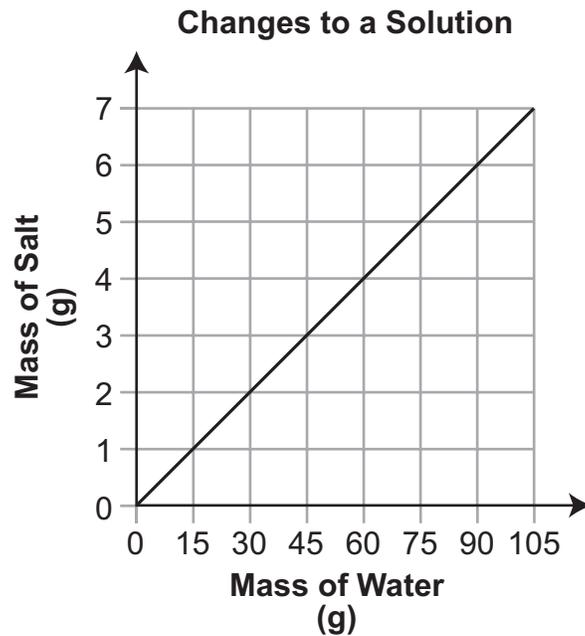


2. In 1901, the SS *Port Morant* became the world's first refrigerated banana ship. It was equipped with carbon dioxide refrigeration. It could carry 23,000 bunches of bananas from Jamaica to England at a controlled temperature. What impact did cargo ship refrigeration systems have on the banana industry?
- A. It made transportation of bananas to overseas markets quicker.
 - B. It made bananas ripen by the time they arrived at their destination.
 - C. It made bananas sweeter than bananas transported without any cooling.
 - D. It made shipment of bananas to faraway ports possible with little spoilage.

Use the graph below to answer question 3.



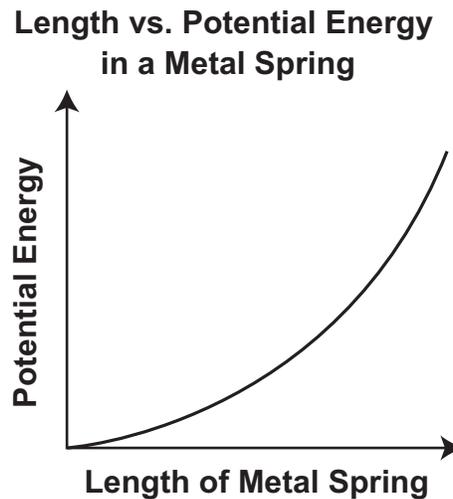
3. The graph shows the relationship between two characteristics of a saltwater solution. Which ratio describes the changes in these two characteristics?
- A. 1:7
 - B. 90:7
 - C. 1:15
 - D. 105:15

Use the data table below to answer question 4.

Trial	Time (seconds)		
	Mouse 1	Mouse 2	Mouse 3
1	58	52	67
2	54	50	65
3	53	49	61
4	47	48	57
5	42	46	55

4. A researcher placed three mice in a maze and recorded the time it took each mouse to complete the maze. Which relationship is **best** supported by the data collected by the researcher?
- A. More practice resulted in faster maze completion times for each mouse.
 - B. More practice had no effect on the maze completion times for each mouse.
 - C. More practice had the greatest effect on Mouse 3's final maze completion time.
 - D. More practice reduced each mouse's maze completion time by more than 10 seconds.

Use the graph below to answer question 5.



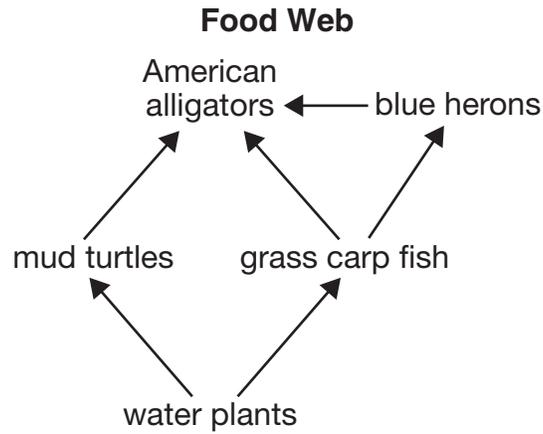
5. Which statement **best** describes the relationship between the length of a metal spring and its potential energy as shown in the graph?
- A. Increased potential energy in the spring forces it to extend.
 - B. Increased potential energy in the spring forces it to contract.
 - C. As the length of the spring increases, its potential energy increases.
 - D. As the length of the spring increases, its potential energy decreases.

6. Which measurements are required to calculate the average speed of a car driving on a road?
- A. time and distance
 - B. time and direction
 - C. mass and distance
 - D. mass and direction
7. Which part of a farm system is directly improved by the use of fossil-fuel-based fertilizers?
- A. air quality
 - B. water purity
 - C. soil temperature
 - D. nutrients and minerals

8. Which word represents the basic unit of heredity in living organisms?
- A. gene
 - B. zygote
 - C. nucleus
 - D. chromosome



Use the food web below to answer question 9.



9. Which statement **best** describes one way energy flows through this food web?
- A. Energy flows from American alligators to mud turtles to water plants.
 - B. Energy flows from American alligators to blue herons to grass carp fish.
 - C. Energy flows from water plants to mud turtles to American alligators to grass carp fish.
 - D. Energy flows from water plants to grass carp fish to blue herons to American alligators.

Use the list below to answer question 10.

Organism Traits

1. Good night vision
2. Good depth perception
3. Very sensitive hearing
4. Fast, silent flight
5. Sharp talons
6. Hooked beaks

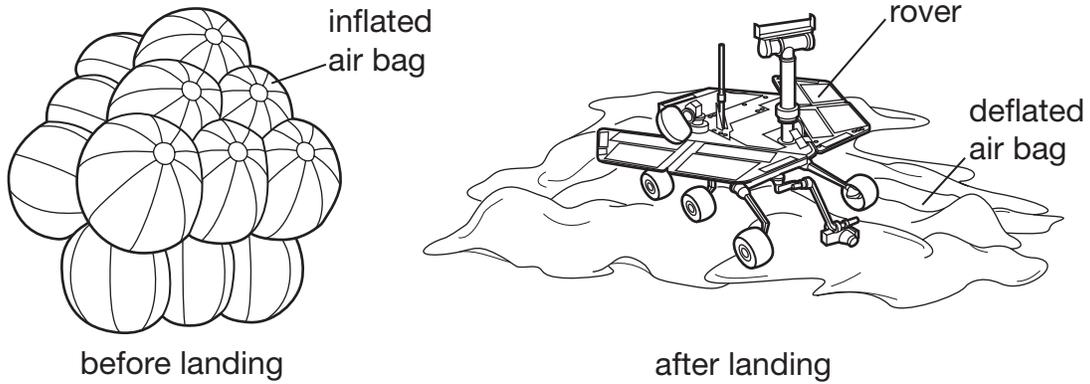
10. Which word **best** describes the organism's role in its ecosystem?

- A. mutualist
- B. parasite
- C. predator
- D. producer

OPEN-ENDED QUESTIONS

Use the diagram below to answer question 17.

Mars Exploration Rover Landing System



17. The landing system for the Mars Exploration Rover spacecraft used a system of air bags to protect its fragile rover during landing. Engineers first used a computer simulation to test the new air bag design; then they used crash tests with various types of vehicles.

Part A: Describe one benefit of using a computer simulation to test the air bag design before conducting crash tests.

Part B: Explain how crash tests help engineers test the air bag design.

STANDALONE MULTIPLE-CHOICE QUESTIONS**E08.D.1.1.1**

40. Read the paragraph.

(1) James Buchanan, born in Pennsylvania in 1791, served as the 15th President of the United States. (2) He attended Old Stone Academy before attending Dickinson College. (3) After graduating from Dickinson College, Buchanan studied law in Lancaster, Pennsylvania. (4) Soon after, he volunteered to serve in the War of 1812.

Which group of words functions as an adjective?

- A. born in Pennsylvania in 1791 in sentence 1
- B. attending Dickinson College in sentence 2
- C. graduating from Dickinson College in sentence 3
- D. to serve in the War of 1812 in sentence 4

E08.D.1.1.2

42. Read the sentence.

My favorite book had already been taken out of the library.

Without changing the meaning of the sentence, what is the **best** way to revise the sentence using active voice?

- A. Someone will be taking my favorite book out of the library.
- B. Someone had already taken my favorite book out of the library.
- C. My favorite book was already taken out of the library by someone.
- D. My favorite book will have been taken out of the library by someone.

E08.D.1.1.4

43. Read the paragraph.

(1) I always read the front section of the newspaper first, especially on Sundays. (2) Although I find it tempting to read the sports page or the comics first, I purposely do not do so. (3) My current events teacher taught us that it is critical for an eighth-grader to be aware of the wide variety of things that are happening in our own area, around the United States, and throughout the world. (4) We were told by her that if we read the front page of the paper every day, we would never be ignorant about what was going on around us.

Which sentence contains an unnecessary shift in the voice of the verb?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

E08.D.1.1.5

44. Read the paragraph.

Last month, residents of our small town waited eagerly to find out who would be elected the next mayor. Having cast their ballots, the current mayor was declared the winner of the election. She won despite the predictions that her opponent would prevail. Soon after the election, many of her supporters planned a victory celebration to take place in our town's small park.

Which underlined group of words is misplaced?

- A. of our small town
- B. Having cast their ballots
- C. that her opponent would prevail
- D. in our town's small park

E08.D.1.1.5

45. Read the paragraph.

(1) Recently in science class, our teacher demonstrated an interesting phenomenon related to light. (2) We were studying ultraviolet light, and she wanted us to observe the effects of this type of light on some classroom objects. (3) She put ink from a highlighter pen in a bowl, turned off the classroom lights, and turned on a black light, which produces ultraviolet light. (4) Glowing in the bowl, we were amazed at how the ink from the highlighter pen was clearly visible.

Which sentence should be revised to correct a misplaced modifier?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

E08.D.1.1.8

46. Read the paragraph.

The bee hummingbird would be an amazing creature at any size; however, it will always be known for its size, which was quite small. If you were to place a bee hummingbird on one side of a scale and a paper clip on the other, the paper clip would weigh more than the hummingbird.

Which underlined word or words should be changed to correct the inappropriate shift in verb tense?

- A. would be
- B. was
- C. were
- D. would weigh

E08.D.1.1.11

47. Read the paragraph.

(1) Rainbow trout live in fresh water throughout much of the United States. (2) What many people do not realize is that the species of fish known as rainbow trout are actually a type of salmon. (3) The steelhead salmon ordinarily swims into the ocean, returning to the lake or stream of its birth to spawn. (4) The steelheads that stay in fresh water and do not leave are called rainbow trout.

Which sentence in the paragraph contains an error in subject-verb agreement?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

E08.D.1.2.1

48. Read the sentences.

“This afternoon our class will be hosting a guest speaker who is an art historian for the local art museum,” the teacher told her students. “She will present to us I am sure you will appreciate it the art of Vincent van Gogh.”

Which is a correct way to write the underlined part of the sentence to indicate a break?

- A. to us I am sure you will appreciate it, the art of Vincent
- B. to us, I am sure you will appreciate it the art of Vincent
- C. to us. I am sure you will appreciate it. The art of Vincent
- D. to us—I am sure you will appreciate it—the art of Vincent

E08.D.1.2.1

49. Read the sentences.

(1) In a letter to a friend, John wrote, “The meeting will start at 7:00 Saturday morning.
(2) This means that you and I will have to arrive around 6:45 if we want I am forgetting that we do not have to attend the first part of the meeting. (3) Let’s arrange to arrive at 7:15.”

Where might the writer insert ellipsis points to show a sudden break in thought?

- A. After 7:00 in sentence 1
- B. After 6:45 in sentence 2
- C. After want in sentence 2
- D. After arrive in sentence 3

E08.D.1.2.2

50. Read the sentence.

The class president announced in her speech that she is requesting healthier options in the lunchroom.

Which is the correct way to rewrite the sentence as a quotation with the underlined words removed?

- A. “The class president; is requesting healthier options in the lunchroom.”
- B. “The class president, is requesting healthier options in the lunchroom.”
- C. “The class president—is requesting healthier options in the lunchroom.”
- D. “The class president . . . is requesting healthier options in the lunchroom.”

E08.D.1.2.5

53. Read the paragraph.

(1) Many people love calico cats for their patches of white, orange, and black fur. (2) It may be surprising to find out that the word calico refers to the color pattern, not to the breed, size, or personality of the cat. (3) Almost any breed of cat—including the American shorthair the American wirehair, and the Japanese bobtail—can have the calico color pattern. (4) It is interesting that calico cats are considered a sign of good luck, are viewed as peaceful, and are nearly always female.

Which sentence needs a comma?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

E08.D.2.1.2

55. Read the paragraph.

(1) Bernie Miller has been my good friend since kindergarten. (2) Last year, he won our school's most respected honor, the scholar-athlete award. (3) As its name suggests, that honor is given to the student who excels in both academics and athletics. (4) Bernie was the most valuable player in three sports: cross-country, basketball, and soccer. (5) Academically, in the classroom, he will graduate with a straight-A average in all of his subjects. (6) Besides all that, Bernie is a great guy, and I'm proud that he is my friend.

Which sentence contains redundant information that should be removed?

- A. sentence 2
- B. sentence 3
- C. sentence 5
- D. sentence 6

E08.D.2.1.3

56. Read the paragraph.

(1) The magnolia is an ancient flowering plant species. (2) It was named after the French plant scientist Pierre Magnol. (3) The pollen produced by the flower attracts beetles in search of food. (4) Thus, the innermost part of the magnolia flower is tough, a trait that prevents damage by beetles.

Which revision that combines sentences 1 and 2 into one sentence **most** improves the style of the paragraph?

- A. The magnolia was named after the French plant scientist Pierre Magnol and is an ancient flowering plant species.
- B. It was named after the French plant scientist Pierre Magnol, and the magnolia is an ancient flowering plant species.
- C. The magnolia, named after the French plant scientist Pierre Magnol, is an ancient flowering plant species.
- D. The French plant scientist Pierre Magnol was the man for whom the magnolia, an ancient flowering plant species, was named.

E08.D.2.1.4

57. Read the paragraph.

(1) Visitors agree that Greencastle, Pennsylvania, is the ideal location to take a walking tour. (2) In the town square, you get to set eyes on a really neat town clock that was built in 1872. (3) Another historic site to experience is a drugstore that has been in business for more than 150 years. (4) Interestingly, this drugstore was the site of Greencastle's first telephone.

Which sentence should be revised to maintain consistency of style?

- A. sentence 1
- B. sentence 2
- C. sentence 3
- D. sentence 4

E08.D.2.1.5

58. Read the paragraph.

(1) A group of students at our school is interested in forming a music club. (2) The group would meet once a month to discuss and listen to music of different genres. (3) Many schools in our area have formed this type of club, and the club meetings are well attended. (4) The eighth-grade teachers including Ms. Foy support the idea.

Choose the correct way to punctuate sentence 4 to **most** effectively emphasize the underlined phrase.

- A. The eighth-grade teachers (including Ms. Foy) support the idea.
- B. The eighth-grade teachers—including Ms. Foy—support the idea.
- C. The eighth-grade teachers, including Ms. Foy, support the idea.
- D. The eighth-grade teachers, “including Ms. Foy,” support the idea.

MULTIPLE-CHOICE QUESTIONS

You may not use a calculator for questions 1–5.

A-N.1.1.3

1. Which expression has a value between -4 and -3 ?

A. $1 - 2\sqrt{10}$

B. $4 - \sqrt{15}$

C. $3\sqrt{5} - 7$

D. $\sqrt{20} - 8$

B-E.1.1.1

2. A company makes a puzzle that is made of 5^3 small plastic cubes. The puzzles are shipped in boxes that each contain 5^2 puzzles. The boxes are loaded into trucks that each contain 5^3 boxes. What is the total number of small plastic cubes in each truck?

A. 5^8

B. 5^{18}

C. 125^8

D. 125^{18}

B-E.1.1.2

3. Solve: $x^2 = 144$

- A. $x = 12$
- B. $x = \pm 12$
- C. $x = 72$
- D. $x = \pm 72$

B-E.1.1.3

4. The thickness of the skin on the human back is about 3×10^{-3} meter. The thickness of the skin on the human eyelid is about 3×10^{-4} meter. How many times as thick is the skin on the human back as on the human eyelid?

- A. 0.1
- B. 1
- C. 10
- D. 30

B-E.1.1.3

5. The human body contains about 1×10^{12} bacteria. The human body contains about 4×10^4 genes. The number of bacteria contained in the human body is how many times as great as the number of genes contained in the human body?
- A. 250
 - B. 4,000
 - C. 25,000,000
 - D. 400,000,000

A calculator is permitted for use in solving questions numbered 6–50 in this sampler.

A-N.1.1

6. Craig uses a ruler to determine the length of two pieces of metal. He records the length of each piece of metal as a rational number. Which statement **best** explains whether the sum of the two lengths Craig recorded must also be a rational number?
- A. When adding two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$, the numerators a and c do not have to be integers. Therefore, the sum does not have to be a rational number.
- B. When adding two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$, the common denominator bd does not have to be an integer. Therefore, the sum does not have to be a rational number.
- C. When adding two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$, the sum is $\frac{ac}{bd}$, and both the numerator and denominator are integers. Therefore, the sum must be a rational number.
- D. When adding two rational numbers $\frac{a}{b}$ and $\frac{c}{d}$, the sum is $\frac{ad + bc}{bd}$, and both the numerator and denominator are integers. Therefore, the sum must be a rational number.

A-N.1.1.5

B-E.1.1.2

11. A packing crate in the shape of a cube has a volume of 70 cubic feet. The length (x), in feet, of one side of the cube can be found by solving $x^3 = 70$. Which point on the number line represents the length, in feet, of one side of the cube?

