Name: _____ School: _____

Reading & Writing		Math	
39 min	**39 min**	**43 min**	**43 min**
1.	1.	1.	1.
2.	2.	2.	2.
3.	3.	3.	3.
4.	4.	4.	4.
5.	5.	5.	5.
6.	6.	6.	6.
7.	7.	7.	7.
8.	8.	8.	8.
9.	9.	9.	9.
10.	10.	10.	10.
11.	11.	11.	11.
12.	12.	12.	12.
13.	13.	13.	13.
14.	14.	14.	14.
15.	15.	15.	15.
16.	16.	16.	16.
17.	17.	17.	17.
18.	18.	18.	18.
19.	19.	19.	19.
20.	20.	20.	20.
21.	21.	21.	21.
22.	22.	22.	22.
23.	23.	23.	23.
24.	24.	24.	24.
25.	25.	25.	25.
26.	26.	26.	26.
27.	27.	27.	27.
28.	28.		
29.	29.		
30.	30.		
31.	31.		
32.	32.		
33.	33.		

Uniform Scoring Chart (To be curved)

English	
66	800
65	790
64	780
63	770
62	770
61	760
60	760
59	750
58	740
57	730
56	730
55	720
54	710
53	700
52	690
51	680
50	670
49	660
48	660
47	650
46	650
45	640
44	630
43	620
42	610
41	590
40	580
39	570
38	560
37	550
36	540
35	530
34	520
33	510
32	510
31	500

Math	
54	800
53	790
52	780
51	770
50	760
49	750
48	740
47	730
46	720
45	710
44	710
43	700
42	690
41	690
40	670
39	660
38	650
37	630
36	620
35	610
34	600
33	590
32	580
31	570
30	560
29	550
28	540
27	530
26	520
25	510
24	500

Module 1

Reading and Writing

33 QUESTIONS

DIRECTIONS:
The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s). All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

In ancient Egypt, hieroglyphics were used as the formal writing system for over three thousand years. Because it accurately represented the spoken language, hieroglyphics achieved _____ use and were used for all aspects of Egyptian life: from religious texts and government documents to graffiti on temple walls.

Which choice completes the text with the most logical and precise word or phrase?

A) widespread

B) careful

C) unintended

D) infrequent

2

When British archaeologist Howard Carter discovered the tomb of Tutankhamun in 1922, he found many ancient sculptures and artifacts. However, the small and obscure sculptures depicting the pharaoh in various poses were initially _____ by the public and other researchers as insignificant; it was only later that they were recognized as important representations of Tutankhamun's reign.

Which choice completes the text with the most logical and precise word or phrase?

A) acknowledged

B) ignored

C) denied

D) underestimated

Module 1

3

While the Aurora Borealis is typically associated with the northern polar region, it has also been observed at lower latitudes during periods of increased solar activity. However, the precise factors that determine when and where these occurrences will happen remain difficult to _____

Which choice completes the text with the most logical and precise word or phrase?

A) predict

B) quantify

C) observe

D) extrapolate

4

In the highlands of Peru, fanners have been using terrace farming technique for thousands of years to cultivate crops in the steep Andean mountains. With its complex system of retaining walls, irrigation channels, and drainage ditches, terrace farming is a/an _____ form of agriculture that requires deep knowledge of the local topography and climate in order to be successful.

Which choice completes the text with the most logical and precise word or phrase?

A) advanced

B) ornamental

C) intricate

D) rudimentary

Module 1

5

The Vedda people of Sri Lanka have lived in the island's forests for thousands of years, relying on traditional hunting and gathering practices to sustain themselves. While the Vedda _____ their ancestral ways of life, they have also had to adapt to the changing natural environment and pressures from modern development.

Which choice completes the text with the most logical and precise word or phrase?

A) abandon

B) cling to

C) innovate

D) ridicule

6

In a recent study, researchers analyzed data from the U.S. Census Bureau and found that some commonly held assumptions about the earnings of college graduates may not hold up. While many people ____ that earning a college degree is a ticket to higher pay and greater economic stability, the researchers found that this was not necessarily the case for all majors and career paths.

Which choice completes the text with the most logical and precise word or phrase?

A) Concluded

B) Debated

C) Inquired

D) Assumed

Module 1

7

The music of Jimi Hendrix is known for its innovative sound that emerged from his unique blend of different musical styles. His work often displays a creative tension between his _____ influences, such as blues, rock, and jazz, which he masterfully combined to create his signature style.

Which choice completes the text with the most logical and precise word or phrase?

A) earlier

B) harmonious

C) non-existent

D) irrelevant

8

New research conducted by gastroenterologists Dr. Aisha Hassan and Dr. Michael Wong focuses on the connection between diet and gut health, but with a unique twist: they're studying the impact of a specific fermented food that has been largely overlooked in previous research. The researchers note that while kimchi and sauerkraut are well-known fermented foods, little research has been done on the impact of consuming fermented milk products like kefir. To address this gap in knowledge, they are conducting a clinical trial to explore how kefir consumption impacts the gut microbiota and markers of gut health.

Which of the following is a valid conclusion that can be drawn from the passage?

A) Kefir is the only fermented milk product that impacts the gut microbiota and markers of gut health.

B) There is an abundance of research on the impact of consuming fermented milk products like kefir.

C) The connection between diet and gut health has not been studied by other researchers.

D) Previous research has explored the impact of consuming kefir on gut microbiota and markers of gut health, but not to the extent of other fermented foods like kimchi and sauerkraut.

Module 1

9

The following passage is from "My Experiments with Truth" by Mahatma Gandhi:

"I realized that the true function of a lawyer was to unite parties riven asunder. The lesson was so indelibly burnt into me that a large part of my time during the twenty years of my practice as a lawyer was occupied in bringing about private compromises of hundreds of cases. I lost nothing thereby - not even money, and certainly not my soul."

Which choice best describes the central idea of the passage?

A) The value of time management in a lawyer's practice

B) The importance of seeking wealth and material success in the legal profession

C) The significance of seeking private compromises in legal cases

D) The role of lawyers in the court system and its impact on society

10

In the year 2015, astronomers had perceived a group of galaxies that appeared to be moving in an anomalous way, and although their observation was deemed reliable, they were uncertain as to what could have induced such an event. Subsequently, Astronomer N. Tejos and his collaborators conducted a study and discovered that this aberrant motion was induced by a covert structure interposed between the galaxies; notwithstanding, they have not fully comprehended the essence of this structure.

Which option describes the purpose of the second sentence with the utmost accuracy in the context of the text?

A) It elaborates upon the discoveries made by N. Tejos and his co-workers.

B) It posits a theory regarding the causation of the initially observed anomaly.

C) It accentuates the uncertainty encircling the original observation.

D) It furnishes a backdrop for the subsequent research performed by N. Tejos and associates.

Module 1

11

The following text is from Maria Augusta Trapp's memoir The Story of the Trapp Family Singers, which inspired the musical The Sound of Music. Maria is a nun who becomes governess to the seven children of widower Georg von Trapp. Maria felt herself quite inadequate to take charge of the education of seven children. To add to her difficulties, the children at first looked upon her as some wild animal of a peculiar species that had suddenly been let loose among them. Gradually she got to know them, and soon the impossible became possible: the children began to like her, and she began to understand their mental and spiritual needs and to be able to help them in their studies.

What can be inferred about Maria from the text?

A) Maria was skilled in handling children's education, despite initial reluctance.

B) Maria was intimidated by the children and had difficulty winning their favor.

C) Maria was immediately well-liked by the children and had no issues with their education.

D) Maria had no previous experience with children's education and struggled to keep up with the Trapp children's needs.

12

In 1934, architect Frank Lloyd Wright designed a house in Pennsylvania that featured a waterfall flowing through the middle of the living room. The house, known as Fallingwater, is perched atop a rocky cliff and is renowned for its integration with its natural surroundings. The waterfall, which is an integral part of the house's design, creates a sense of serenity and harmony with the surrounding environment.

Which choice best captures the main idea of the text?

A) Fallingwater, designed by Frank Lloyd Wright in 1934, is a house in Pennsylvania that features a waterfall flowing through its living room, seamlessly integrating with its natural surroundings.

B) The unique design of a waterfall flowing through the living room makes Fallingwater, designed by Frank Lloyd Wright, one of the most iconic houses in Pennsylvania.

C) Fallingwater, located atop a rocky cliff in Pennsylvania, has become a popular tourist destination due to its unconventional design, which includes a waterfall flowing through the middle of the house.

D) Frank Lloyd Wright's Fallingwater exemplifies the concept of organic architecture by seamlessly integrating a waterfall into its design, enhancing the connection between human habitation and the natural world, as seen in the 1934 design.

Module 1

13

The ecological diversity of the Korean Demilitarized Zone (DMZ) is often disregarded because it is mostly known for its political conflict. Despite being a buffer between North and South Korea, the DMZ is home to a remarkable variety of plants and animals, many of which are endangered. Unfortunately, the attention given to the area is usually focused on its militarized past rather than its ecological significance.

Which excerpt from a work by an ecologist would best illustrate the author's argument?

A) The DMZ is a symbol of the deep political divisions between North and South Korea, but it is also a region of incredible ecological importance, with rare and endangered species found nowhere else in the world.

B) Despite its reputation as a militarized zone, the DMZ is actually one of the most ecologically diverse regions in Asia, with a remarkable array of species inhabiting its forests, rivers, and wetlands.

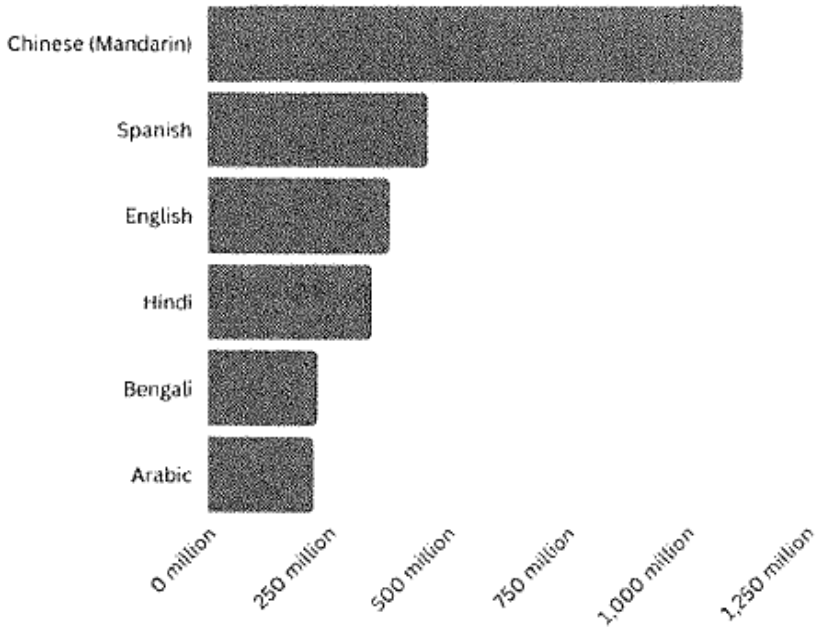
C) While the DMZ is often viewed as a barren wasteland, it is, in fact, a thriving ecosystem that supports a wide variety of plant and animal life, including several species that are endangered or threatened.

D) The DMZ represents a paradox: a heavily militarized zone that is also a refuge for biodiversity. Despite its fraught political history, the region is a valuable natural resource that deserves protection.

Module 1

14

A group of linguists conducted a study on the number of native speakers of six different languages in the world. They found that Chinese (Mandarin) has the highest number of native speakers, followed by Spanish and then English. However, they also noted that while Arabic has fewer native speakers than Hindi and Bengali, it is still one of the most widely spoken languages in the world due to its use as a liturgical language in Islam.



*FICTIONAL DATA

Which choice best describes data from the table that support the linguists' findings?

A) English has fewer native speakers than Spanish and Chinese (Mandarin), but it is still one of the most widely spoken languages in the world due to its use as a common language for international communication.

B) Bengali has fewer native speakers than Arabic, but it is still widely spoken due to its use as a second language in India.

C) Bengali and Hindi have more native speakers combined than Arabic, but Arabic is still widely spoken due to its religious significance.

D) Spanish has more native speakers than English and Arabic combined, but English is more widely spoken globally.

Module 1

15

Given that the Big Bang Theory proposes that the universe began as a hot, dense state and has been expanding ever since, some physicists have suggested that the cosmic microwave background radiation (CMB) should be evenly distributed in all directions. This idea is supported by observations of the CMB, which show a nearly uniform temperature in all directions.

Which finding, if true, would most directly weaken the physicists' claim?

A) Measurements of the CMB polarization reveal patterns that suggest the existence of gravitational waves, which could have caused fluctuations in the temperature distribution.

B) The expansion rate of the universe is found to be accelerating, suggesting the existence of dark energy, which could have affected the uniformity of the CMB.

C) Observations show that the CMB has a slightly higher temperature in one direction than in others, indicating a possible asymmetry in the early universe.

D) Observations of distant supernovae indicate that the universe's expansion has been accelerating for billions of years, which is inconsistent with the Big Bang Theory's prediction of a decelerating expansion.

Module 1

16

In ancient Egyptian religion, Osiris was the god of the afterlife and the judge of the dead. According to legend, he was murdered by his brother Set and resurrected by his sister-wife Isis. Some scholars argue that the Osiris myth was originally a nature myth that was later adapted to express beliefs about the afterlife. Other scholars argue that the myth was always intended to convey ideas about the afterlife.

Which finding, if true, would most directly support the argument that the Osiris myth was originally a nature myth?

A) The earliest known depictions of Osiris show him as a plant or tree, not as a human figure.

B) The Osiris myth was only mentioned in texts from the Old Kingdom period of Egypt (c. 2686-2181 BCE), which was a time of great agricultural productivity.

C) The Osiris myth was associated with the Nile River, which was seen as the source of all life in Egypt.

D) The Osiris myth features several characters who represent natural phenomena, such as the sun, the moon, and the stars.

Module 1

17

Organic farming emphasizes the use of natural and renewable resources, such as compost and biological pest control, to promote soil health, biodiversity, and water conservation. Additionally, organic farming practices typically avoid synthetic pesticides, genetically modified organisms (GMOs), and synthetic fertilizers, which can help reduce potential negative impacts on human health and the environment. In recent years, there has been a growing interest in organic farming as a more sustainable and environmentally friendly alternative to conventional farming.

Which of the following statements, if true, would challenge the argument that organic farming can be a viable option for large-scale agriculture?

A) The use of organic farming techniques requires significantly more labor and time investment than conventional farming, making it impractical for large-scale operations.

B) The availability and cost of organic fertilizers and pest management products are highly variable and inconsistent, making it difficult to maintain consistent yields over large acreages.

C) Organic farming often requires the use of tillage and other soil-disturbing practices, which can lead to soil erosion and reduce long-term soil health.

D) The profitability of organic farming is highly dependent on consumer demand, which is subject to fluctuations and may not be reliable enough to support large-scale operations.

Module 1

18

Archaeologists excavated two ancient Mesopotamian sites, A and B, and found similar types of artifacts at both locations. Site A is known to have been inhabited during the early Bronze Age, while Site B is believed to have been inhabited during the late Bronze Age.

Which of the following, if true, would most strongly suggest that the dating of the sites is incorrect and that they were inhabited during the same time period?

A) Carbon dating was used to determine the age of the artifacts found at both sites, and the results were found to be within the same range of years.

B) The artifacts found at both sites include many examples of pottery and jewelry with intricate designs and fine craftsmanship.

C) Historical records indicate that the people who lived at Site A were enemies of the people who lived at Site B, and that they did not coexist.

D) The artifacts found at Site A were mostly made of copper and bronze, while the artifacts found at Site B were made mostly of iron, indicating different technological periods.

19

A team of researchers conducted a study on the effects of different light conditions on the growth of Pistia stratiotes, also known as water lettuce. They found that when the plants were exposed to red light with a wavelength of 660 nm, they grew taller and had larger leaves than plants exposed to blue light with a wavelength of 450 nm. However, when the plants were exposed to a combination of both red and blue light, they grew even taller and had even larger leaves than when exposed to red light alone. Based on these results, the researchers concluded that _____

Which choice most logically completes the text?

A) Pistia stratiotes grows better in blue light than in red light.

B) The growth of Pistia stratiotes is primarily influenced by the wavelength of light.

C) Exposure to blue light inhibits the growth of Pistia stratiotes.

D) The optimal wavelength for the growth of Pistia stratiotes is around 555 nm.

Module 1

20

A member of the Montenegrin Academy of Sciences and Arts, Andrija Mohorovičić is renowned for his discovery of the Mohorovičić discontinuity, a boundary between the Earth's crust and mantle that ____ the speed of seismic waves.

Which choice most logically completes the text?

A) affects

B) has affected

C) affected

D) having affected

21

In Franz Kafka's novella "The Metamorphosis," Gregor Samsa wakes up one morning to find himself metamorphosed into a _____ Gregor attempts to go about his daily routine as if nothing has happened, but his family's reaction to his transformation is mixed. His sister initially shows him compassion, but eventually grows disgusted with him and seeks to get rid of him. Meanwhile, his parents are horrified and refuse to accept his new form, leading to a breakdown in their relationship. This novella illustrates the consequences of the lack of acceptance and understanding for those who are different.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) large insect-like creature. Despite his shocking appearance,

B) large, insect-like creature. Despite his shocking appearance,

C) large, insect-like creature. Despite, his shocking appearance

D) large insect-like creature, despite his shocking appearance

Module 1

22

Pope Francis, _____ Jorge Mario Bergoglio, is the first pope from the Americas. He was born in Buenos Aires, Argentina, in 1936 and joined the Jesuit order in 1958. He was ordained a priest in 1969 and served as a bishop and archbishop before being elected Pope in 2013. Pope Francis is known for his progressive views on social issues such as poverty, climate change, and immigration. His papacy has been marked by efforts to reform the Catholic Church and make it more inclusive.

Which of the following options correctly uses a relative clause to provide additional information about Pope Francis?

A) which is

B) who is

C) whose given name is

D) that is

23

Chinua Achebe's "Things Fall Apart" (1958), a novel that portrays the effects of British colonialism on the Igbo people of Nigeria, _____ readers' perception or the impact or colonialism on African societies.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) has shaped

B) shapes

C) shaped

D) will shape

Module 1

24

According to geologists, fault lines are the areas where two tectonic plates meet and interact with each other. The movement of these plates can cause earthquakes and volcanic eruptions. In some cases, these movements can cause the formation of new mountains or oceanic trenches. _____ fault lines can also contribute to the formation of valuable mineral deposits.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) In addition, to these dramatic geological events,

B) In addition to these dramatic geological events

C) In addition to these dramatic geological events:

D) In addition to these dramatic geological events,

25

The first complete English translation of "The Tale of Genji," a Japanese classic, written by Murasaki Shikibu in the 11th century, _____ Western readers' understanding of Japanese literature and culture during the Heian period.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) revolutionized

B) revolutionizes

C) has revolutionized

D) will revolutionize

Module 1

26

David Ducharme is an American sand artist who has won multiple awards for his sand sculptures. He has created sand art installations for major events such as the Super Bowl. When viewed from a distance, his sand sculptures appear to be massive and incredibly detailed, but upon closer inspection, they reveal themselves to be _____ grains of sand carefully arranged to create the illusion of texture and form.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) individual

B) individual, and

C) individual; the

D) individual, the

27

Kelp grows in underwater forests. Kelp forests are incredibly important ecosystems that support a diverse range of marine life. However, kelp is not single-celled. Instead, it is a complex, multicellular organism that can grow up to 60 meters in length. _____, kelp is not a plant, but rather belongs to the group of algae known as brown algae.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) On the other hand,

B) Similarly,

C) Basically,

D) Specifically,

Module 1

28

While researching a topic, a student has taken the following notes:

• President Abraham Lincoln signed the Emancipation Proclamation in 1863, which declared that all slaves in the Confederate states were to be set free.

• However, it wasn't until the passage of the 13th Amendment to the U.S. Constitution in 1865 that slavery was abolished throughout the United States.

• In recognition of his role in ending slavery, Congress awarded Lincoln a posthumous grant of $25,000 in 1866.

Which choice most effectively uses relevant information from the notes to describe the Lincoln grant to an audience unfamiliar with the subject?

A) The passage of the 13th Amendment to the U.S. Constitution in 1865 abolished slavery throughout the United States, and a year later, Congress recognized President Abraham Lincoln's role in ending slavery by awarding him a posthumous grant of $25,000.

B) President Abraham Lincoln signed the Emancipation Proclamation in 1863, declaring that all slaves in the Confederate states were to be set free. In 1866, Congress awarded Lincoln a posthumous grant of $25,000 in recognition of his efforts.

C) Congress awarded President Abraham Lincoln a posthumous grant of $25,000 in 1866, the year after slavery was abolished throughout the United States with the passage of the 13th Amendment to the U.S. Constitution.

D) The Lincoln grant of $25,000 was awarded by Congress to President Abraham Lincoln posthumously in recognition of his role in ending slavery in the Confederate states, a feat he achieved with the signing of the Emancipation Proclamation in 1863.

Module 1

29

While researching a topic, a student has taken the following notes:

• Free trade refers to the exchange of goods and services across international borders without restrictions or tariffs.

• Supporters of free trade argue that it leads to greater economic growth and increased access to goods for consumers.

• Opponents of free trade argue that it can harm domestic industries and lead to job losses.

• The North American Free Trade Agreement (NAFTA) is an example of a free trade agreement.

• Critics of NAFTA argue that it has led to job losses in the U.S. and environmental degradation in Mexico.

The student wants to explain the concept of free trade and present arguments both in favor and against it. Which choice most effectively uses relevant information from the notes to accomplish these goals?

A) Free trade is the exchange of goods and services across international borders without restrictions or tariffs. Supporters believe it leads to economic growth and increased access to goods. Critics argue that it can harm domestic industries and lead to job losses. NAFTA is an example of a free trade agreement that has been criticized for these reasons.

B) Free trade, which is the exchange of goods and services across international borders without restrictions or tariffs, has been a subject of debate. Supporters of free trade argue that it leads to greater economic growth and increased access to goods, while opponents argue that it can harm domestic industries and lead to job losses. An example of a free trade agreement is NAFTA, which has faced criticism for its impact on jobs and the environment.

C) Free trade refers to the unrestricted exchange of goods and services across international borders. Proponents of free trade argue that it promotes economic growth and consumer access to goods, while detractors argue that it has negative impacts on domestic industries and job markets. NAFTA is an example of a free trade agreement that has been controversial due to concerns about its effects on jobs and the environment.

D) The concept of free trade involves the unrestricted exchange of goods and services across international borders. Advocates of free trade argue that it leads to economic growth and improved access to goods, whereas critics argue that it can be harmful to domestic industries and employment. The North American Free Trade Agreement (NAFTA) is one example of a free trade agreement that has generated controversy due to concerns about job losses and environmental degradation.

Module 1

30

While researching a topic, a student has taken the following notes:

• Kiki Smith is a contemporary artist who works in a variety of media.

• Smith was born in Germany in 1954, but grew up in the United States.

• Her work often explores themes related to the body, gender, and spirituality.

• Smith's sculpture *Lying with the Wolf* (2001) depicts a woman reclining next to a wolf.

• Smith has been the subject of solo exhibitions at major museums, including the Whitney Museum of American Art and the Walker Art Center.

The student wants to write an introduction to an essay about Kiki Smith's artistic themes. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) Kiki Smith is a contemporary artist who was born in Germany and is known for her sculpture *Lying with the Wolf* (2001), which features a woman and a wolf.

B) With her focus on themes such as gender, spirituality, and the body, Kiki Smith has become one of the most renowned contemporary artists in the world.

C) *Lying with the Wolf* (2001) is just one of Kiki Smith's many sculptures exploring themes related to the body, gender, and spirituality.

D) Kiki Smith's solo exhibitions at major museums, such as the Whitney Museum of American Art and the Walker Art Center, have showcased her unique explorations of themes related to the body, gender, and spirituality.

Module 1

31

While researching a topic, a student has taken the following notes:

• Thaddeus Pope is a Professor of Law and Bioethics at Mitchell Hamline School of Law.

• Pope has written several articles and book chapters on end-of-life issues, medical futility, and health policy.

• He has advocated for the use of palliative care to alleviate suffering at the end of life and prevent unnecessary treatment.

• In 2011, Pope co-authored an article in the Journal of the American Medical Association that explored the ethical issues surrounding futile care.

• Pope is the founding director of the Health Law Institute at Mitchell Hamline School of Law.

The student wants to introduce Thaddeus Pope's stance on end-of-life care. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) Thaddeus Pope is a Professor of Law and Bioethics who advocates the use of palliative care to prevent unnecessary treatment and alleviate suffering at the end of life.

B) In 2011, Thaddeus Pope and his colleagues published an article in the Journal of the American Medical Association exploring the ethical issues surrounding futile care.

C) Thaddeus Pope has written extensively on end-of-life issues, medical futility, and health policy and is the founding director of the Health Law Institute at Mitchell Hamline School of Law.

D) At Mitchell Hamline School of Law, Thaddeus Pope has researched the use of palliative care and ethical issues surrounding end-of-life care, which has been published in several articles and book chapters.

Module 1

32

While researching a topic, a student has taken the following notes:

• The Waitomo Glowworm Caves in New Zealand is a popular tourist attraction.

• The caves are home to a species of bioluminescent fungus gnat, commonly known as the glowworm, that emits a blue-green light.

• The glowworms use their light to attract prey and mates.

• The caves were first explored in the year 1887 by local Maori Chief Tane Tinorau and English surveyor Fred Mace.

• The caves are formed from limestone, and the glowworms are found in the cave's wet areas.

The student wants to emphasize the significance of the Waitomo Glowworm Caves to the local Maori culture. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) The Waitomo Glowworm Caves are a popular tourist attraction in New Zealand that was first explored in l887 by Maori Chief Tane Tinorau and English surveyor Fred Mace.

B) The caves are formed from limestone and are home to a species of bioluminescent fungus gnat called the glowworm, which uses its blue-green light to attract prey and mates.

C) The Waitomo Glowworm Caves in New Zealand is an important part of local Maori culture, having been first explored by Maori Chief Tane Tinorau and English surveyor Fred Mace in 1887.

D) The glowworms found in the Waitomo Glowworm Caves emit a blue-green light and use it to attract prey and mates in the cave's wet areas.

Module 1

33

Santhali is an indigenous community in India. While researching this community, a student has taken the following notes:

• Santhali is the third largest tribe in India.

• The Santhali language belongs to the Austroasiatic language family.

• Dr. Boro Baski is a Santhali social activist and linguist who founded the Ghosaldanga Bishnubati Adibasi Trust in 1987.

• The Ghosaldanga Bishnubati Adibasi Trust is a non-profit organization that works to promote the development of Santhali communities.

• The trust's efforts have led to the establishment of schools, community centers, and health clinics in Santhali villages.

The student wants to emphasize Dr. Boro Baski's role in promoting the development of Santhali communities. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) The Santhali community in India is the third largest tribe and speaks a language belonging to the Austroasiatic language family.

B) The Ghosaldanga Bishnubati Adibasi Trust is a non-profit organization that has established schools, community centers, and health clinics in Santhali villages.

C) Dr. Boro Baski, a Santhali social activist and linguist, founded the Ghosaldanga Bishnubati Adibasi Trust in 1987 to promote the development of Santhali communities.

D) The Ghosaldanga Bishnubati Aclibasi Trust's efforts have led to significant improvements in Santhali villages, including the establishment of schools, community centers, and health clinics.

Module 2

Reading and Writing

33 QUESTIONS

DIRECTIONS:
The questions in this section address a number of important reading and writing skills. Each question includes one or more passages, which may include a table or graph. Read each passage and question carefully, and then choose the best answer to the question based on the passage(s). All questions in this section are multiple-choice with four answer choices. Each question has a single best answer.

1

According to astronomers, a planet experiencing a transit event may cause a temporary dip in the brightness of its host star. A planet with an eccentric orbit in a habitable zone, on the other hand, will not cause any _____ transit events.

Which choice completes the text with the most logical and precise word or phrase?

A) capricious

B) detectable

C) retrograde

D) massive

2

Critics have observed that the French composer Maurice Ravel's _____ attention to detail is evident in his meticulously crafted compositions, such as his iconic piece "Bolero," which features a hypnotic, repetitive melody that gradually builds in intensity.

Which choice completes the text with the most logical and precise word or phrase?

A) casual

B) perfunctory

C) fastidious

D) nonchalant

Module 2

3

Ursula K. Le Guin, a prominent American science fiction author, was known for her willingness to _____ the traditional boundaries of the genre and explore themes that were not typically addressed in science fiction. She passed away on January 22, 2018, in Portland, Oregon, but her legacy as a trailblazing author and visionary thinker live on through her work.

Which choice completes the text with the most logical and precise word or phrase?

A) accept

B) transcend

C) embody

D) emulate

4

In the novel "The Hungry Tide" (2004), Amitav Ghosh explores his _____ of the natural world by immersing the reader in the rich ecology of the Sundarbans, a vast mangrove forest in the Bay of Bengal. Through his vivid descriptions of flora and fauna of the region, as well as the human communities that call it home, Ghosh conveys both a deep reverence for the power and beauty of nature, as well as a sense of the perilous balance that exists between human and non-human life in this fragile ecosystem.

Which choice completes the text with the most and precise word or phrase?

A) detachment from

B) deep familiarity with

C) reverence for

D) disdain for

Module 2

5

The poem "The Wheelbarrow" (1923) by William Carlos Williams portrays a simple object in a new and striking way. Here is an extract from the poem.

"So much depends
upon
a red wheel
barrow
glazed with rain
water
beside the white
chickens."

What is the effect of the poem's structure and use of line breaks on the reader's experience of the poem?

A) To create a sense of urgency and excitement

B) To convey a feeling of introspection and contemplation

C) To emphasize the importance of each individual word and image

D) To establish a rhythm and flow that mirrors the motion of the wheelbanow

6

The following text is adapted from Charles Dickens' A Tale of Two Cities, published in 1859. In this passage, the character Sydney Carton is reflecting on his wasted life and bleak future.

"I care for no man on earth and no man on earth cares for me. […] *If you knew what a conflict goes on in the business mind, when the business mind is divided between good-natured impulse and business appearances, you would he amused, Mr. Darnay. I think myself; if I were in your place I should forgive you; but I'll make a present of myself, if that will be any satisfaction to you. […] You have acted as if you do; but I don't think you do."*

Which choice best states the main purpose of the text?

A) To present a character who is struggling with feelings of loneliness and despair

B) To explore the conflict between personal desires and professional responsibilities

C) To describe a situation in which one character forgives another for a past transgression

D) To highlight the complexities of social relationships in 19th-century England

Module 2

7

The following text is about the use of color in Pablo Picasso's painting Les Demoiselles d'Avignon.

In Les Demoiselles d'Avignon, Pablo Picasso uses color to convey the intensity and primal nature of the figures in the painting. The warm colors of the women's bodies are juxtaposed against the cool, almost clinical white of the background, creating a tension that emphasizes the unsettling and confrontational nature of the composition. Additionally, the use of angular and distorted forms further adds to the sense of unease in the painting.

Which choice best describes the overall purpose of the text?

A) To explore the use of color in Picasso's art

B) To provide a detailed analysis of Les Demoiselles d'Avignon

C) To argue that Picasso's art is primarily concerned with unsettling and confrontational subject matter

D) To compare and contrast Les Demoiselles d'Avignon with other works by Picasso

8

The Nile River is the longest river in the world, stretching over 6,600 kilometers. The Nile flows through 11 countries, including Egypt, Sudan, and Ethiopia, and provides water for over 300 million people. However, the Nile is facing challenges due to climate change, population growth, and competition for resources.

According to the text, what is the potential impact of the challenges facing the Nile River?

A) Increased risk of water scarcity and conflicts

B) Rise in sea level and loss of coastal habitats

C) Disruption of migratory routes and extinction of species

D) Decrease in agricultural productivity and food insecurity

Module 2

9

Text 1:
Astrophysicist Jane Lee and colleagues have analyzed data from the Hubble Space Telescope and found evidence of a new type of dark matter. They believe that this form of dark matter is made up of particles that interact with each other and can be detected by observing how galaxies are pulled together by gravity. This discovery could greatly improve our understanding of the universe.

Text 2:
Astrophysicist James Smith and his team have disputed the idea that there is a new type of dark matter. They argue that the observations made by Lee and her colleagues are based on faulty data and that the supposed new type of dark matter does not actually exist. Smith and his team suggest that other explanations, such as modified gravity, could better explain the observed gravitational pull of galaxies.

Based on the texts, how would Smith and his team (Text 2) most likely characterize the conclusion presented in Text 1?

A) As groundbreaking, because it represents a significant advancement in the study of dark matter.

B) As unproven, because the observations made by Lee and her colleagues are based on faulty data.

C) As incomplete, because Lee and her colleagues have not considered other explanations for the observed gravitational pull of galaxies.

D) As controversial, because the evidence for the existence of a new type of dark matter is still being debated in the scientific community.

Module 2

10

In a study examining the mating habits of Black widow spiders, researchers found that contrary to previous beliefs, males who are smaller in size are more likely to approach and mate with females, despite the risk of being cannibalized by the female after copulation.

Why is this finding significant?

A) The finding suggests that male Black widow spiders have evolved a unique strategy to increase their chances of reproducing, which can have implications for understanding the evolution of mating behavior in other species.

B) The finding highlights the importance of size and physical strength in male-female relationships among Black widow spiders, which can inform our understanding of gender dynamics in other animal species.

C) The finding confirms previous studies on the mating behavior of Black widow spiders, which can help establish a more accurate understanding of the reproductive ecology of this species.

D) The finding challenges previous assumptions that larger males are more successful in mating with females among Black widow spiders, which can lead to a re-evaluation of our understanding of sexual selection in this species.

11

Memoirs of a Geisha is a novel written by Arthur Golden, which tells the story of a young girl who is sold into the world of geisha and trained to become one. A literary critic suggests that one of Golden's likely aims in writing Memoirs of a Geisha was to shed light on the experiences of geisha and improve their representation in literature.

Which finding, if true, would most strongly support the critic's claim?

A) Memoirs of a Geisha became an international bestseller and won numerous literary awards, including the prestigious National Book Award, bringing significant attention to the world of geisha and Japanese culture.

B) After the publication of Memoirs of a Geisha, the number of foreign visitors to Japan increased, with many citing the novel as their inspiration for visiting the country and experiencing its culture firsthand.

C) In interviews, Arthur Golden cited his extensive research on the geisha world, including interviews with geisha and former geisha, as a primary influence on his writing of Memoirs of a Geisha.

D) Memoirs of a Geisha was the first novel about geisha written by a non-Japanese author to be published in Japan, sparking a national conversation about the portrayal of geisha in literature and media.

Module 2

12

Matthew Arnold was a 19th-century English poet and critic who wrote several essays on the value and function of literature. In his essay "The Function of Criticism at the Present Time," Arnold argues that the role of criticism is to promote the best that has been thought and said in the world, and that literature has a vital role in shaping a society's values and morals.

Which quotation from "The Function of Criticism at the Present Time" best illustrates Arnold's claim?

A) "The future of poetry is immense, because in poetry, where it is worthy of its high destinies, our race, as time goes on, will find an ever surer and surer stay. There is not a creed which is not shaken, not an accredited dogma which is not shown to be questionable, not a received tradition which does not threaten to dissolve."

B) "Literature is always tending to become more and more a mere appanage of wealth and luxury; and it is easy to see that the tendencies of what is called the world at present, in respect to the multiplication and diffusion of luxurious articles and luxuriously furnished dwellings, threaten a furtherance of this result."

C) "The future of our society depends on the quality of its literature, and it is the duty of the critic to ensure that only the best literature is promoted and celebrated."

D) "The great men of culture are those who have had a passion for diffusing, for making prevail, for carrying from one end of society to the other, the best knowledge, the best ideas of their time."

Module 2

13

In his book *Sapiens,* Yuval Harari argues that humans have created shared myths and stories throughout history to bind together large groups of individuals and create cooperative societies.

Which quote from Sapiens best illustrates Harari's claim?

A) "The truly unique feature of our language is not its ability to transmit information about men and lions. Rather, its the ability to transmit information about things that do not exist at all."

B) "Ever since the Cognitive Revolution, Sapiens have thus been living in a dual reality. On the one hand, the objective reality of rivers, trees and lions; and on the other hand, the imagined reality of gods, nations and corporations."

C) "The appearance of new ways of thinking and communicating, between 70,000 and 30,000 years ago, constitutes the Cognitive Revolution. What caused it?"

D) "It is by the grace of agriculture that we became builders of cities and empires, and creators of cultures and religions."

Module 2

14

The chart below shows the average daily temperature and the number of ice cream cones sold at an ice cream stand in a small town during each month of the year 2021:

MONTH	AVERAGE DAILY TEMPERATURE (°C)	NO. OF ICE CREAM CONES SOLD
JANUARY	5	50
FEBRUARY	7	60
MARCH	10	90
APRIL	15	120
MAY	20	180
JUNE	25	220
JULY	30	250
AUGUST	28	230
SEPTEMBER	25	200
OCTOBER	20	150
NOVEMBER	22	80
DECEMBER	7	60

*FICTIONAL DATA

A research team studying the sales patterns of the ice cream stand has concluded that the higher sales during the summer months are likely due to the warmer temperatures.

Which of the following choices most effectively uses data from the table to support the research team's conclusion?

A) The number of ice cream cones sold in September is higher than in any other month, indicating a unique influence on sales during that time.

B) The increase in average daily temperature from June to July is the largest of any month, which suggests that warmer temperatures played a significant role in the rise in demand.

C) The ice cream stand consistently sold a similar number of ice cream cones throughout the year, which suggests that temperature has little effect on sales.

D) The number of ice cream cones sold in the winter months is dramatically lower than in the summer months, suggesting that sales patterns are more heavily influenced by the end of the year.

Module 2

15

The chart below shows the number of hours of sleep per day for two groups of people over a period of one week:

	GROUP A	GROUP B
TUESDAY	6	9
WEDNESDAY	7	7
THURSDAY	8	7
FRIDAY	6	8
SATURDAY	9	6
SUNDAY	7	7

*Fictional Data

A researcher hypothesized that Group A sleeps for a shorter amount of time on average compared to Group B.

Which choice best describes data from the table that support the researcher's hypothesis?

A) Group A sleeps for more hours than Group B on three days of the week.

B) Group A has a lower total number of hours of sleep compared to Group B over the week.

C) Group A and Group B both sleep for the same number of hours on three days of the week.

D) Group A and Group B both sleep for an average of 7 hours per day over the week.

Module 2

16

The Kyoto Protocol is an international treaty aimed at combating climate change by reducing greenhouse gas emissions. Under the protocol, participating countries agree to reduce their emissions by a certain percentage below their 1990 levels. However, some critics argue that the protocol has shortcomings. For example, it does not require emissions reductions from developing countries, which are major emitters. Therefore, some experts express concern that the protocol may have the unintended effect of ____

Which choice most logically completes the text?

A) increasing economic inequality between developed and developing countries, as the latter are not required to take action to reduce their emissions.

B) discouraging countries from investing in renewable energy and other climate-friendly technologies.

C) decreasing public awareness of the need to address climate change, as the protocol is perceived as inadequate.

D) increasing emissions from developed countries, as they are not required to reduce their emissions as much as developing countries.

17

The history of coffee is fascinating and often mysterious. While coffee is thought to have originated in Ethiopia, it is not clear how it first spread to other parts of the world. To shed light on this mystery, researchers analyzed the DNA of coffee plants from around the world. They discovered that coffee was first domesticated in Ethiopia and that there are two major lineages of coffee plants: one from East Africa and one from West Africa. Based on their findings, the researchers concluded that ____

Which choice most logically completes the text?

A) the two major lineages of coffee plants are the result of independent domestication events that occurred in East and West Africa.

B) coffee was likely introduced to the Arabian Peninsula through trade with East Africa.

C) the distribution of coffee plants around the world is the result of natural migration and does not involve human activity.

D) the first people to cultivate coffee outside of Ethiopia were likely European colonizers in the Americas.

Module 2

18

Quarks are elementary particles that are the building blocks of protons and neutrons. These particles are held together by the strong nuclear force. When two quarks are close enough, they ____ together to form a particle called a meson. This process is known as quark confinement and occurs because the energy required to separate two quarks increases as they move further apart.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) bind

B) bound

C) are binding

D) will bind

19

Even though the double-slit experiment is often associated with Thomas Young, it was actually performed by a physicist named George Ellis over a century earlier. Ellis' experiment ____ that light has wave-like properties, a concept that Young later popularized through his own work.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) explained

B) explaining

C) have explained

D) explains

Module 2

20

Stan Lee, the co-creator of iconic comic book characters such as Spider-Man and the X-Men, often made cameo appearances in films based on his creations. In some cases, he even ____ the role of the character's creator, adding a metafictional layer to the films.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) played

B) plays

C) will play

D) had played

21

The period of European history between the 5th and 10th centuries was marked by significant cultural and societal changes. While some historians argue that this time period was characterized by intellectual _____ to the rise of new art forms and cultural expressions that emerged during this time.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) stagnation, others point

B) stagnation others point

C) stagnation: others point

D) stagnation. Others point

Module 2

22

The social scientist Herbert Simon is known for his work in decision-making and problem-solving, and he was awarded the Nobel Memorial Prize in Economics in 1978. Simon argued that decision-making is not always a rational process but is instead influenced by a variety of ____ factors.

Which choice most logically completes the text?

A) psychological, cultural, and social

B) psychological, cultural and social,

C) psychological. cultural and/or social

D) psychological; cultural and social

23

The research of linguist Noam Chomsky has been influential in the field of language acquisition, particularly his theory of universal grammar. Chomsky argues that humans are born with an innate ability to understand the grammatical rules that underlie all languages, which he calls the language acquisition device, or LAD. While some researchers have criticized Chomsky's theory, it remains a ____ framework for understanding how children acquire language.

Which choice most logically completes the text?

A) prominent

B) prominent,

C) prominent:

D) prominent but

Module 2

24

The Great Depression, a period of economic downturn in the United States during the 1930s, was marked by widespread unemployment, poverty, and financial instability. Despite the difficult circumstances, many communities came together to support one another and provide mutual aid. One notable figure from this era ____ Eleanor Roosevelt, who worked tirelessly to promote social welfare programs and advocate for the rights of marginalized groups.

Which choice most logically completes the text?

A) was

B) were

C) are

D) has been

25

Based on fossil records, paleontologists have generally agreed that the extinction of the saber-toothed tiger occurred approximately 10,000 years ago. However, since discovering a recently uncovered tooth in a remote cave in South America, ____ may have occurred much later.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) paleontologist Maria Gomez's theory is that the extinction

B) paleontologist Maria Gomez argues that the extinction

C) the extinction, paleontologist Maria Gomez argues,

D) the argument that paleontologist Maria Gomez made is that the extinction ·

Module 2

26

Zambia has a rich cultural heritage, and its many ethnic groups have their unique customs and traditions. In recent years, the country has made efforts to promote cultural tourism and preserve its heritage. In 2015, UNESCO designated the archaeological site of ____ located in eastern Zambia, as a World Heritage Site.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) Ingombe llede

B) Ingombe Ilede,

C) Ingombe llede;

D) Ingombe Ilede.

27

Anthropologist Maria Gonzalez-Fernandez is studying the impact of globalization on indigenous communities in Mexico. She is particularly interested in how the introduction of new technologies has affected traditional modes of subsistence, such as agriculture and fishing. ____ Gonzalez-Fernandez hopes to gain a better understanding of the challenges facing these groups in the modern world.

Which choice completes the text so that it conforms to the conventions of Standard English?

A) By conducting interviews and observing daily life in these communities.

B) By conducting interviews and observing daily life in these communities,

C) By conducting interviews, and observing daily life in these communities,

D) By conducting interviews and observing daily life in these communities

Module 2

28

Nuclear energy has been controversial due to concerns over safety and the disposal of radioactive waste. Despite this, many scientists argue that nuclear power is a crucial part of the solution to the world's energy crisis. ____ some environmentalists remain skeptical, nuclear energy is increasingly being embraced as a clean alternative to fossil fuels.

Which choice most logically completes the text?

A) In contrast,

B) Nonetheless,

C) In fact,

D) Even though

29

In elephants, communication involves a range of vocalizations, physical gestures, and even chemical signals. ____, the complexity of elephant communication likely contributes to the development of their large and sophisticated brains. Research into elephant communication could therefore shed light on the evolution of animal intelligence.

Which choice completes the text with the most logical transition?

A) Furthermore,

B) However,

C) In contrast,

D) On the other hand,

Module 2

30

During cell division, mitosis is the process by which a single cell divides into two identical daughter cells. ____, meiosis is a different type of cell division that occurs only in sex cells and results in four unique daughter cells with half the genetic material of the original cell.

Which choice completes the text with the most logical transition?

A) By contrast

B) Moreover

C) In addition

D) In spite of ·

31

Archaeologist Dr. Wei Xiang is leading a team that is studying the rock art found in the Dabous region of Niger. These engravings, depicting life-sized giraffes, were created during the Neolithic period, but their purpose remains a mystery. Some researchers have suggested that they may have had religious or ritual significance, but no conclusive evidence has been found. Dr. Xiang's team is hoping to shed new light on the meaning of the engravings by analyzing the chemical composition of the rocks and studying the surrounding landscape. ____, the remote location of the site poses a significant challenge for the team, who must navigate rugged terrain and extreme weather conditions to conduct their research.

Which choice completes the text with the most logical transition?

A) Furthermore

B) Nevertheless

C) Conversely

D) In addition

Module 2

32

While researching UN-Habitat, a student has taken the following notes:

• UN-Habitat is the United Nations program for human settlements and sustainable urban development.

• Its mission is to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all.

• UN-Habitat has been active in implementing urban development projects in various countries.

• It also focuses on addressing urban challenges such as poverty, climate change, and inequality.

• One of its recent initiatives is the New Urban Agenda, which was adopted in 2016 and outlines a vision for sustainable urbanization.

The student wants to emphasize a key objective of UN-Habitat. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) UN-Habitat has been active in implementing urban development projects in various countries, including social housing and transportation initiatives.

B) The New Urban Agenda, adopted by UN-Habitat in 2016, outlines a vision for sustainable urbanization and a set of guidelines for achieving it.

C) UN-Habitat promotes sustainable urban development, but it does not specifically address issues of poverty and inequality in cities.

D) UN-Habitat's focus on adequate shelter for all has been largely overlooked in favor of more general sustainability goals.

Module 2

33

While researching the environmental impact of EVs, a student has taken the following notes:

• EVs produce fewer emissions than gasoline-powered vehicles.

• However, the manufacturing process for EVs typically produces more emissions than the manufacturing process for gasoline-powered vehicles.

• In addition to emissions, the production of EV batteries also requires the extraction of minerals such as cobalt and lithium, which can have negative environmental and social impacts.

• Despite these concerns, some argue that the long-term environmental benefits of EVs, such as reducing greenhouse gas emissions and air pollution, outweigh the negative impacts of their production.

The student wants to emphasize the potential long-term benefits of EVs for the environment. Which choice most effectively uses relevant information from the notes to accomplish this goal?

A) The manufacturing process for EVs typically produces more emissions than the manufacturing process for gasoline-powered vehicles, and the production of EV batteries can have negative environmental and social impacts.

B) Despite concerns about their production, some argue that the long-term environmental benefits of EVs, such as reducing greenhouse gas emissions and air pollution, outweigh their negative impacts.

C) EVs produce fewer emissions during use than gasoline-powered vehicles, but the production of EV batteries requires the extraction of minerals that can have negative environmental impacts.

D) The extraction of minerals such as cobalt and lithium for EV batteries can have negative environmental and social impacts, but some argue that the long-term benefits of EVs for the environment outweigh these concerns.

Math

27 QUESTIONS

DIRECTIONS

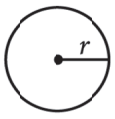
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

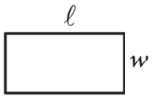
Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

REFERENCE



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



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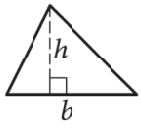
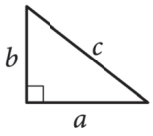


$A = \frac{1}{2}bh$



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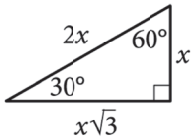
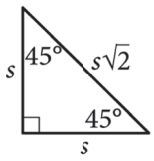
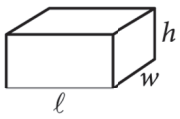
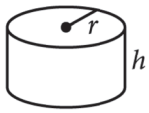




Special Right Triangles

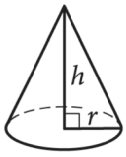


$V = \ell wh$

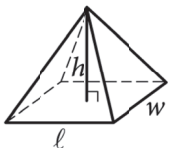


$V = \pi r^2 h$

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



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



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

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

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

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

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

• Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.

• If you find **more than one correct answer,** write and circle only one answer.

• Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.

• If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.

• If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.

• If your answer is a **mixed number** (such as 3½), write it as an improper fraction (7/2) or its decimal equivalent (3.5).

• Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1

If a car depreciates by 20% in the first year, and then by an additional 10% in the second year, what percentage of its original value does it retain after the two years?

A) 70%

B) 72%

C)75%

D) 76.5%

2

$x^2 + 6x + 3 = 0$

Which of the following quadratic equations has the same solutions as the given equation?

A) $(x+3)^2 = 9$

B) $(x - 3)^2 = 12$

C) $(x + 3)^2 = 6$

D) $(x - 6)^2 = 9$

3

A company offers a subscription plan for their streaming service. The plan includes a $20 monthly fee and an additional charge of $0.75 for every hour of premium content watched. A subscriber intends limit his budget with $50 for h hours on the service per month. Which inequality represents this situation?

A) $20 + 0.75h \leq 50$

B) $20h + 0.75 \leq 50$

C) $20h \leq 50$

D) $0.75h \leq 50$

4

The function f is defined by

$f(x) = x^2 + 3x$.

For which value of a is $f(a) = 18$?

A) 6

B) -2

C) 3

D) 4

5

Number of Contestants by Score and Day

	5 out of 5	4 out of 5	3 out of 5	2 out of 5	1 out of 5	0 out of 5	Total
Day 1	2	3	4	6	2	3	20
Day 2	2	3	5	5	4	1	20
Day 3	3	3	4	5	3	2	20
Total	7	9	13	16	9	6	60

The same 20 contestants, on each of 3 days, answered 5 questions in order to win a prize. Each contestant received 1 point for each correct answer. The number of contestants receiving a given score on each day is shown in the table above.

No contestant received the same score on two different days. If a contestant is selected at random, what is the probability that the selected contestant received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days?

6

A certain job can be done in 20 hours by 4 people. How many hours are needed to do the same job by 10 people?

7

The function f is defined by the equation: $(\ -1) = 5 \ -8$. What is the value for $f(2)$?

8

Two years ago, Estee was five times as old as Carol. If Carol is now x years old, which of the following represents Estee's age now?

A) $5x$

B) $5x - 8$

C) $5(x - 2)$

D) $5(x + 2)$

9

$2x + 8y = 9$

$ax + 4y = 15$

In the system of equations above, a is a constant. If the system has no solution, which of the following could be a possible value of a?

A) -1

B) 2

C) 1

D) 8

10

A store owner is stocking shelves with 30 items, each priced at either \$5 or \$10. To track the total cost, how can the store owner formulate an equation where x represents the number of \$5 items and y represents the number of \$10 items, thereby calculating the total cost C in terms of x?

A) $C = 15x + 10y$

B) $C = 30x - 5y$

C) $C = 300 - 5x$

D) $C = 300 - 15x$

11

Right ΔABC and ΔRST are similar, where A and B correspond to R and S, respectively. If $\cos\angle B = \frac{1}{2}$, then what is the value of $\sin\angle S$?

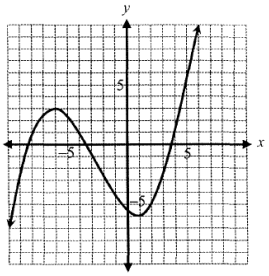
A) $\frac{1}{2}$

B) $\frac{\sqrt{2}}{2}$

C) $\frac{\sqrt{3}}{2}$

D) $\frac{\sqrt{3}}{3}$

12



The graph of $y = f(x)$ is shown. For how many values of x does $|f(x)| = 3$?

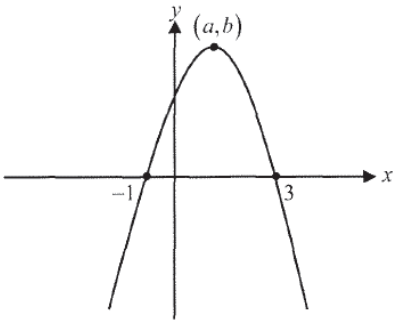
A) Three

B) Four

C) Five

D) Six

13



The graph of $y = -2(x + 1)(x - 3)$ is shown above, and the coordinates of the vertex of the equation are represented as (a, b). What is the value of b?

14

Sarah bought a combination of apples and oranges for $30. Each apple costs $2, and each orange costs $3. If Sarah bought 10 more apples than oranges, how many apples did she buy?

15

Which expression is equivalent to

$4a^3(b - 2) - 8a^2(b - 2)$?

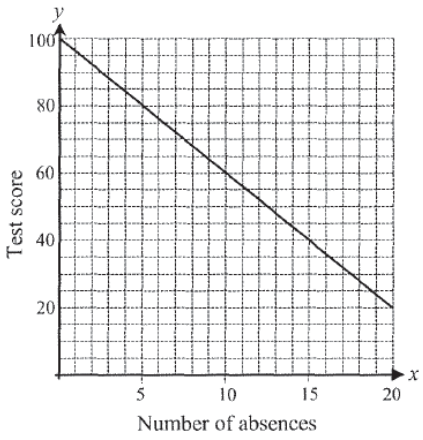
A) $-4a^2(b - 2)$

B) $4a(a - 2)(b^2)$

C) $4a^2(a - 2)(b - 2)$

D) $4a^3(a - 2b)$

16



The graph illustrates the relationship between the number of absences from school, x, and the test scores achieved, y, by a group of students. Which equation could represent this relationship?

A) $8x + y = 100$

B) $x + y = 100$

C) $8x + 2y = 200$

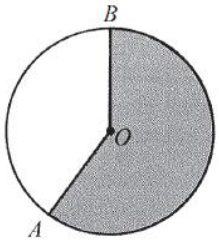
D) $8x - 2y = 100$

17

Data value	Frequency
13	13
15	2
16	22
17	4
19	12
20	14

The frequency table represents data on the ages of 67 individuals in a survey. What is the median age in the data set?

18



In the figure above, the radius of circle O is 3 and the area of the shaded region is 6π square units. What is the length of the minor (unshaded) arc AB?

A) 2π

B) 3π

C) 4π

D) 6π

19

A circular park has a radius of 2.5 miles. What is the area of the park in square acres? (1 square mile = 640 acres)

A) $4,000\pi$ square acres

B) $25,600\pi$ square acres

C) $625,000\pi$ square acres

D) $2,560,000\pi$ square acres

20

x	$f(x)$
0	3
2	7
8	19

For the linear function $f(x)$, the table shows three values of x and their corresponding values of y. $g(x)$ is the result of translating the function 5 units to the right in the xy-plane. What is the x-intercept of the translated line?

21

In a school, there are classrooms with 25 students each, and classrooms with 30 students each. The total number of students in the school is 240. The equation

$25x + 30y = 240$

reflects the accounting. In this equation, what does x best represent?

A) The number of classrooms with 25 students each.

B) The number of classrooms with 30 students each.

C) The average number of students per classroom with 25 students.

D) The average number of students per classroom with 30 students.

22

$x^2 - 10x - 7 = 0$

Which expression is equivalent to the equation above?

A) $(x + 5)^2 = 25$

B) $(x - 5)^2 = 32$

C) $(x + 5)^2 = 32$

D) $(x - 5)^2 = 25$

23

Initially, there were 1,000 bacteria in a culture. The number of bacteria doubles every 2 hours. How many bacteria will there be in the culture after 8 hours?

A) 5,000

B) 10,000

C) 16,000

D) 32,000

24

The height of an equilateral triangle is $4\sqrt{3}$ square centimeters. What is the area of this triangle in centimeters?

A) 8

B) $8\sqrt{3}$

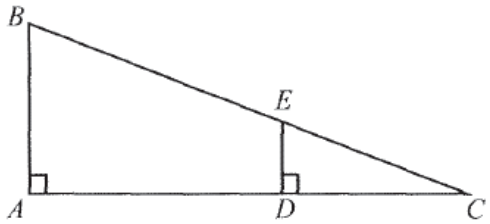
C) 16

D) $16\sqrt{3}$

25

The equation of a circle is $(x-3)^2+(y+4)^2=r^2$ and passes through the point (2, 1). The area of the circle can be expressed in the form of $k\pi$. What is the value of k?

26



In the figure above, AB $= \frac{3}{2}$DE. The area of ΔABC is how many times the area of ΔDEC?

A) 1.5

B) 2.25

C) 2.5

D) 6.25

27

$^2 + \ ^2 = 12$

$= \sqrt{\ }$

In solving the above system of equations, what is the value of x?

Module 2

Math

27 QUESTIONS

DIRECTIONS

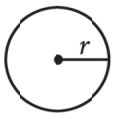
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

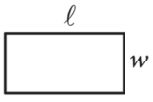
Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

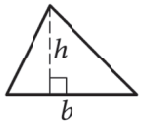
REFERENCE



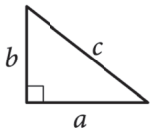
$A = \pi r^2$
$C = 2\pi r$



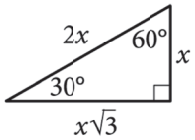
$A = \ell w$

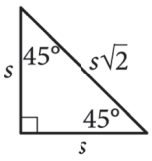


$A = \frac{1}{2}bh$

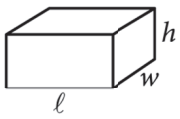


$c^2 = a^2 + b^2$

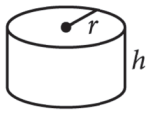




Special Right Triangles

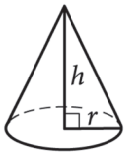


$V = \ell wh$

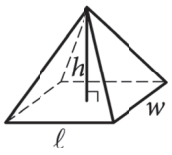


$V = \pi r^2 h$

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



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



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

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

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

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

Module 2

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

• Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.

• If you find **more than one correct answer,** write and circle only one answer.

• Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.

• If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.

• If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.

• If your answer is a **mixed number** (such as 3½), write it as an improper fraction (7/2) or its decimal equivalent (3.5).

• Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

Module 2

1

James is paid k dollars for working s hours. If he works for w hours, which of the following represents his pay in dollars?

A)

B) —

C) —

D) —

2

$$h(\ ) = 2(\ -3.5)^2 - 32$$

The quadratic function h is defined as shown. In the xy-plane, the graph of y equals, h of x intersects the x-axis at the points with coordinates (0, 0), and (0, t), where t is a constant. What is the value of t ?

A) 5.5

B) 6

C) 7.5

D) 8

3

Oil and gas production in a certain area dropped from 4 million barrels in 2000 to 1.9 million barrels in 2013. Assuming that the oil and gas production decreased at a constant rate, which of the following linear functions f best models the production, in millions of barrels, t years after the year 2000?

A) $4 + \frac{21}{130}$

B) $4 - \frac{19}{130}$

C) $4 + \frac{19}{130}$

D) $4 - \frac{21}{130}$

4

The equation $d = 16t^2$ represents the distance d in meters that an object falls from rest as a function of time t in seconds under the influence of gravity. What is the distance, in meters, that the object has fallen after 4 seconds?

A) 32

B) 64

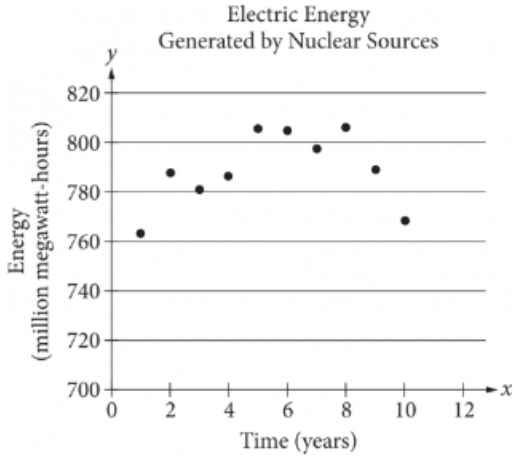
C) 128

D) 256

Module 2

5

The scatterplot below shows the amount of electric energy generated, in millions megawatt-hours, by nuclear sources over a 10-year period.



Of the following equations, which best models the data in the scatterplot?

A) $y = 1.674x^2 + 18.76x - 745.73$

B) $y = -1.674x^2 + 18.76x - 745.73$

C) $y = 1.674x^2 + 18.76x + 745.73$

D) $y = -1.674x^2 - 18.76x + 745.73$

6

$f(x) = 5x + 8$

In the xy-plane, the graph of $y = g(x)$ is the result of shifting the graph of $y = f(x)$ to the left by 3 units. Which equation defines the function g?

A) $g(x) = 5x + 5$

B) $g(x) = 5x + 11$

C) $g(x) = 5x - 7$

D) $g(x) = 5x + 23$

7

The cost of renting a backhoe for up to 10 days is \$270 for the first day and \$135 for each additional day. Which of the following equations gives the cost y, in dollars, of renting the backhoe for x days, where is a positive integer and $x \leq 10$?

A) $y = 270x - 135$

B) $y = 270x + 135$

C) $y = 135x - 270$

D) $y = 135x + 270$

Module 2

8

Mrs. Porter recorded her students' grades in the frequency table below.

Score	Frequency
90	2
85	4
80	10
75	4
70	2

What is the mean of the scores?

9

The equation $P(d) = 115(0.95)^d$ gives the estimated percentage of original strength for a certain medication, where d is the number of days since the medication was manufactured. Which of the following is the best interpretation of the number 115 in this context?

A) The original strength of the medication when it was first manufactured

B) The daily decrease in the medication's strength

C) The number of days the medication has been in Existence

D) The percent decrease in the medication's strength each day

10

$f(x) = x^2 - 6x + k$

The minimum value of $f(x)$ is 25, where k is a constant. What is the value of k?

A) 16

B) 20

C) 32

D) 34

11

Each year, the population P of a certain small town, t years after a specific starting point, grows by 1.2%, of its population from the previous year. Which of the following functions best models the change in the town's population over time?

A) $P(t) = P(0)(1 + 0.012t)$

B) $P(t) = P(0) + 0.012t$

C) $P(t) = P(0)(1.12)^t$

D) $P(t) = P(0)(1.012)^t$

Module 2

12

The revenue of a company increased by 20% each year from 2020 to 2023. If the 2022 revenue is r times the 2020 revenue, what is the value of r?

A) 1.2

B) 1.4

C) 1.44

D) 4.0

13

Which expression is equivalent to $\sqrt[7]{3} \times \sqrt[5]{2}$

A) $\sqrt[35]{5}$

B) $\sqrt[12]{6}$

C) $\sqrt[35]{6}$

D) $\sqrt[35]{29}$

14

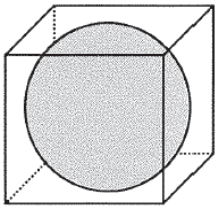
A school is organizing a field trip. The transportation fee is \$480, and the entry fee per student is \$25. Additionally, a fixed amount of \$80 is required for a supervising teacher's expenses. The school has allocated \$1,000 for the trip. What is the maximum number of students that can go on the trip without exceeding the budget?

15

If $|8^{2} - 16| - 40 = 0$, what is the value of x^2?

Module 2

16



In the figure above, a solid sphere, having a volume of 36π cubic inches, is placed inside a cube in such a way that the sphere touches the center of each face of the cube. What is the volume of the cube in cubic inches?

A) 27

B) 64

C) 125

D) 216

17

What is the circumference of the circle in the xy-plane with equation $^{2} - 10 \; + \; ^{2} - 12 \; - 20 = 0$?

A) 13π

B) 18π

C) 32π

D) 36π

18

For the exponential function h, the value of $h(3) = n$, where n is a constant. Which of the following equivalent forms of the function h shows the value of n directly as the coefficient?

A) $h(\;\;) = 7.5(2)^{+1}$

B) $h(\;\;) = 15(2)$

C) $h(\;\;) = 30(2)^{-1}$

D) $h(\;\;) = 120(2)^{-3}$

19

A model predicts that each year from 2018 to 2030, the number of rabbits in a certain area increased by 200% compared to the number at the end of the previous year. The model estimates that at the end of 2019, there were 300 rabbits in the area. Which of the following equations represents this model, where r is the estimated number of rabbits at the end of y years after 2018?

A) $= 100(3)$

B) $= 100(2)$

C) $= 150(3)$

D) $= 300(3)$

Module 2

20

$2x + 3y = 7$

$4x^2 - 9y^2 = 35$

The ordered pair (a, b) is a solution to the given system of equations. What is the value of $4a - 6b$?

A) 5

B) -5

C) 10

D) -10

21

Line k intersects the y-axis at the point (0, -6) and passes through the point (2, 2). If the point (20, w) lies on line k, what is the value of w?

22

In the given system of equations,

$y = x^2 + 3x - 8$

$y = x - k$

where k is a constant. If the system has real solution(s), what is the largest possible integer value of k?

23

Line h is perpendicular to line g, which is defined by $(\ ) = -\frac{1}{2}\ + 5$, and it has an x-intercept at (-8, 0). What is the y-intercept of line h?

A) (0, -32)

B) (0, -16)

C) (0, 16)

D) (0, 32)

Module 2

24

In the xy-plane, the graph of the equation $y = -2x^2 + 20x - k$, where k is a constant, intersects the line $y = 15$ at exactly one point. What is the value of k?

A) 35

B) 25

C) 15

D) 5

25

A rectangle is inscribed in a circle, such that each vertex of the rectangle lies on the circumference of the circle. The diagonal of the rectangle is twice the length of the shortest side of the rectangle. The area of the rectangle is $1{,}089\sqrt{3}$ square units. What is the length, in units, of the diameter of the circle?

26

For an electric field passing through a flat surface perpendicular to it, the electric flux of the electric field through the surface is the product of the electric field's strength and the area of the surface. A certain flat surface consists of two adjacent squares, where the side length, in meters, of the larger square is 3 times the side length, in meters, of the smaller square. An electric field with strength 29.00 volts per meter passes uniformly through this surface, which is perpendicular to the electric field. If the total electric flux of the electric field through this surface is 4,640 voltsmeters, what is the electric flux, in voltsmeters, of the electric field through the larger square?

27

$$\frac{6^{2} - \quad + 10}{-} = 3x - 2$$

In the equation above, a, b, and k are constants. If the equation is true for all values of x, what is the value of k?

Module ❷