} = \frac{b}{\cos B}$

D. $b^2 = a^2 + c^2 - 2ab(\sin B)$

E. $c^2 = a^2 + b^2 - 2ab(\cos C)$

56. Event A consists of 6 simple events. Event B consists of 3 simple events, none of which are in Event A. Event C is the union of A and B, and Event D is the intersection of A and B. Which of the following statements is true?

(Note: Given that Event X consists of n simple events, $|X| = n$.)

F. $|B| < |A| < |C| < |D|$
G. $|B| < |A| < |D| < |C|$
H. $|C| < |B| < |A| < |D|$
J. $|D| < |B| < |A| < |C|$
K. $|D| < |C| < |B| < |A|$

www.crackab.com

www.actexam.net

DO YOUR FIGURING HERE.

57. The base of a right square pyramid has a side length of 20 ft. The pyramid's slant height is 15 ft. What is the total surface area, in square feet, of the pyramid?

A. 550
B. 600
C. 1,000
D. 1,600
E. 2,000

58. For how many integers x is the value of the expression $(x - 1)(x - 4)$ a positive prime number?

F. 0
G. 1
H. 2
J. 3
K. 4

59. Which of the following degree values of x is NOT in the domain of the function below?

$$f(x) = \frac{1}{1 + \sec x}$$

A. 0°
B. 45°
C. 60°
D. 150°
E. 180°

60. The function below is defined for constants a and b and for all positive integers n.

$$r(n) = ab^n$$

It is known that $r(1) = \frac{1}{2}$, $r(2) = \frac{3}{2}$, $r(3) = \frac{9}{2}$, and $r(4) = \frac{27}{2}$. Which of the following functions is equivalent to $r(n)$?

F. $f(n) = 3\left(\frac{1}{2}\right)^{n-1}$

G. $g(n) = 3\left(\frac{1}{2}\right)^{n}$

H. $h(n) = \frac{1}{2}\left(\frac{3}{2}\right)^{n-1}$

J. $j(n) = \frac{1}{2}(3)^{n-1}$

K. $k(n) = \frac{1}{2}(3)^{n}$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

www.crackab.com

www.actexam.net

READING TEST

35 Minutes—40 Questions

DIRECTIONS: There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

LITERARY NARRATIVE: This passage is adapted from the essay "The Border Is Open" by Ray Gonzalez (©2002 by Ray Gonzalez).

Home is where our individual memories are rooted and never disappear, the place where our inner being begins and ends, a haven for birth and death. Home is the place where we return when we need to adjust to new energies the world presses upon our daily lives. Home is comfort and uneasiness. Despite the age-old cliché of not being able to go home again, we carry home wherever we dwell. If we never leave our hometown to live elsewhere, which is true for a larger percentage of the American population, we create our territory of existence in the place where we were born—home. The character of that home is vastly different from the one created elsewhere by people who left their hometown ages ago. Home as territory—fortress or open house.

As a native of the Southwest, I know my home will always be the desert surrounding El Paso and the southern New Mexico area. I left in 1979 but have never been able to create a natural sense of home in other cities where I have lived. The memory of the desert creates an invisible nest of roots that allows a native to wander far before finding a way back. The memory of the Rio Grande passing its vein of mud south is one I sleep with, then wake to see if the level of the current has gone down. The stark peaks of the Franklin Mountains dominate the city that grows in a horseshoe shape around them. El Paso spreads for miles into the desert east of the mountains. Housing developments tear high into the Franklins themselves. The horseshoe is now bent and twisted, its boundaries of my childhood gone. I gaze up at the bare face of the Franklins and conclude that the crown of my home has eroded over the forty-nine years of my life. Each time I come home, the mountains are closer to the ground.

Memories of wandering the desert alone as a boy and teaching myself about the rocks, the fossils stuck inside them, and the tarantulas scuttling across my dirt path pull me back home. Childhood memories that made me leave rise when I visit my home—the silent father, the grandmother who always wanted me by her side. The happy experiences—the climb up muddy arroyos after a desert rain, riding tiny paddleboats at the amusement park on the other side of town—have me wishing I could go back in time. Home is the generator of longing. It is the yearning for a united family, happy Christmas days, innocent adventures with kids next door. It is also the place where the person we wanted to be when we grew up never appeared, because we became someone else. It was my divorced parents and my dreams of being successful in careers that never materialized, until I accomplished many things I never thought I would. Home created a different individual because El Paso educated my heart and mind, placing its limits upon me. Such limits often match the city limits of our hometown as we grow up, so we are forced to go live elsewhere.

I visualize rattlesnakes, lizards, bats, turtles, scorpions, hawks, and coyotes. I recall the onion, chili, lettuce, and cotton fields of La Mesilla Valley. When I think of home, these creatures and food sources are a major part of my memories. When I visit, I know where to go if I want to explore the natural world of the borderlands. This inner pull is similar to my rattlesnake dreams, drawing me to walk along the river where I mark the changing course of the Rio Grande and learn where the bridges of home span the muddy stretches. This magnetism helps me to identify where the adobe ruins stand in La Mesilla Valley, thirty years after I first found the row of migrant worker huts as a boy.

I do not believe in the loss of home. Our private sounds and memories tell us where home lies eternally. Navajo people believe sacred ground must be earned. You are not born into a family and automatically given a place in the world. You must earn it. As you pay for it, the joys and sorrows that grow on sacred ground are identified for you as the citizens of your places on earth. You can celebrate or mourn the area where you grew up, with its stage of autobiographical failures and triumphs, but you have earned them and can't abandon them completely. The Navajos say it comes down to belief. The things you believe in are the factors that will protect or diminish your origins and your home.

I have been gone from the desert Southwest for twenty-five years, yet I continue to write about it. As the years go by, it is easier to acknowledge this landscape that "covers the past and hangs as the ember of thought / wisdom molded out of the falling world," as I wrote in one of my poems.

www.crackab.com

www.actexam.net

1. The main purpose of the passage is for the author to describe his:
   - **A.** recollection of significant events from his childhood.
   - **B.** personal philosophy about what constitutes home.
   - **C.** theory that most people don't understand the concept of home.
   - **D.** hometown and how it has remained mostly unchanged since 1979.

2. The author most strongly suggests that when he was a boy, the time he spent in the desert surrounding his hometown was primarily marked by:
   - **F.** fascination and fear.
   - **G.** celebration and mourning.
   - **H.** exploration and solitude.
   - **J.** innocence and recklessness.

3. The metaphor the author uses of the invisible nest of roots (lines 20–22) mainly helps emphasize the idea that the author:
   - **A.** has resided in many locations far from the desert Southwest.
   - **B.** has conflicting memories about El Paso and the southern New Mexico area.
   - **C.** feels deeply and ceaselessly connected to the desert Southwest.
   - **D.** feels more drawn to the Franklin Mountains than to the desert that surrounds them.

4. The main point of lines 35–44 is that regarding the author's feelings about home, he is:
   - **F.** glad he spent so much time in the desert as a child.
   - **G.** pulled by both difficult and pleasant memories.
   - **H.** upset about some of his family relationships.
   - **J.** surprised by the memories that surface when he visits.

5. The author uses the word *natural* in line 19 mainly to convey the idea that what he is searching for in other cities is a sense of home that feels:
   - **A.** simple yet lively.
   - **B.** innocent yet provocative.
   - **C.** authentic and innate.
   - **D.** wild and unfettered.

6. The author states that the horseshoe of El Paso now looks bent and twisted mainly because:
   - **F.** environmental conditions are causing the peaks of the mountains to erode.
   - **G.** housing developments are progressing farther out into the desert and up into the mountains.
   - **H.** environmental conditions are causing people to move up into the mountains.
   - **J.** housing developments are obscuring the views of the surrounding areas from the mountain peaks.

7. In the passage, when the author reflects on the careers that never materialized, his reaction can best be characterized as one of:
   - **A.** bitterness; he feels his hometown prevented him from realizing his dreams.
   - **B.** pride; he had visualized himself as a writer for most of his life.
   - **C.** confusion; he's still hoping his home can illuminate a career path for him.
   - **D.** acceptance; he has been successful in ways he hadn't anticipated.

8. Which of the following is the best paraphrase for the statement the author makes in lines 54–56?
   - **F.** We can find out who we really are by living in our hometown as adults.
   - **G.** Who we become is primarily shaped by the education we receive and experiences we have in our hometown.
   - **H.** Becoming who we long to be requires a substantial amount of self-reflection.
   - **J.** Opportunities to become who we long to be may not be available in our hometown, forcing us to find them elsewhere.

9. As it is used in lines 76–77, the phrase "the citizens of your places on earth" most nearly refers to one's:
   - **A.** neighbors close to home.
   - **B.** personal experiences.
   - **C.** satisfying moments.
   - **D.** physical location.

10. The main purpose of the last paragraph is to demonstrate that the:
    - **F.** desert Southwest has contributed to a significant part of the author's writing.
    - **G.** subjects of the author's writing, like his location, often change.
    - **H.** longer the author is away from the desert Southwest, the harder it is for him to write about it.
    - **J.** author plans to return to the desert Southwest someday despite having been away for so long.

www.crackab.com

www.actexam.net

Passage II

SOCIAL SCIENCE: This passage is from the book *Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc* by Hugh Aldersey-Williams.

The breakthrough that enabled gas to maintain its advantage over the newfangled electric lighting for a little longer during the closing years of the nineteenth century was made by Carl Auer, later the Baron von Welsbach, a Viennese who had completed his studies in Heidelberg with Robert Bunsen, long the guru of European chemists. On his arrival in Heidelberg in 1880, Auer showed the great man a modest collection of rare earth mineral specimens that he had amassed, and Bunsen set him to work analyzing them, laughing off Auer's protests that the quantities were insufficient. This project set the course of his career; and the rare earths would make his fortune. Auer's annus mirabilis came in 1885 back in Vienna, when he succeeded in separating the supposed element didymium into two true elements, which were duly named praseodymium and neodymium. Their green and pink compounds make them attractive for use in ceramic wares and in tinted glass for protective eyewear.

Auer was not content merely to add to the number of the rare earths. In his Heidelberg days, he had marveled at Bunsen's already famous burner, with its tunable flame that could be adjusted to simmer or roast. He had noticed how, when turned up high, the Bunsen burner flame would cause his rare earth ores to glow brightly with their own light. He began to explore this phenomenon with different combinations of metal oxides. It was well known that a flame set against a piece of lime (calcium oxide) will produce the incandescence known as limelight. Auer's investigation included the oxides of magnesium and beryllium, both closely related to lime, as well as those of his rare earths and other elements.

Gas lighting was well established in streets and homes by the mid nineteenth century, but the light it shed was limited by the luminosity of the flame it produced, which depended in turn on the mixture of hydrocarbons being burnt. Candles and oil lamps gave a brighter light than gas, but only gas could be supplied continuously. Auer believed that a lamp design in which his rare earth oxides were positioned close to the gas flame might yield a brighter light. Over a period of several years, he soaked sleeves of cotton mesh in different mixtures of rare earth and other salts. Once dried, these sleeves or mantles, now stiff with encrusted oxide, were placed around the flame, which burnt away the fabric to leave a brittle lace of the refractory oxide. This would then glow brightly in the heat of the flame.

Little was known about the properties of many of the oxides, and still less about how they behaved in combination, so there was no way of predicting which composition would produce a white incandescence. Auer first patented a gas light with a mantle made of a mixture of magnesium, lanthanum and yttrium oxides in 1885, but its fragility and sickly green light meant that it remained unpopular. However, by 1891, he found that thorium and cerium oxides mixed in the proportions of ninety-nine to one gave a satisfactory white light (thorium is not a rare earth but is the heavier—and, unknown then, radioactive—cousin of cerium). Mantles made of this material were more sturdy and quickly caught on. Unusually for a scientist, Auer was an astute businessman, and his name soon became more widely known even than Bunsen's. For while the bunsen burner had its place in the laboratory, the bright new Auerlicht, as it was known, was of utility to all, and was rapidly distributed across a grateful continent by various Auer companies. Some 90,000 Auer mantles were sold in Vienna and Budapest alone in 1892; twenty years later, annual production stood at 300 million units.

It can have done no harm to the inventor's prospects that Auer, a variant of the prefix *Ur*-, is an archaic German word for the dawn. At the exact moment when the first of Auer's bright gas lamps was lit outside the Opern Café in Vienna on 4 November 1891, Auer's countryman Gustav Mahler, no stranger to the place, was composing a song that would be incorporated into his second symphony, called 'Urlicht'—primordial light.

Auer clearly acquired a taste for appending his name to his inventions. He followed up the success of the gas mantle with an osmium electric filament, the Auer-Oslight—even as he perfected his gas mantle, Auer was hedging his technological bets by experimenting with materials for the electric lamps that he already suspected might one day replace them.

From pages 366–368 of the book *Periodic Tales: A Cultural History of the Elements, from Arsenic to Zinc* by Hugh Aldersey-Williams (©2011 by Hugh Aldersey-Williams). First published in 2011 by Viking, an imprint of Penguin Books Ltd, London. Reproduced by permission of Penguin Books Ltd.

11. Based on the passage, which of the following materials could most reasonably be classified as one of Auer's "rare earths" (lines 32–33)?

A. Praseodymium
B. Beryllium
C. Magnesium
D. Lime

12. The passage credits Bunsen for pushing Auer to work on the project that would:

F. preserve Auer's collection of rare earth minerals.
G. allow Auer to invent limelight.
H. set the course of Auer's career.
J. help Auer complete his studies in Heidelberg.

www.crackab.com

www.actexam.net

13. The use of the word "sickly" (line 55) most nearly serves to emphasize the author's point that the light emitted by the gas light Auer patented in 1885 was:

A. usually flecked with burnt particles of minerals.
B. feared for its frequent explosive bursts.
C. known to produce pollutants.
D. unappealing in color.

14. According to the passage, compared to the usefulness of Bunsen's burner to the general public, the usefulness of Auer's Auerlicht to the general public was:

F. much greater.
G. about equal.
H. slightly less.
J. much less.

15. The main point of the fifth paragraph (lines 72–80) is that:

A. Auer enjoyed the song "Urlicht."
B. Mahler was one of the first people to see one of Auer's gas lamps be lit.
C. a song called "Urlicht" was incorporated into Mahler's second symphony.
D. Auer had a fortunate name, given that he created and sold lamps.

16. The passage states that even as Auer worked to perfect his gas mantle, he sensed that:

F. other researchers had created gas mantles far superior to his own.
G. his first gas mantles would be more popular than his new ones.
H. electric lamps were the future of lighting.
J. Bunsen's burner was the more elegant invention.

17. It can most reasonably be inferred from the passage that, unlike Auer, Bunsen was convinced that the specimens of rare earth minerals that Auer showed him in 1880 were:

A. too old to be reliable in experiments.
B. adequate enough in quantity to be analyzed.
C. much like the specimens Bunsen himself had found years earlier.
D. going to be important to the development of electric filaments for lamps.

18. According to the passage, what made the elements praseodymium and neodymium particularly appealing for use in ceramics and in glass for protective eyewear?

F. Their green and pink compounds
G. Their consistent durability
H. Their melting points over 1500°F
J. Their low density

19. The passage asserts that unlike most scientists, Auer also showed talent as a:

A. businessman.
B. philosopher.
C. musician.
D. teacher.

20. The author uses the phrase "grateful continent" (line 67) primarily to emphasize that:

F. the opening of Auer companies all around Europe was a relief to distributors of the Auerlicht.
G. Europeans had been waiting for a lamp like the Auerlicht and were pleased to finally have it.
H. the general public was surprised to find that the Auerlicht was inexpensive.
J. Auer's visits to several countries in Europe were well received by the public.

www.crackab.com

www.actexam.net

Passage III

HUMANITIES: Passage A is from the article "The Art of Video Games" by Abigail Tucker. Passage B is from the article "In 'The Art of Video Games'" by Philip Kennicott.

Passage A by Abigail Tucker

The Supreme Court ruled that video games should be considered an art form, as deserving of First Amendment safeguards as "the protected books, plays and movies that preceded them." Chris Melissinos reached that opinion some 30 years earlier, as a teenager plugging away at King's Quest on a neighbor's PC.

The game's hand-drawn animation and two-word commands seem crude now, but "I remember thinking, 'Oh my goodness, this is a fairy tale come to life,'" Melissinos says. He still gets goose bumps remembering hidden warp zones in the first Super Mario Brothers.

Now Melissinos is the guest curator of "The Art of Video Games," an exhibition at the Smithsonian American Art Museum that celebrates 40 years of the genre, from Pac-man to Minecraft. The show will include video-game screen shots, videotaped interviews with game designers, vintage consoles from Melissinos's personal collection ("I'm having a bit of separation anxiety," he says) and several opportunities for visitors to seize the arcade joystick or PlayStation controls themselves.

Not all of the 80 featured games recall classic film or literature. Attack of the Mutant Camels, for example, stars fireball-spitting dromedaries. Nonetheless, the exhibition contends that games offer much more than a chance to mow down armies and plunder cars. Gamers can till fields, build hospitals, steer the wind. They can be inspired to feel guilt or joy or moral ambiguity. They can be transformed instead of just distracted.

Indeed, video games may be the most immersive medium of all, in Melissinos's estimation. "In books everything is laid before you," he says. "There is nothing left for you to discover. Video games are the only forms of artistic expression that allow the authoritative voice of the author to remain true while allowing the observer to explore and experiment."

Melissinos grew up with the first games; he later became chief gaming officer at Sun Microsystems, and he is now vice president of corporate marketing at Verisign, a network infrastructure company. He has seen the clunky aliens of Space Invaders and the two-dimensional damsel in distress of Donkey Kong morph into Bioshock and Zack & Wiki. Today drops of animated rain dot computer screens, and characters leave reflections in puddles; it's like watching cave art become Impressionism in just a few decades, he says. Games are in many respects converging with movies (which, in their infancy, were also belittled as non-art, Melissinos notes). Designers employ photo-realistic environments and motion-capture technologies and commission original scores.

Passage B by Philip Kennicott

"The Art of Video Games," a technologically impressive but intellectually inert exhibition at the Smithsonian American Art Museum, belongs in a history or technology museum, not in an institution devoted to art. Despite its title, it fails to grapple with questions about the definition and boundaries of art, questions that tend to make people squeamish in a democratic society that would rather everything be art than anyone feel excluded from the realms of sanctified culture.

Which is not to say that the 40-year history of video games hasn't produced supremely sophisticated aesthetic experiences. Or that the virtual worlds summoned by designers of the best of the 80 games on display aren't every bit as "artistic" as the best scenic design for theater or the movies. Or that people can't have emotional reactions to the events within a game, though it is clear that this aspect of gaming is a work in progress rather than a fully achieved goal.

But is it in fact the case, as game designer Jenova Chen says, that "everything is an art"? Or are there important lines that demarcate entertainment and art? Exhibition curator Chris Melissinos hedges in the wall text that introduces the show: "Using the cultural lens of an art museum, viewers can determine whether the games on display are indeed worthy of the title 'art.'"

Very likely, some of these games, and even more in the future, rise to that level. But the exhibition doesn't address what distinguishes merely entertaining games from great ones, and what models designers should pursue if they want to achieve greater artistic substance.

Instead, it focuses on technology, presented as if the overriding force driving most game design is basic verisimilitude. In one display, we see basic actions—running, climbing, flying—depicted from the earliest era of design in the 1980s to the past decade in which humans and monsters move with an almost cinematic believability.

Passage A: From the article "The Art of Video Games" by Abigail Tucker (©2012 by Smithsonian).

Passage B: From The Washington Post, March 18 © 2012 Washington Post Company. All rights reserved. Used by permission and protected by the Copyright Laws of the United States. The printing, copying, redistribution, or retransmission of this Content without express written permission is prohibited.

www.crackab.com

www.actexam.net

Questions 21–24 ask about Passage A.

21. The main purpose of the third paragraph of Passage A (lines 13–22) is to:

A. provide an overview of what is included in the exhibition *The Art of Video Games*.
B. compare different video game consoles in Melissinos's collection.
C. establish how Melissinos decided what to include in *The Art of Video Games*.
D. indicate ways in which video games have changed in the past forty years.

22. The main point of the fifth paragraph of Passage A (lines 31–37) is that Melissinos believes video games:

F. should be judged primarily by how much they allow the observer to explore and experiment.
G. are created through a collaboration between author and observer that creates a more emotional form of art.
H. could be the most immersive medium because they maintain an authorial voice while allowing the observer to explore and experiment.
J. are similar to books because both mediums emphasize the authoritative voice of the author.

23. In Passage A, the main purpose of lines 44–47 is to:

A. emphasize how much more sophisticated video games have become in a few decades.
B. suggest that the technology of video games has improved while the concepts of video games have not.
C. establish how impressionist art directly influenced the visual styles used in modern video games.
D. indicate that breakthroughs in art are both derivative of prior breakthroughs and innovative in their own right.

24. The parenthetical information in lines 49–50 of Passage A most strongly suggests that Melissinos believes:

F. early movies lacked the artistry of later movies.
G. eventually, video games will be as widely accepted as art as movies are today.
H. in the future, video games will emotionally resonate with observers more than movies do now.
J. video games will eventually make movies an obsolete art form.

Questions 25–27 ask about Passage B.

25. The author of Passage B uses the phrase "to grapple with" (line 57) mainly to emphasize:

A. the degree to which Melissinos agonized over which games to include in the show.
B. the difficulties of defining what is and what is not art.
C. that artists have difficulty in deciding what to include in their artworks.
D. that technological innovation is overlooked by art critics.

26. It can most reasonably be inferred from Passage B that Melissinos's intention in "using the cultural lens of an art museum" (lines 76–77) for the exhibit is to encourage viewers to:

F. consider how much the technology of video games has improved.
G. make an emotional connection with different aspects of video games.
H. change the context in which they typically think of video games.
J. reflect on how realistic the characters in video games look.

27. As it is used in line 86, the word *driving* most nearly means:

A. dispatching.
B. commuting.
C. hauling.
D. advancing.

Questions 28–30 ask about both passages.

28. Concerning the potential value of *The Art of Video Games*, the attitudes of the passage authors differ in that the author of Passage B is more:

F. lenient.
G. distressed.
H. indifferent.
J. skeptical.

www.crackab.com

www.actexam.net

29. Which of the following statements best describes how the passages present Melissinos's belief about whether people should consider video games to be art?

A. Passage A suggests Melissinos believes people should consider video games to be art, while Passage B suggests Melissinos believes people should decide for themselves.
B. Passage A suggests Melissinos believes people should consider video games to be merely entertainment, while Passage B suggests Melissinos believes people should consider them to be art.
C. Both passages suggest Melissinos believes people should consider video games that are used for educational purposes to be art.
D. Both passages suggest Melissinos believes people should consider early video games to be art but more recent video games to be merely entertainment.

30. Which of the following questions is answered in both passages?

F. How many video games are featured in *The Art of Video Games* ?
G. Which elements of *The Art of Video Games* came from Melissinos's personal collection?
H. How long was *The Art of Video Games* featured at the Smithsonian American Art Museum?
J. Which video game designers does Melissinos consider to be the best?

Passage IV

NATURAL SCIENCE: This passage is from the article "Architects of the Swamp" by John Carey.

Joy Zedler carefully planned the three experimental wetlands at the University of Wisconsin–Madison's Arboretum to be identical: parallel marshes 295 feet long and 15 feet wide, carved by engineers into the green landscape. Zedler's contractors planted all three tracts with similar species to see how the vegetation would absorb and clean water runoff during storms.

Zedler's team also allowed the same amount of water to flow into the test beds from a pond at the front ends of the tracts. They planned to measure the nutrients in the water entering each plot and draining into a basin at the far end, as well as soil stability, water absorption, and the productivity and diversity of the grasses and other plants. The scientists expected that each of the three wetlands would behave similarly.

The stakes were higher than for the typical university project. The city of Madison was keenly interested because it wanted to learn how to use wetlands to slow and cleanse storm water pouring out of town into neighboring Lake Wingra, which is suffering from high levels of nutrients such as nitrogen and phosphorus in the runoff. And the question of how to maximize the many valuable so-called ecosystem services that wetlands can provide, from reducing runoff and flood damage to boosting biodiversity, has been growing more urgent by the year as wetlands worldwide vanish at an alarming rate. Zedler, a professor of botany and restoration ecology at the university, had hoped the experiment would provide some insight.

Three years later, however, it was clear that the experiment had raised new questions the researchers had not anticipated. "Nothing about the system behaved as we supposed," Zedler says. The first surprise: even though the tracts were just three feet apart and had been planted and expected to develop similarly, one plot became dominated by cattails, whereas the other two blossomed with up to 29 plant species. Second, although the cattail plot produced more plant material overall, it was lousy at everything Zedler expected from lush growth. It did not slow floodwater or control soil erosion. It did not absorb much of the nutrients in the water. The other two tracts provided more of the expected benefits—except for high productivity.

Why the surprising differences? Zedler's team discovered that a layer of clay under the cattail marsh was slightly thicker and thus less permeable than the layer under the two adjacent plots—so water ponded instead of percolating into the ground. That allowed storm water and nutrients to race down the channel. Meanwhile the cattails shaded out soil-stabilizing moss—which grew well in the neighboring swales—so soil erosion was higher.

Zedler's unforeseen results are helping her and other experts explain why the track record of past restoration efforts is poor, and they are pointing the way to improving the success rate. The big lesson from multiple investigations is to forget about trying to re-create a fully functioning wetland that is identical to the one being lost. "We don't know how to do it," says Doug Wilcox, professor of wetland science at the College at Brockport, S.U.N.Y. There are too many variables.

Instead scientists should focus on one or two key objectives, such as rebuilding land, improving water quality or boosting fish populations, and engineer the system to optimize those objectives. Then, once the basic engineering is done, let nature fill in the details as it pleases.

Another lesson is to monitor wetland projects for years, as Zedler continues to do with her experiment. That time is needed to uncover the often surprising details of what works and why and to take corrective action when necessary. Unlike cars, "wetlands do not come with repair manuals," Wilcox says.

Accepting the notion that we usually cannot restore wetlands to their original state is a sobering reminder of the limits of science. But achieving one or two goals can be a major step forward. Inspiration is coming from a growing list of successful projects, from Delaware Bay and the Mississippi River Delta to Iraq and the Guyana coast. "Restoring is a heck of a lot better now than it used to be," says William J. Mitsch, director of the Everglades Wetland Research Park in Florida.

www.crackab.com

www.actexam.net

85 Recent successes are welcome news because wetlands are so valuable. Mitsch calls them "nature's kidneys" and "ecological supermarkets, where all the critters go to eat or be eaten."

Reproduced with permission. Copyright © 2013 Scientific American, a division of Nature America, Inc. All rights reserved.

31. The primary purpose of the passage is to:

A. convince readers to support local wetland restoration projects.
B. analyze varying results from several wetland restoration projects.
C. report the results of one restoration project and its implications for future wetland restoration.
D. explain why Zedler's wetland restoration project was more successful than others of its kind.

32. It can most reasonably be deduced from the passage that if Zedler had planted only one tract, her findings would have been:

F. less instructive.
G. less controversial.
H. more predictable and thus more credible.
J. more conclusive about a variety of plants.

33. Regarding wetland restoration, a primary claim in the passage is that wetlands:

A. must be researched carefully before they can be restored to their original state.
B. are nearly impossible to duplicate exactly.
C. are more useful if engineered by scientists than left in their original state.
D. are being lost too quickly for restoration efforts to make a difference.

34. Compared to the other plots described in the passage, the cattail plot was better at:

F. absorbing nutrients.
G. slowing floodwater.
H. controlling soil erosion.
J. producing plant material.

35. In the context of the passage, Wilcox mentions repair manuals primarily to make the point that wetlands:

A. can't be repaired in a systematic, standardized way.
B. don't need human intervention to repair themselves.
C. stop functioning periodically and need repairs, much like cars do.
D. are more easily repaired now that others can learn from Zedler's research.

36. Based on the passage, scientists trying to reestablish a functioning wetland will most likely succeed if they:

F. reintroduce any species that formerly thrived in the area, so the wetland can function as before.
G. prioritize a few objectives, design the project accordingly, and then monitor the area over time.
H. remove buildings that intrude on former wetlands and let the area replenish itself naturally.
J. plant three different tracts with distinct species and then allow nature to control which species thrive.

37. The main idea of the ninth paragraph (lines 75–84) is that:

A. restoration projects occur globally, from Delaware Bay and the Mississippi Delta to Iraq and Guyana.
B. science has limits, so projects should focus on conserving wetlands rather than restoring them.
C. due to advances in restoration science, wetland loss won't be a problem in the future.
D. although wetland loss is still a serious concern, restoration efforts have improved substantially.

38. In the context of the passage, the phrase "the stakes were higher" (line 16) most clearly indicates that:

F. most university projects aren't funded as generously as Zedler's project was.
G. Zedler's project was more of a gamble than other wetland restoration studies had been.
H. Zedler's reputation would be saved if her project was successful.
J. the outcome of Zedler's project was particularly critical.

39. Based on the passage, which of the following would most likely result from additional clay in the soil?

A. Less soil erosion
B. More moss growth
C. Less water permeating the ground
D. More nutrient absorption into the plants

40. The main function of the last paragraph is to:

F. describe recent successes in wetland restoration.
G. compare wetlands to ecological supermarkets.
H. explain how wetlands act as nature's kidneys.
J. reinforce wetlands' ecological significance.

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

www.crackab.com

www.actexam.net

SCIENCE TEST

35 Minutes—40 Questions

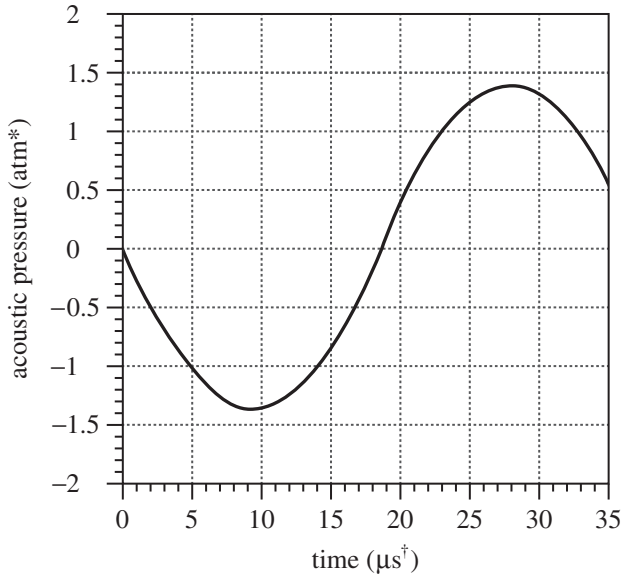
DIRECTIONS: There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

Passage I

To demonstrate *single bubble sonoluminescence* (SBSL), an air bubble in liquid water was subjected to sound waves that caused the bubble to expand, collapse, and then emit a flash of light over a range of wavelengths.

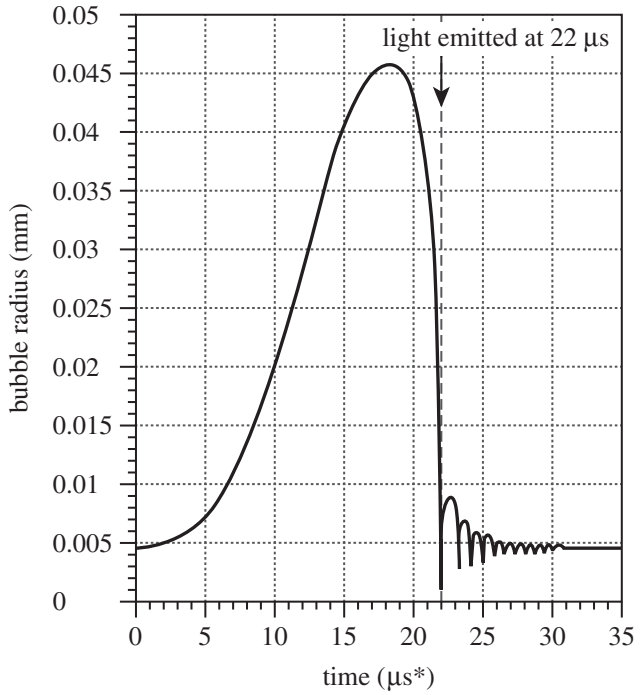
Figure 1 shows how the *acoustic pressure* (the pressure change caused by the sound wave) varied with time as the sound wave passed through the bubble.



*atmospheres
†microseconds

Figure 1

Figure 2 shows how the bubble's radius changed with time as the sound wave passed through the bubble. Figure 2 also shows the time at which the light was emitted.



*microseconds

Figure 2

www.crackab.com

www.actexam.net

Table 1 lists, at each of several wavelengths, the intensity of the emitted light.

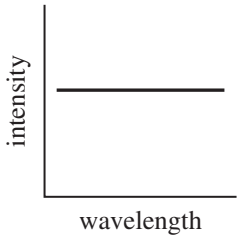
Table 1	
Wavelength (nm*)	Intensity (W/m†)
200	0.321
250	0.193
300	0.154
350	0.132
400	0.111
450	0.085
500	0.071
550	0.061
600	0.052
650	0.045
700	0.042

*nanometers
†watts per meter

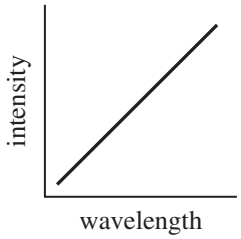
Figures and table adapted from S. J. Putterman, "Sonoluminescence: Sound into Light." ©1995 by Scientific American.

1. Based on Table 1, the relationship between intensity and wavelength is best represented by which of the following graphs?

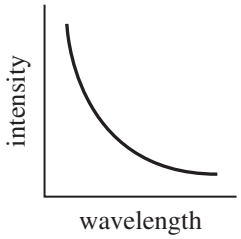
A.



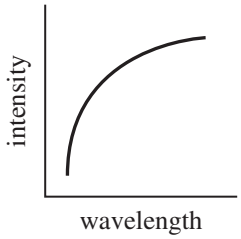
C.



B.



D.



2. Based on Figure 2, approximately how long did the bubble take to expand to its maximum radius, and approximately how long after that did the bubble take to contract to its minimum radius?

	time to expand	time to contract
F.	18 μs	4 μs
G.	18 μs	9 μs
H.	22 μs	4 μs
J.	22 μs	9 μs

3. Based on Figure 1, at approximately what time did the acoustic pressure of the sound wave change from negative to positive?

A. 6 μs
B. 11 μs
C. 14 μs
D. 19 μs

4. Based on Figures 1 and 2, the time at which the flash of light was emitted corresponded most closely with the time when which of the following occurred?

F. The maximum negative acoustic pressure
G. The maximum positive acoustic pressure
H. The smallest bubble radius
J. The largest bubble radius

5. Consider the time interval from 5 μs to 25 μs. Based on Figures 1 and 2, when the acoustic pressure had a value of 0.5 atm, the bubble radius was closest to which of the following?

A. 0.011 mm
B. 0.021 mm
C. 0.031 mm
D. 0.041 mm

6. Consider the claim "The bubble radius will not begin to increase until after the acoustic pressure reaches its most negative value." Do Figures 1 and 2 support this claim?

F. Yes; the most negative acoustic pressure was reached at 9 μs, and the bubble radius began to increase at 9 μs.
G. Yes; the most negative acoustic pressure was reached at 9 μs, and the bubble radius began to increase at 14 μs.
H. No; the most negative acoustic pressure was reached at 9 μs, and the bubble radius began to increase at 0 μs.
J. No; the most negative acoustic pressure was reached at 9 μs, and the bubble radius began to increase at 7 μs.

www.crackab.com

www.actexam.net

Passage II

Students conducted a study to estimate the population size for a particular species of snail in a stream and to determine the linear distance the snails traveled in 7 days.

Study

The students divided into 4 groups (Groups 1–4), each of which was assigned 1 of 4 equal-sized survey areas in the stream. Each group was assigned a different color—white, red, orange, or green—and placed a rock painted that color in the center of its survey area (see Table 1).

Table 1

Group	Color
1	white
2	red
3	orange
4	green

From 12:00 p.m. to 12:30 p.m., each group collected 25 snails from the group's survey area and dried each snail's shell using a paper towel. Then each group marked the snails using nail polish of the group's assigned color. After the nail polish dried, each group released its snails next to the group's assigned rock.

Seven days later, from 12:00 p.m. to 12:30 p.m., each group collected all the snails it located in its survey area and counted the number of recaptured snails marked with its color (R) and the number of unmarked snails (U). Each group then used its data to calculate the estimated population size (N) for the snails in the stream (see Table 2).

Table 2

Group	Number of marked snails (R)	Number of unmarked snails (U)	Estimated population size (N)
1	7	23	107
2	18	21	54
3	14	20	61
4	20	21	51

Note: $N = \frac{M(R+U)}{R}$, where M equals the number of snails marked during the first visit.

Each group measured the linear distance between the site of release and the site of recapture for each marked snail and determined the snails' minimum, maximum, and average linear distance traveled (see Table 3).

Table 3

Group	Linear distance snails traveled (m)		
	minimum	maximum	average
1	0.54	2.43	1.46
2	0.24	3.05	1.50
3	0.43	5.89	3.30
4	0.35	5.20	2.35

Table 3 adapted from Timothy W. Stewart, "Measuring Animal Movements in a Natural Ecosystem: A Mark-Recapture Investigation Using Stream-Dwelling Snails." ©2007 by University of California Press.

7. Was the number of unmarked snails captured during the second visit higher for Group 2 or for Group 3 ?

A. Group 2; the students in Group 2 captured 21 unmarked snails, whereas the students in Group 3 captured 20 unmarked snails.
B. Group 2; the students in Group 2 captured 23 unmarked snails, whereas the students in Group 3 captured 21 unmarked snails.
C. Group 3; the students in Group 3 captured 21 unmarked snails, whereas the students in Group 2 captured 20 unmarked snails.
D. Group 3; the students in Group 3 captured 23 unmarked snails, whereas the students in Group 2 captured 21 unmarked snails.

8. The estimated size of the snail population was *smallest* for the group assigned which color?

F. White
G. Red
H. Orange
J. Green

www.crackab.com

www.actexam.net

9. Suppose the students plan to repeat the study the next year to determine whether the size of the snail population has changed. Which of the following aspects of the study's design should be kept constant so that the data from each year can be validly compared?

I. Species of snail studied
II. Location of the study area
III. Time of year the study was conducted

A. I and II only
B. I and III only
C. II and III only
D. I, II, and III

10. Consider the following steps that were performed in the study.

1. Marking the snails with nail polish
2. Drying the snails' shells
3. Releasing the snails back into the stream

In the study, these steps were performed in what sequence?

F. 1, 2, 3
G. 1, 3, 2
H. 2, 1, 3
J. 2, 3, 1

11. Suppose that the nail polish used to mark the snails had worn off some of the snails within 3 days. Which of *R* and *N*, if either, would most likely have been affected?

A. *R* only
B. *N* only
C. Both *R* and *N*
D. Neither *R* nor *N*

12. The linear distance traveled was measured for a total of how many recaptured snails?

F. 25
G. 59
H. 85
J. 100

13. What was the minimum linear distance, in *centimeters*, traveled by a snail recaptured by Group 3 ?

A. 0.0043 cm
B. 0.43 cm
C. 4.3 cm
D. 43 cm

www.crackab.com

www.actexam.net

Passage III

When placed in an ink solution, *Tetrahymena* (single-celled eukaryotes) take in ink by *phagocytosis*. The ink is surrounded by the plasma membrane of a cell and enters the cell in *vesicles* (membrane-bound structures) that pinch off from the plasma membrane. Figure 1 shows how these ink-containing vesicles (ICVs) are formed.

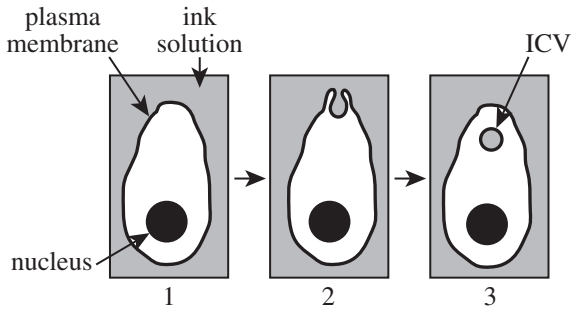


Figure 1

Four students predicted how the number of ICVs formed by *Tetrahymena* would be affected by ink concentration and temperature.

Student 1

High concentrations of ink inhibit *Tetrahymena's* ability to form vesicles. Therefore, as the ink concentration increases, the average number of ICVs formed decreases. Furthermore, increasing *Tetrahymena's* temperature increases the rigidity of the plasma membrane, decreasing the cells' ability to form vesicles. Therefore, as the temperature increases, the average number of ICVs formed decreases.

Student 2

High concentrations of ink increase the probability that *Tetrahymena* will come in contact with and take in ink. Therefore, as the ink concentration increases, the average number of ICVs formed increases. Temperature has no effect on *Tetrahymena's* ability to form vesicles.

Student 3

High concentrations of ink stimulate *Tetrahymena* to increase the rate of vesicle formation. Therefore, as the ink concentration increases, the average number of ICVs formed increases. Furthermore, increasing *Tetrahymena's* temperature decreases the activity of a protein needed for vesicle formation. Therefore, as the temperature increases, the average number of ICVs formed decreases.

Student 4

Ink concentration has no effect on *Tetrahymena's* ability to form vesicles. However, because *Tetrahymena's* activity level is directly related to its temperature, as the temperature increases, the average number of ICVs formed increases.

Experiment

The students determined the average number of ICVs formed by *Tetrahymena* exposed to different concentrations of ink at 22°C and by *Tetrahymena* exposed to a 1% ink solution at different temperatures (see Tables 1 and 2, respectively).

Table 1

Ink concentration	Average number of ICVs
1%	4.4
5%	3.5
10%	1.3

Table 2

Temperature (°C)	Average number of ICVs
12	3.4
22	4.5
30	6.1

www.crackab.com

www.actexam.net

14. Which of the following tables is most consistent with Student 3's prediction about how increasing solution temperature affects ICV formation?

F.

Temperature (°C)	Average number of ICVs
5	0.3
10	1.2
15	2.3
20	3.4

G.

Temperature (°C)	Average number of ICVs
5	0.3
10	1.2
15	0.8
20	0.4

H.

Temperature (°C)	Average number of ICVs
5	3.4
10	2.3
15	1.2
20	0.3

J.

Temperature (°C)	Average number of ICVs
5	1.2
10	1.2
15	1.2
20	1.2

15. The results shown in Table 2 are consistent with the prediction(s) of which of the students, if any?

A. Student 1 only
B. Student 4 only
C. Students 2 and 3 only
D. None of the students

16. Are the data shown in Table 1 consistent with Student 2's prediction about how ink concentration affects the average number of ICVs formed?

F. No; as the ink concentration increased, the average number of ICVs increased.
G. No; as the ink concentration increased, the average number of ICVs decreased.
H. Yes; as the ink concentration increased, the average number of ICVs increased.
J. Yes; as the ink concentration increased, the average number of ICVs decreased.

17. Prior to the experiment, with which of the following statements about the effect of ink concentration on ICV formation would both Students 2 and 3 have been likely to agree? As ink concentration increases, the frequency at which *Tetrahymena* come into contact with ink:

A. increases and, thus, the more frequently they will be stimulated to form an ICV.
B. increases and, thus, the less frequently they will be stimulated to form an ICV.
C. decreases and, thus, the more frequently they will be stimulated to form an ICV.
D. decreases and, thus, the less frequently they will be stimulated to form an ICV.

18. Prior to the experiment, for which temperature—22°C or 30°C—would Student 1 most likely have predicted that *Tetrahymena* would, on average, produce the greatest number of ICVs ?

F. 22°C, because the plasma membrane of *Tetrahymena* would be more flexible at 22°C than at 30°C.
G. 22°C, because the plasma membrane of *Tetrahymena* would be less flexible at 22°C than at 30°C.
H. 30°C, because the plasma membrane of *Tetrahymena* would be more flexible at 30°C than at 22°C.
J. 30°C, because the plasma membrane of *Tetrahymena* would be less flexible at 30°C than at 22°C.

19. Which of the students predicted that the average number of ICVs formed by *Tetrahymena* is affected by either ink concentration or temperature but not both?

A. Student 2 only
B. Student 3 only
C. Students 1 and 3 only
D. Students 2 and 4 only

20. Suppose it were determined that, at high ink concentrations, ink particles physically interfere with the ability of *Tetrahymena's* plasma membrane to form vesicles. This result would strengthen the prediction(s) of which of the students, if any?

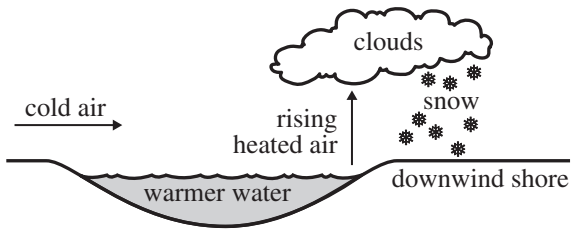
F. Student 1 only
G. Student 2 only
H. Students 3 and 4 only
J. None of the students

www.crackab.com

www.actexam.net

Passage IV

Lake-effect snow (LES) is snow that falls along downwind shores of large lakes. When cold air moves across long expanses of warmer lake water, the air is heated by the lake water. This heated air then rises and mixes with colder air above, causing moisture in the air to condense into clouds. LES then falls on the downwind shore (see LES diagram).



LES diagram

When snow falls at a site that is not downwind of the lake, the snow is categorized as *non-lake-effect snow* (NLES).

Study

Scientists conducted a study at 2 sites (Sites 1 and 2) on the shores of a large lake in the U.S. to determine how frequently LES and NLES occurred. Site 1 was located on the western shore, and Site 2 was located on the eastern shore. When the wind was from the east, Site 1 was downwind of the lake, and when the wind was from the west, Site 2 was downwind of the lake.

Over the course of 1,000 consecutive days, the scientists recorded the number of *snowfall days* (days during which there was any snowfall) for each site by collecting hourly observations of snowfall. The snowfall at a given hour was then classified as either LES or NLES based on the wind direction at the time the snowfall was observed.

Then the scientists calculated *snowfall frequencies* for each type of snowfall at each site during each hour of the day. Each frequency was calculated by expressing the number of days that a given site received a given type of snowfall during a given hour as a percent of all days in the study. Figures 1 and 2, respectively, show the results for Sites 1 and 2.

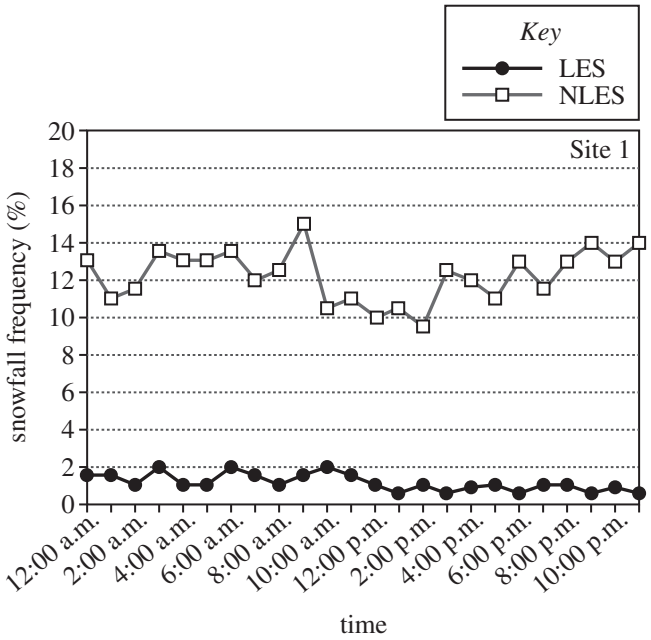


Figure 1

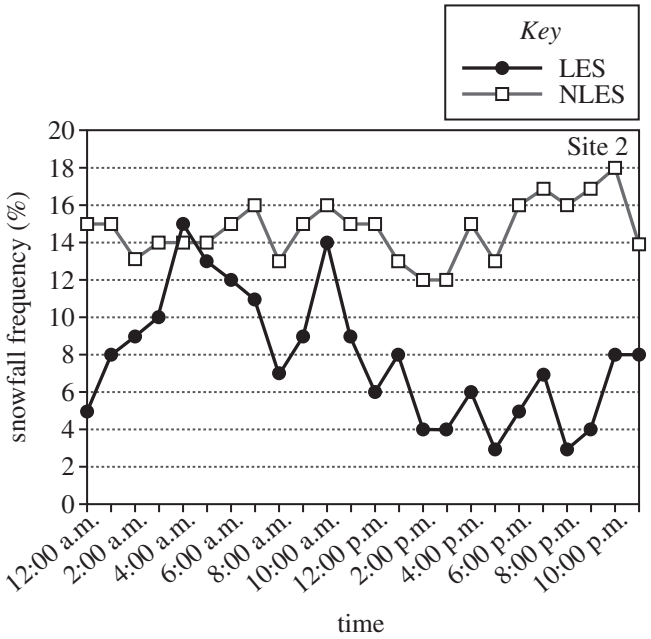


Figure 2

Figures 1 and 2 adapted from David A. R. Kristovich and Michael L. Spinar, "Diurnal Variations in Lake-Effect Precipitation near the Western Great Lakes." ©2005 by American Meteorological Society.

www.crackab.com

www.actexam.net

21. According to the results of the study, at what time of day was the snowfall frequency of NLES greatest for Site 1, and at what time of day was the snowfall frequency of NLES greatest for Site 2 ?

	Site 1	Site 2
A.	9:00 a.m.	2:00 p.m.
B.	9:00 a.m.	10:00 p.m.
C.	2:00 p.m.	2:00 p.m.
D.	2:00 p.m.	10:00 p.m.

22. Suppose that snow were falling at one of the sites. Based on the description of the study, which of the following measurements would be necessary to determine whether the site was receiving LES or NLES ?

F. Wind speed
G. Wind direction
H. Air temperature at Site 1
J. Air temperature at Site 2

23. Which of the following statements about the snowfall frequency of LES is consistent with the results from Sites 1 and 2 ? During the study, LES typically occurred:

A. more often at both sites between 12:00 a.m. and 12:00 p.m. than between 12:00 p.m. and 12:00 a.m.
B. less often at both sites between 12:00 a.m. and 12:00 p.m. than between 12:00 p.m. and 12:00 a.m.
C. more often, on average, at both sites than did NLES.
D. less often, on average, at Site 2 than at Site 1.

24. Suppose the temperature of the lake were 5°C. The formation of LES would be most likely to occur if the air moving across the lake had which of the following temperatures?

F. 0°C
G. 5°C
H. 10°C
J. 15°C

25. The *total* snowfall frequency at 12:00 p.m. for Site 2 was closest to which of the following?

A. 11%
B. 16%
C. 21%
D. 26%

26. Based on the results of the study, on how many days did NLES fall at Site 1 at 4:00 p.m. ?

F. 10 days
G. 60 days
H. 120 days
J. 150 days

27. Can the results of the study alone be used to determine which site received more inches of LES ?

A. Yes, because the results show that Site 1 received less snow than Site 2 when Site 1 received LES.
B. Yes, because the results show that Site 2 received more snow than Site 1 when Site 2 received LES.
C. No, because the results show that LES did not fall at either site when both sites received snow.
D. No, because the results do not show the LES snowfall amounts.

www.crackab.com

www.actexam.net

Passage V

A *carboxylic acid* (CA) is a compound containing an acidic –COOH group. Table 1 lists the name, molecular formula, and *molecular mass* (the mass of 1 molecule in atomic mass units, amu) for each of 8 CAs. In each of the 8 CAs, the –COOH group is bound to an H atom or to a hydrocarbon chain made up of C atoms and H atoms.

Table 1

CA name	Molecular formula	Molecular mass (amu)
Methanoic acid	HCOOH	46
Ethanoic acid	CH_3COOH	60
Propanoic acid	CH_3CH_2COOH	74
Butanoic acid	$CH_3(CH_2)_2COOH$	88
Pentanoic acid	$CH_3(CH_2)_3COOH$	102
Hexanoic acid	$CH_3(CH_2)_4COOH$	116
Heptanoic acid	$CH_3(CH_2)_5COOH$	130
Octanoic acid	$CH_3(CH_2)_6COOH$	144

Figure 1 shows a plot of BP (the boiling point at 1 atmosphere of pressure) versus molecular mass for the 8 CAs.

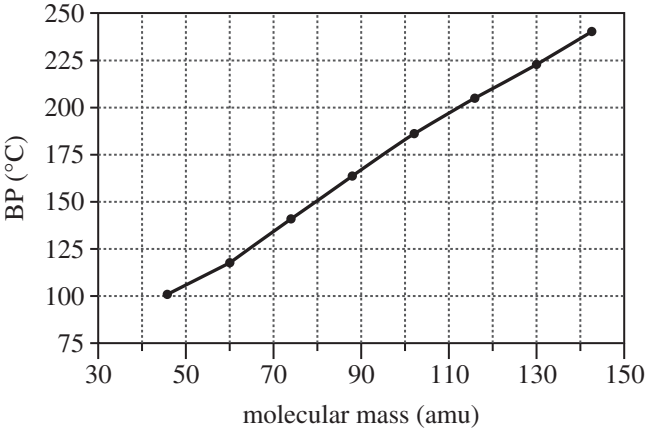


Figure 1

Figure 2 shows, for the 8 CAs, a plot of the pH of a 0.01 mole/L aqueous CA solution at 25°C versus the number of C atoms per CA molecule.

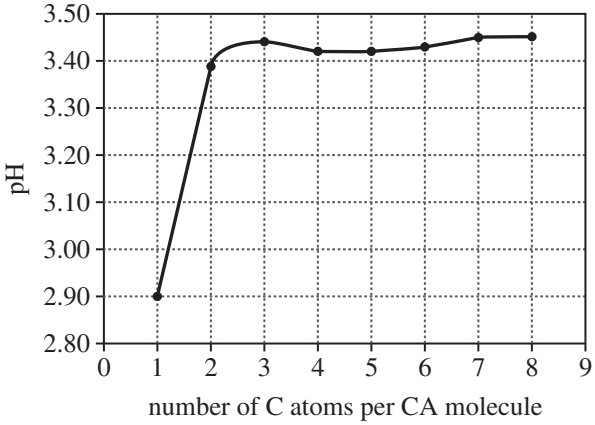


Figure 2

Table and figures adapted from W. M. Haynes, ed., *CRC Handbook of Chemistry and Physics on CD-ROM*, Version 2011. ©2011 by CRC Press, LLC.

28. Based on Figure 2, as the number of C atoms per CA molecule increases from 1 through 8, the pH of the CA solution at 25°C:

F. decreases only.
G. increases only.
H. decreases, then remains between 3.40 and 3.50.
J. increases, then remains between 3.40 and 3.50.

29. Consider the CA represented in Figure 1 with a BP of approximately 165°C. Based on Table 1 and Figure 2, a 0.01 mole/L aqueous solution of that CA at 25°C will have a pH of approximately:

A. 2.90.
B. 3.05.
C. 3.25.
D. 3.40.

www.crackab.com

www.actexam.net

30. Based on Table 1 and Figure 1, will pentanoic acid at 200°C and 1 atmosphere be a gas or a liquid?

F. Gas, because 200°C is lower than the BP of pentanoic acid.
G. Gas, because 200°C is higher than the BP of pentanoic acid.
H. Liquid, because 200°C is lower than the BP of pentanoic acid.
J. Liquid, because 200°C is higher than the BP of pentanoic acid.

31. Based on Table 1 and Figure 1, the BP of ethanoic acid is approximately how much lower or higher than the BP of hexanoic acid?

A. 85°C lower
B. 85°C higher
C. 115°C lower
D. 115°C higher

32. Consider the CA *decanoic acid*, $CH_3(CH_2)_8COOH$. Based on Table 1 and Figure 1, the BP of decanoic acid will most likely be:

F. less than 225°C.
G. between 225°C and 240°C.
H. between 240°C and 255°C.
J. greater than 255°C.

33. The *empirical formula* of a compound is a chemical formula that shows the simplest whole number ratio of the atoms of each element in the compound. Based on Table 1, what is the empirical formula of octanoic acid?

A. C_4H_8O
B. $C_4H_8O_2$
C. C_8H_8O
D. $C_8H_8O_2$

www.crackab.com

www.actexam.net

Passage VI

Some students performed studies of *static friction* (the frictional force between 2 surfaces that are at rest relative to each other) and *kinetic friction* (the frictional force between 2 surfaces that are sliding past each other).

Study 1

The students obtained three identically sized planes, each made of either glass, metal, or wood, and three 1.0 kg blocks, each made of either glass, metal, or wood. They looked up the *coefficient of static friction* (μ_S, a measure of the frictional force between a plane and a motionless block) for each combination of plane and block to be tested. With a plane in the horizontal position ($\theta = 0°$, where θ was the angle between the plane and the table) and a block at the starting line (see Figure 1), the students increased θ until the moment the block began to slide. They recorded the angle at that moment as θ_S (see Table 1).

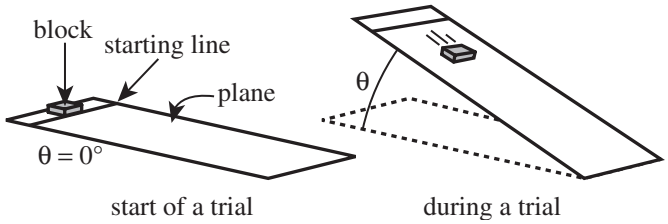


Figure 1

Table 1				
Trial	Plane	Block	μ_S	θ_S
1	glass	glass	0.93	43°
2	glass	metal	0.60	31°
3	glass	wood	0.19	11°
4	metal	metal	0.75	37°
5	metal	wood	0.53	28°
6	wood	wood	0.34	19°

Study 2

The students looked up the *coefficient of kinetic friction* (μ_K, a measure of the frictional force between a plane and a sliding block) for each combination of plane and block. For each trial, θ was initially 45°. Once a block was placed on the plane and released, it began to slide. The students reduced θ until it reached its critical value, θ_C, the angle at which the block's speed down the incline became constant (see Table 2).

Table 2				
Trial	Plane	Block	μ_K	θ_C
7	glass	glass	0.40	22°
8	glass	metal	0.25	14°
9	glass	wood	0.05	3°
10	metal	metal	0.58	30°
11	metal	wood	0.19	11°
12	wood	wood	0.25	14°

34. Based on the results of the studies, the absolute value of the difference between θ_S and θ_C was greatest for which of the following pairs of trials?

F. Trials 1 and 7
G. Trials 2 and 8
H. Trials 3 and 9
J. Trials 4 and 10

35. Based on the results of Study 2, as μ_K increased, θ_C:

A. increased only.
B. decreased only.
C. increased and then decreased.
D. decreased and then increased.

www.crackab.com

www.actexam.net

36. Based on the results of the 2 studies, for each combination of plane and block tested, compared to the coefficient of kinetic friction, the coefficient of static friction was:

F. always greater.
G. always less.
H. always equal.
J. sometimes greater and sometimes less.

37. Can it be determined from the results of the studies whether the value of θ_S for a given block depended on the mass of that block?

A. Yes, because the blocks varied in mass.
B. Yes, because the blocks all had the same mass.
C. No, because the blocks varied in mass.
D. No, because the blocks all had the same mass.

38. In Study 2, the students performed the minimum number of trials necessary to test each substance with itself and with every other substance listed in Table 2. Suppose that they had included a fourth plane and a fourth 1.0 kg block in Study 2, each made of concrete. What minimum number of trials would have been required in Study 2 to test each of the 4 substances?

F. 6
G. 10
H. 14
J. 18

39. In Study 1, why did the block in a given trial begin to move? Once θ became equal to θ_S, the:

A. gravitational force on the block was decreased enough such that the frictional force could accelerate the block down the plane.
B. gravitational force on the block was increased enough such that the frictional force could accelerate the block down the plane.
C. frictional force on the block was decreased enough such that the gravitational force could accelerate the block down the plane.
D. frictional force on the block was increased enough such that the gravitational force could accelerate the block down the plane.

40. In each trial of Study 2, θ was initially 45°. Based on the results of Study 1, which of the following statements best explains why this initial value of θ was chosen? For each combination of plane and block tested in Study 2, this initial value of θ was:

F. equal to θ_C.
G. less than θ_C.
H. less than θ_S.
J. greater than θ_S.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

www.crackab.com

www.actexam.net

Scoring Guide

Raw Scores

The number of questions you answered correctly on each test section is a raw score. Because there are many forms of the ACT, each with different questions, the difficulty level varies between the forms. A raw score of 35 on one form of the mathematics test section, for example, may be about as difficult to earn as a raw score of 37 on another form of that test section.

Computing raw scores: To compute your raw scores, check your answers with the scoring information in the scoring keys and conversion table and do the following:

1. Mark a one (1) in the blank for each question answered correctly.
2. Count the number of correct answers for each of the four multiple-choice test sections.
3. Add up the total number correct for each category and test section and capture it as directed above its scoring key.

These numbers are your raw scores on the individual multiple-choice test sections. The highest raw score for a given test section is the number of questions included on that test section:

- English: 75
- Mathematics: 60
- Reading: 40
- Science: 40

Note: *Raw scores are also provided as part of the Summary Report for each test section taken online in TestNav.*

English Test 1 Section

English Scoring Key *(for Form G19)*

English Reporting Categories
(Capture raw scores/correct answers.)

Production of Writing (POW) = ___ of 24

Knowledge of Language (KLA) = ___ of 12

Conventions of Standard English (CSE) = ___ of 39

Total English (POW + KLA + CSE) = ___ of 75

English Number	Correct Answer	Correct (Mark 1)	Reporting Categories
1	D		CSE
2	F		CSE
3	C		POW
4	J		CSE
5	A		KLA
6	G		CSE
7	C		CSE
8	J		POW
9	D		CSE
10	F		CSE
11	B		CSE
12	G		POW
13	A		CSE
14	G		POW
15	A		POW
16	G		CSE
17	C		CSE
18	F		KLA
19	D		KLA
20	F		CSE
21	D		CSE
22	H		POW
23	C		POW
24	H		KLA
25	A		POW

www.crackab.com

www.actexam.net

English Number	Correct Answer	Correct (Mark 1)	Reporting Categories
26	J		CSE
27	D		POW
28	H		KLA
29	C		CSE
30	F		POW
31	B		CSE
32	J		CSE
33	B		CSE
34	H		POW
35	C		CSE
36	H		CSE
37	D		CSE
38	J		POW
39	C		KLA
40	G		CSE
41	A		POW
42	G		KLA
43	D		CSE
44	F		POW
45	D		POW
46	G		CSE
47	C		CSE
48	F		POW
49	C		POW
50	J		POW

English Number	Correct Answer	Correct (Mark 1)	Reporting Categories
51	A		CSE
52	G		CSE
53	A		POW
54	J		CSE
55	C		CSE
56	F		KLA
57	B		CSE
58	H		POW
59	A		KLA
60	G		CSE
61	D		KLA
62	F		CSE
63	A		CSE
64	G		CSE
65	A		POW
66	H		CSE
67	C		POW
68	G		CSE
69	A		KLA
70	J		POW
71	B		CSE
72	H		CSE
73	B		KLA
74	J		CSE
75	D		POW

www.crackab.com

www.actexam.net

Mathematics Test 2 Section

Mathematics Scoring Key *(for Form G19)*

Mathematics Reporting Categories
(Capture raw scores/correct answers.)

Preparing for Higher Math (PHM) = ___ of 35
(A + F + G + N + S)
A = Algebra
F = Functions
G = Geometry
N = Number & Quantity
S = Statistics & Probability

Integrating Essential Skills (IES) = ___ of 25

Modeling (MDL) = ___ of 21

Total Mathematics (PHM + IES) = ___ of 60

Note: *Do not include MDL in Total Mathematics raw score.*

Math Number	Correct Answer	Correct (Mark 1)	Reporting Categories
1	C		IES, MDL
2	H		PHM-G
3	D		PHM-F, MDL
4	K		IES, MDL
5	B		IES
6	F		PHM-A
7	A		PHM-N, MDL
8	G		PHM-A
9	A		PHM-F, MDL
10	H		PHM-F, MDL
11	B		PHM-A
12	H		IES, MDL
13	E		PHM-G
14	H		PHM-G, MDL
15	D		IES, MDL
16	G		IES
17	D		PHM-N, MDL
18	G		PHM-G, MDL
19	A		IES
20	H		IES
21	E		IES, MDL
22	H		IES, MDL
23	B		PHM-S
24	F		PHM-S
25	C		IES, MDL
26	G		IES
27	E		PHM-N
28	K		PHM-F
29	E		PHM-A
30	K		PHM-A
31	E		IES
32	G		IES, MDL
33	B		PHM-G
34	F		PHM-A
35	C		IES
36	F		IES
37	D		IES
38	G		IES
39	D		PHM-N
40	G		IES
41	A		IES, MDL
42	F		IES, MDL
43	D		PHM-G
44	H		PHM-F, MDL
45	A		IES
46	J		PHM-S
47	E		PHM-S
48	K		PHM-A, MDL
49	B		PHM-G
50	G		PHM-S, MDL
51	B		PHM-F
52	J		IES
53	E		PHM-A
54	J		PHM-N
55	E		PHM-G
56	J		PHM-S
57	C		IES
58	F		IES
59	E		PHM-F
60	J		PHM-F, MDL

www.crackab.com

www.actexam.net

Reading Test 3 Section

Reading Scoring Key *(for Form G19)*

Reading Reporting Categories
(Capture raw scores/correct answers.)

Key Ideas & Details (KID) = ___ of 23

Craft & Structure (CS) = ___ of 12

Integration of Knowledge & Ideas (IKI) = ___ of 5

Total Reading (KID + CS + IKI) = ___ of 40

Reading Number	Correct Answer	Correct (Mark 1)	Reporting Categories
1	B		CS
2	H		KID
3	C		CS
4	G		KID
5	C		CS
6	G		KID
7	D		KID
8	J		KID
9	B		KID
10	F		CS
11	A		KID
12	H		KID
13	D		CS
14	F		KID
15	D		KID
16	H		KID
17	B		KID
18	F		KID
19	A		IKI
20	G		CS
21	A		CS
22	H		KID
23	A		CS
24	G		KID
25	B		CS
26	H		KID
27	D		CS
28	J		IKI
29	A		IKI
30	F		IKI
31	C		CS
32	F		KID
33	B		IKI
34	J		KID
35	A		KID
36	G		KID
37	D		KID
38	J		KID
39	C		KID
40	J		CS

www.crackab.com

www.actexam.net

Science Test 4 Section

Science Scoring Key *(for Form G19)*

Science Reporting Categories
(Capture raw scores/correct answers.)

Interpretation of Data (IOD) = ___ of 18

Scientific Investigation (SIN)= ___ of 9

Evaluation of Models, Inferences
& Experimental Results (EMI) = ___ of 13

Total Science (IOD + SIN + EMI) = ___ of 40

Science Number	Correct Answer	Correct (Mark 1)	Reporting Categories
1	B		IOD
2	F		IOD
3	D		IOD
4	H		IOD
5	D		IOD
6	H		EMI
7	A		EMI
8	J		IOD
9	D		SIN
10	H		SIN
11	C		SIN
12	G		IOD
13	D		IOD
14	H		EMI
15	B		EMI
16	G		EMI
17	A		EMI
18	F		EMI
19	D		EMI
20	F		EMI
21	B		IOD
22	G		SIN
23	A		EMI
24	F		EMI
25	C		IOD
26	H		SIN
27	D		EMI
28	J		IOD
29	D		IOD
30	G		EMI
31	A		IOD
32	J		IOD
33	A		IOD
34	F		IOD
35	A		IOD
36	F		IOD
37	D		SIN
38	G		SIN
39	C		SIN
40	J		SIN

www.crackab.com

www.actexam.net

Scale Scores

To adjust for the small differences among different forms of the ACT test, raw scores are converted into scale scores. Scale scores appear on reports sent to your school.

When your raw scores are converted into scale scores, it becomes possible to compare your scores with those of examinees who took different test forms. For example, a scale score of 26 on the mathematics test section has the same meaning for any form of the ACT.

Converting Raw Scores to Scale Scores

Each ACT test section generates a single scale score of 1–36. Use the Conversion of Raw Scores to Scale Scores table to convert your raw scores to scale scores. For each test section:

1. Locate your raw score, or the range of raw scores that includes it, in the conversion table.
2. Locate the cell in the Scale Score column of the row that corresponds to that raw score to identify the scale score for that test section.
3. As you determine your scale scores, enter them in the blanks below.

Test section scale scores:

English = ___

Mathematics = ___

Reading = ___

Science = ___

Calculating a Composite Score

An ACT test generates a single Composite score of 1–36. Compute the Composite score by averaging the four scale scores. To do this:

1. Add your four scale scores. Enter this sum of scores in the blank below.
2. Divide the sum by 4. If the resulting number ends in a fraction, round it to the nearest whole number. (Round down any fraction less than one-half, except for averages lower than one; round up any fraction that is one-half or more and/or less than one.)
3. Enter this number in the blank below. This is your Composite score.

Composite of scale scores:

Sum of scores = ___

Composite score (sum ÷ 4) = ___

Note: *If you left a test section completely blank and marked no items, do not list a scale score for that section and do not calculate a Composite score.*

www.crackab.com

www.actexam.net

Conversion of Raw Scores to Scale Scores *(for Form G19)*

Scale Score	Raw Score Test 1: English	Raw Score Test 2: Mathematics	Raw Score Test 3: Reading	Raw Score Test 4: Science
36	74–75	59–60	39–40	39–40
35	72–73	57–58	37–38	38
34	70–71	55–56	36	37
33	69	54	35	—
32	68	53	34	36
31	67	51–52	33	35
30	66	49–50	32	34
29	65	48	—	33
28	64	46–47	31	32
27	62–63	43–45	30	31
26	61	41–42	29	30
25	58–60	38–40	28	28–29
24	56–57	35–37	27	26–27
23	53–55	33–34	26	24–25
22	50–52	32	25	23
21	46–49	30–31	23–24	21–22
20	43–45	29	22	20
19	41–42	27–28	21	18–19
18	39–40	24–26	19–20	16–17
17	37–38	21–23	18	15
16	35–36	17–20	17	13–14
15	31–34	14–16	15–16	12
14	28–30	11–13	14	11
13	25–27	8–10	12–13	10
12	23–24	7	10–11	8–9
11	20–22	6	9	7
10	17–19	5	7–8	6
9	14–16	4	6	5
8	12–13	3	5	4
7	10–11	—	—	—
6	8–9	2	4	3
5	6–7	—	3	2
4	5	1	2	—
3	3–4	—	—	1
2	2	—	1	—
1	0–1	0	0	0

www.crackab.com

www.actexam.net

ACT®
PO BOX 168
IOWA CITY, IA 52243-0168

www.crackab.com

CrackAB.com

ACT Resource Links

ACT Online Practice Tests: https://www.crackab.com/act/

- **ACT English Practice Tests:**
  https://www.crackab.com/act/english/
- **ACT Math Practice Tests:**
  https://www.crackab.com/act/math/
- **ACT Reading Practice Tests:**
  https://www.crackab.com/act/reading/
- **ACT Science Practice Tests:**
  https://www.crackab.com/act/science/

ACT Grammar: https://www.crackab.com/act/grammar/

ACT Real Past Papers Download:

https://www.crackab.com/act-downloads/

Mock ACT Tests Online: https://exam.actexam.net

Digital SAT Practice Tests:

https://www.cracksat.net

https://www.satpanda.com

Real SAT Tests Download:

http://www.cracksat.net/sat-downloads/

More ACT Online Practice Tests:

https://www.actpanda.com

AP Exams Practice Tests:

https://www.crackap.com