2020
Complete AMI Packet
of
ACT Prep Work

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Contact Information

Questions regarding Reading, Writing, or English	Ms. Brinkley lbrinkley@msd3.org
Questions regarding Math concepts	Mr. McBride- Algebra jmcbride@msd3.org Mr. Frost- Geometry cfrost@msd3.org
Questions regarding Science concepts	Ms. Taylor wtaylor@msd3.org
Questions regarding ACT registration and/or test dates	Mrs. Burleson kburleson@msd3.org

ACT READING

4 Passage Types

- **Humanities**: architecture, art, dance, ethics, film, language, literary criticism, music, philosophy, radio, television, and theater.
- **Social studies**: anthropology, archaeology, biography, business, economics, education, geography, history, political science, psychology, and sociology.
- **Natural sciences**: anatomy, astronomy, biology, botany, chemistry, ecology, geology, medicine, meteorology, microbiology, natural history, physiology, physics, technology, and zoology.
- **Literary fiction**: short stories, novels, memoirs, and personal essays.

Question stems:

- Main idea - the main point or theme of the passage.
- Detail - usually refers directly to a line in the text and asks what it means or how it functions.
- Vocabulary - vocabulary words are usually straightforward, but they might be used in an unusual way in context.
- Development - how are ideas arranged within the passage?
- Implied ideas - these are inference questions. While this might seem subjective, there will only be one unambiguously correct answer.
- Voice - what is the author or narrator's tone, style, attitude, or perspective?

Best Practices

- Read the introductory line or blurb at the beginning of the passage. This introduction will tell you where the passage is from and who the author is. Right away you can gain a sense of the passage's context, which is helpful for understanding its main purpose.
- Be cautious about making assumptions before you even start reading - instead, use the blurb to inform you, while remaining open-minded about the passage's content and meaning.
- Time is of the essence!! Because time is limited there are reading options that you will want to find that will best suit your need and comfort level.
    - Option A: Read the questions first to know of content needed before reading the passage.

        - Reading over the questions before reading the passage. This way you'll have a sense of what content you're looking for, and you can read with a discerning eye. If questions refer to any specific lines within the passage, then make a mark on the passage next to that line so you'll know to pay attention to it when you read.
    - *Option B:* Skim the passage first and then read and answer questions.
        - Some students find it distracting to glance over the questions before reading.
        - Skim the passage first and then look at the questions, once they have a sense of its content, structure, and purpose. In this approach, the same rules of skimming as described above still apply, and you can still mark up the passage once you start working to help yourself locate important details and ensure that you have evidence to back up your answers.

Answering Questions

- Looking at your questions … it is helpful to answer the detail- and line-specific questions first and leave the general purpose questions for the end.
- Decide what is right before looking at options.
- If you're not sure about the answer after reading the answer choices, you should try to use process of elimination to locate the right answer.
    - While the ACT might word questions like they're open to interpretation, they are not. There is only ever one 100% correct answer choice.
- The process of elimination could help you narrow down your answer choices until you hone in on the correct one, or, if need be, make your best guess.
- Because of time restrictions, sometimes guessing is the best option AFTER you have eliminated or tried otherwise.

Answer the questions in your test booklet and then transfer them to the bubble sheet.

Do this in chunks after you complete the set of questions about each passage.

Make sure to keep an eye on time, though - you wouldn't want to run out of time having answers in your test booklet that you haven't marked on the answer sheet yet.

Start with the passages you feel most confident about, whether it's natural sciences, social studies, humanities, or literary fiction, and answering those questions first. That way you can get through more questions faster. Stress and anxiety can also put up obstacles to learning, actually using up your mental energy so it's not available to comprehend the task at hand.

On the opposite side, if you're really intrigued by a lesson or activity, you feel engaged and like it flies by. You also actually absorb the information or practice much more efficiently, because you're personally involved in it.

Fight boredom!

Passage A: In Orbit

July 20, 1969: I'm running in a wide circle at the far end of the cul-de-sac, around and around until I settle in the dust under a thorny bush, but then my name floats into the game, calling me back as dusk descends on the neighborhood. Other names unfurl like ribbons, doors opening and closing—Bobby, Brenda, Laura!—and none of us kids even says goodbye, we just disperse, our small band so easily dissolved. I leave my perfect hiding place—knees scratched, my hair smelling of sap—to go back inside, where it's too hot and smells of stuffed cabbage, the television on to the evening news. Father, mother, brothers—we're all angled toward the television because something momentous is about to happen: the first man to walk on the moon.

Somehow we're going to see it. We'll see Armstrong in his space suit emerge from the metal door; we'll see it as if looking through a scratched and dirty window, with blips and bleeps and static and a shimmering gray overlaying everything because he's out there now, a lone man in a different atmosphere altogether, moving backward down the ladder one slow step at a time. And then, right before his foot touches down in the dust, the words that will become an emblem: one small step for man, one giant leap for mankind. He does it, takes a little hop down onto that alien surface, the only man in the universe.

Everyone is sitting quiet, watching, forks in midair—I can see the profile of my father's jaw, my mother's small shoulders—and just at that moment, I decide to clank my fork on the edge of my plate, to make a loud noise that will penetrate the vast silence in which this man now moves. Everyone turns toward me: father, mother, brothers, angry, annoyed, and my father says well, thank you very much, and I know I've ruined it, this historic moment.

I don't know why I did it: maybe I just feel vastly lonely, want to make my presence known, or maybe I thought it would be funny, or maybe I was kind of applauding, the way the men in Houston must have been jumping up and down, shaking hands, mission accomplished after so many years of study and work and planning, they had done it, they had put a man on the moon! My faux-pas just hangs in the air, the clank of the fork still hurting my ears. They turn back to the television, the set of their bodies so solidly against me, and I guess I don't really understand why it would be so great—to be a man on the moon, exiled, in orbit so far from home.

5.

Passage B: On July 20th, 1969...

Moon Landing Day—we gathered before the television set to watch Apollo's final approach to the lunar surface. (And who ever imagined that we would watch the event as it happened, on television, in our homes?) "Two thousand feet," Aldrin said, and Houston said, "Eagle looking great. You're GO." With the incredible crawl-line at the bottom of the screen saying something like LIVE TRANSMISSION FROM THE MOON. Followed by long anxious moments as the landing vehicle drifted over the barren surface, moving between craters and a boulder field—I am looking at the MOON, I told myself, I am looking at the MOON—and then came the great plume of dust as touchdown approached, and then the words, the unforgettable words, "Houston, Tranquility Base here. The Eagle has landed."

Naively I thought that the hatch would now open, Neil Armstrong would come scrambling down the ladder, and within moments we would behold the spectacle of a human being walking on the moon. Well, no, there was all sorts of preliminary stuff to do first, hours of it, and throughout the rest of that afternoon and evening we hovered impatiently near the TV, and waited, and waited, and waited, and somewhere around eleven o'clock came word that Armstrong was about to emerge, and there was that foot on the ladder, and the dimly seen spidery figure descending, and then, step by step, the descent to the lunar surface, the arrival on it, the utterance of the somewhat bungled and stagy official First Words.

I could hardly sleep that night. I could envision Luna City a-building a decade or two ahead, and the first lunar tourist trips, and then the first manned voyage to Mars somewhere around 1992, with all the rest of the universe just beyond. Who could have known that the beginning of all that was also the end, that all the glory of the space adventure was front-loaded, that we would attempt the journey, and succeed, and then stop? No one saw that coming. No one. Least of all we poor shortsighted prophets of the future, the science fiction writers.

1. The last paragraph of Passage A (lines 37-49) marks a shift in the passage from:

A. a description of events leading up to a sudden action by the narrator to a reflection on the intentions and meanings behind that action.

B. an overview of a family dilemma to an explanation of how the narrator solved that dilemma.

C. an example of the narrator's typical response to family events to an analysis of the narrator's personality.

D. a chronology of a historical event to a summary of the narrator's circumstances at the time.

2. In Passage A, the narrator's descriptions of Armstrong suggest that she sees him as ultimately:

E. self-confident and triumphant.

F. isolated and alone.

G. awe-inspiring and heroic.

H. stiff and ceremonial.

3. The narrator of Passage A most nearly suggests that her family is angry and annoyed with her for clanking her fork on her plate because the noise:

A. demonstrates that the narrator has not been watching the broadcast.

B. disrupts the family's observance of a momentous event.

C. causes the family to worry about the outcome of Armstrong's endeavor.

D. drowns out the sound from the television.

Questions 4-6 ask about Passage B.

4. The narrator's statement "I am looking at the MOON, I told myself, I am looking at the MOON" (lines 60-62) is most nearly meant to:

E. reflect the excitement of the astronauts as they prepare to land.

F. illustrate the narrator's disappointment with the moon's barren appearance.

G. express the narrator's irritation at having to wait for Apollo to land.

H. convey the narrator's awe at the event that is being broadcast.

5. Passage B indicates that compared to the narrator's expectation about how the first person walking on the moon would be televised, the broadcast itself was:

A. similar; the narrator had expected the television companies to prolong the event with preliminary material.

B. similar; the narrator had expected Armstrong would be chosen to walk on the moon's surface.

C. dissimilar; the narrator had expected there would be cities on the moon before a moon walk would be televised.

D. dissimilar; the narrator had expected to see Armstrong's moon walk shortly after the lunar vehicle landed.

6. Based on the passage, the information about Luna City and Mars provided in lines 80-84 is most likely meant to represent the:

E. types of advances in space exploration the narrator anticipated would happen next.

F. plotlines the narrator planned to develop in his science fiction stories.

G. official plans for space development revealed during the broadcast.

H. far-fetched fantasies that first inspired the narrator to become a science fiction writer.

Questions 7-9 ask about both passages.

7. Which of the following statements provides the most accurate comparison of the tone of each passage?

A. Passage A is fondly nostalgic, while Passage B is impersonal and scientific.

B. Passage A is optimistic and exuberant, while Passage B is sarcastic and cynical.

C. Both passages begin by conveying some sense of the narrator's wonder but conclude with a note of disenchantment.

D. Both passages begin by conveying the narrator's doubt but conclude with some sense of lasting pride.

8. Compared to the narrator of Passage A, the narrator of Passage B provides more information about:

E. Armstrong's actions after setting foot on the moon's surface.

F. Armstrong's qualifications for a moon voyage.

G. the prior accomplishments of the space program.

H. the order of events throughout the moon landing broadcast.

9 It can reasonably be inferred that after seeing the first man walk on the moon, compared to the narrator of Passage B, the narrator of Passage A felt:

A ○ more impressed by the fact that the event was broadcast on television

B ○ more optimistic about future space exploration

C ○ less able to appreciate the celebration surrounding the man on the moon

D ○ less disappointed by the delay in the broadcast

Passage A and B

Answers

1. **The best answer is A.** The first three paragraphs of Passage A tell the story of the night the narrator watched the moon landing and clanked her fork loudly and suddenly. The last paragraph features the narrator considering the reasons why she clanked her fork during the moon landing.
2. **The best answer is F.** The narrator repeatedly emphasizes the loneliness and isolation of Armstrong. He is "a lone man in a different atmosphere" (line 21) and "the only man in the universe" (line 27). Passage A concludes with the narrator saying she doesn't understand "why it would be so great—to be a man on the moon, exiled, in orbit so far from home" (lines 47–49). She admires Armstrong and his achievement, but her descriptions demonstrate that she sees him primarily as isolated and alone.
3. **The best answer is B.** The evidence for B comes from lines 33–36, in which the narrator's family turns to her angrily after she clanked her fork during the moon landing broadcast, and she says, "I know I've ruined it, this historic moment."
4. **The best answer is H.** The first paragraph clearly indicates that "I am looking at the MOON" is something the narrator tells himself (lines 60–61). It is also evident that the narrator is in awe of the moon landing. He writes, "And who ever imagined that we would watch the event as it happened, on television, in our homes?" (lines 52–54). He also describes the crawl line on the television as "incredible" (line 56), and he uses all capital letters in "MOON" to underscore his amazement.
5. **The best answer is D.** The second paragraph of Passage B (lines 66–79) shows that the narrator expected that Armstrong would walk on the moon shortly after the lunar vehicle landed, but instead the narrator had to wait several hours before the moon walk took place.
6. **The best answer is E.** In lines 80–84 of Passage B, the narrator says he envisioned Luna City and the voyage to Mars when he was lying in bed on the night of the moon landing.
7. **The best answer is C.** Both passages begin with a sense of wonder from the respective narrators: "something momentous is about to happen" (lines 13–14) in Passage A; "And who ever imagined that we would watch the event as it happened, on television, in our homes?" (lines 52–54) in Passage B. Also, both passages conclude with a note of disenchantment. In Passage A, the narrator has spoiled the moment and sees Armstrong as "exiled" (line 48); in Passage B, the narrator expresses surprise and displeasure that "all the glory of the space adventure was frontloaded, that we would attempt the journey, and succeed, and then stop" (lines 86–88).
8. **The best answer is H.** Passage B mentions many details about the moon landing broadcast in the first two paragraphs (lines 50–79), such as the approach to the moon, the words spoken when the lunar vehicle landed, and the long delay before Armstrong stepped out of the vehicle. Passage A includes only details about Armstrong's first steps on the moon.
9. **The best answer is C.** Even though the narrator of Passage A wonders if she might have clanked her fork to applaud the accomplishment of the moon landing, the passage ends with her saying, "I guess I don't really understand why it would be so great—to be a man on the moon, exiled, in orbit so far from home" (lines 47–49). The narrator of Passage B, however, finds the moon landing compelling and wonders what future space voyages may happen next.

NATURAL SCIENCE: This passage is adapted from the article "How to Build a Baby's Brain" by Sharon Begley (©1997 by Newsweek, Inc.). In this selection, the term neuron refers to a specialized cell of the nervous system, and tomography refers to a method of producing three-dimensional images of internal structures.

How to Build a Baby's Brain

You cannot see what is going on inside your newborn's brain. You cannot see the electrical activity as her eyes lock onto yours and, almost instantaneously, a neuron in her retina makes a connection to one in her brain's visual cortex that will last all her life. The image of your face has become an enduring memory in her mind. And you cannot see the explosive release of a neurotransmitter—brain chemical—as a neuron from your baby's ear, carrying the electrically encoded sound of "ma," connects to a neuron in her auditory cortex. "Ma" has now commandeered a cluster of cells in the infant's brain that will, as long as the child lives, respond to no other sound.

You cannot see any of this. But Dr. Harry Chugani can come close. With positron-emission tomography (PET), Chugani, a pediatric neurobiologist, watches the regions of a baby's brain turn on, one after another, like city neighborhoods having their electricity restored after a blackout. He can measure activity in the primitive brain stem and sensory cortex from the moment the baby is born. He can observe the visual cortex burn with activity in the second and third months of life. He can see the frontal cortex light up at 6 to 8 months. He can see, in other words, that the brain of a baby is still forming long after the child has left the womb—not merely growing bigger, but forming the microscopic connections responsible for feeling, learning and remembering.

Scientists are just now realizing how experiences after birth, rather than something innate, determine the actual wiring of the human brain. Only 15 years ago neuroscientists assumed that by the time babies are born, the structure of their brains had been genetically determined. But by 1996, researchers knew that was wrong. Instead, early-childhood experiences exert a dramatic and precise impact, physically determining how the intricate neural circuits of the brain are wired. Since then they have been learning how those experiences shape the brain's circuits.

At birth, the brain's 100 billion or so neurons form more than 50 trillion connections (synapses). The genes the baby carries have already determined his brain's basic wiring. They have formed the connections in the brain stem that will make the heart beat and the lungs respire. But that's not all. Of a human's 80,000 different genes, fully half are believed to be involved in forming and running the central nervous system. Yet even that doesn't come close to what the brain needs. In the first months of life, the number of synapses will increase 20-50 fold—to more than 1,000 trillion. There simply are not enough genes in the human species to specify so many connections.

How to Build a Baby's Brain continued...

That leaves experience—all the signals that a baby receives from the world. Experience seems to exert its 55effects by strengthening synapses. Just as a memory will fade if it is not accessed from time to time, so synapses that are not used will also wither away in a process called pruning. The way to reinforce these wispy connections has come to be known as stimula-60tion. Contrary to the claims of entrepreneurs preying on the anxieties of new parents, stimulation does not mean subjecting a toddler to flashcards. Rather, it is something much simpler—sorting socks by color or listening to the soothing cadences of a fairy tale. In the most 65extensive study yet of what makes a difference, Craig Ramey of the University of Alabama found that it was blocks, beads, peekaboo and other old-fashioned measures that enhance cognitive, motor and language development—and, absent traumas, enhance them per-70manently.

The formation of synapses (synaptogenesis) and their pruning occurs at different times in different parts of the brain. The sequence seems to coincide with the emergence of various skills. Synaptogenesis begins in 75the motor cortex at about 2 months. Around then, infants lose their "startle" and "rooting" reflexes and begin to master purposeful movements. At 3 months, synapse formation in the visual cortex peaks; the brain is fine-tuning connections allowing the eyes to focus on 80an object. At 8 or 9 months the hippocampus, which indexes and files memories, becomes fully functional; only now can babies form explicit memories of, say, how to move a mobile. In the second half of the first year, finds Chugani, the prefrontal cortex, the seat of 85forethought and logic, forms synapses at such a rate that it consumes twice as much energy as an adult brain. That furious pace continues for the child's first decade of life.

1

The main point of this passage is to:

A ○ illustrate the importance of genetics in the formation of a baby's brain.

B ○ illustrate the importance of stimulation and experience in the formation of a baby's brain.

C ○ indicate the great need for conducting further research on babies' brains.

D ○ compare the latest research on babies' brains with similar research conducted fifteen years ago.

2. The main point made in the second, third, and fourth paragraphs (lines 14-52) is that the structure of a baby's brain:

E ○ is genetically determined before the child is born.

F ○ can be seen through positron-emission tomography.

G ○ can be altered through a process known as pruning.

H ○ is still developing after the child is born.

3. According to the passage, one thing PET allows neurobiologists to do is:

A ○ observe activity in the frontal cortex of a baby's brain.

B ○ determine the number of genes involved in the formation of a baby's brain.

C ○ control the release of neurotransmitters in a baby's auditory cortex.

D ○ restore microscopic connections in a baby's brain.

4. When she compares a baby's brain to city neighborhoods, the author is most nearly illustrating her point that:

E ○ neurotransmitters are actually brain chemicals.

F ○ regions of the brain are awakened through experience.

G ○ the visual cortex allows a baby to recognize specific images.

H ○ a baby's brain has about 1,000 trillion synapses.

5 Which of the following would the author of the passage be LEAST likely to recommend as a way to strengthen the synapses of a baby's brain?

A ○ Reading to a baby

B ○ Playing peekaboo with a baby

C ○ Teaching a baby with flashcards

D ○ Showing a baby how to distinguish red socks from blue blocks

6 The last paragraph suggests that the formation of synapses occurs most rapidly:

E ○ during the first two months of a child's life.

F ○ during the first nine months of a child's life.

G ○ from the time a child is about six months old until that child is about ten years old.

H ○ from the time a child is about one year old until that child is well into adolescence.

7 As it is used in line 30, the phrase *something innate* most nearly means:

A ○ a memory.

B ○ learned behavior.

C ○ physical immaturity.

D ○ an inherited trait.

8 The fifth paragraph (lines 53-70) suggests that one of the main causes of pruning is:

E ○ a lack of stimulation.

F ○ an insufficient number of genes.

G ○ the use of flashcards.

H ○ the strengthening of synapses.

9 When the author refers to "entrepreneurs preying on the anxieties of new parents" (lines 60-61), she is most likely suggesting that new parents should:

A ○ give their babies products such as flashcards only if they have examined these products carefully.

B ○ not be deceived by advertising that claims certain products will increase a baby's intelligence.

C ○ not worry if their babies' development is slightly behind that suggested by neurobiologists.

D ○ take their pediatrician's advice before they listen to the advice given by other family members.

10 The passage states that, in terms of development, the average baby should be able to:

E ○ focus his or her eyes on an object at two months of age.

F ○ develop a "startle" reflex at about two months of age.

G ○ make logical connections between ideas at about four months of age.

H ○ form explicit memories at about nine months of age.

How to Build a Baby's brain

Answers

1. The best answer is B because throughout the passage, the author focuses primarily on "how experiences after birth, rather than something innate, determine the actual wiring of the human brain" (lines 29-31). The third, fourth, and fifth paragraphs particularly focus on this topic by showing how "early-childhood experiences exert a dramatic and precise impact" (lines 35-36) on the brain's circuits and how "experience seems to exert its effects by strengthening synapses" (lines 54-55). The author goes on to say that the way to reinforce these developing synapses "has come to be known as stimulation" (lines 59-60).
2. The best answer is H. Information in each of the three paragraphs (second, third, and fourth), reinforces the author's point that the structure of the baby's brain is still developing: "the brain of a baby is still forming long after the child has left the womb" (lines 24-25); "experiences after birth, rather than something innate, determine the actual wiring of the human brain" (lines 29-31); "In the first months of life, the number of synapses will increase 20-fold" (lines 48-50).
3. The best answer is A. Support for this choice is in the second paragraph, which clearly shows that with PET, a neurobiologist can watch "regions of the baby's brain turn on" (line 17) and "observe the visual cortex burn with activity" (lines 21-22).
4. The best answer is F. In the second paragraph, the author uses the analogy of restoring electricity to city neighborhoods after a blackout to help explain how a neurobiologist, by using PET, can watch "regions of a baby's brain turn on, one after another" (line 17) as the baby grows older and has more and more experiences.
5. The best answer is C. This question asks the test taker to choose the LEAST likely way to strengthen a baby's synapses. Lines 61-62 clearly state that "stimulation does not mean subjecting a toddler to flashcards." This suggests that flashcards are not the preferred way to strengthen brain connections.
6. The best answer is G. Support for this choice is stated directly in lines 83-88: "In the second half of the first year . . . , the prefrontal cortex . . . forms synapses at such a rate that it consumes twice as much energy as an adult brain. That furious pace continues for the child's first decade of life."
7. The best answer is D because the word innate means "existing at birth." In the context of the sentence, it can easily be determined that the word innate means something other than "experiences after birth" (lines 29-30), so it must mean "existing at birth."
8. The best answer is E because lines 57-60 state that "synapses that are not used will also wither away in a process called pruning," and the way to prevent pruning "has come to be known as stimulation."
9. The best answer is B. This is the only logical choice because the phrase "entrepreneurs preying on the anxieties of new parents" suggests that parents should be cautious about possibly being deceived by entrepreneurs, and lines 60-62 suggest that parents should be particularly wary of entrepreneurs who claim that flashcards are good stimulation for toddlers.
10. The best answer is H because it is the only choice that is accurate, based on information in the passage. Direct support for this choice can be found in lines 80-82, which state that "at 8 or 9 months, the hippocampus, which indexes and files memories, becomes fully functional; only now can babies form explicit memories."

ACT English

1. RUN-ONS & FRAGMENTS

A complete sentence contains a subject, a predicate verb, and a complete thought. If any of the three is lacking, the sentence is called a fragment. A run-on contains too much information, usually because two independent clauses (two complete thoughts) are being improperly combined.

2. VERBS: SUBJECT-VERB AGREEMENT & VERB TENSES

The ACT English section often includes long sentences in which the main subject and the verb are separated by many words or clauses. If you identify the subject of each sentence and make sure the verb matches it, you can ace this grammar rule. In addition, the ACT tests your knowledge of past, present, future, past perfect, present perfect, and future perfect tenses.

3. PUNCTUATION

Commas, apostrophes, colons, semicolons, dashes, periods, question marks, and exclamation points are all tested on the ACT. Know how to tackle them to grab some quick points on this test.

4. IDIOMS

Idioms are expressions native to the English language. Two-part idioms are commonly tested such as “neither…nor” and ”not only…but also” as well as prepositional idioms like “opposed TO” and “participate IN.” The ACT will also test verb and preposition idioms. Both of these types can be tricky because there is not a list of rules. Instead of trying to memorize each one, you should practice to get a sense of which idioms come up frequently.

5. WORDINESS

As long as there are no new grammar errors introduced, the shortest answer choice is often correct. Redundancy is a type of wordiness where the same thing is said twice such as “happy and joyful.” Keep it simple and to the point.

6. PARALLEL STRUCTURE

Parallelism is tested on the ACT English test in the context of phrases or items in a list. In parallel construction, the phrases or items must be in the same form. This can be tested with a number of parts of speech: nouns, verbs, prepositions, etc.

7. PRONOUNS

The most common error associated with pronouns is pronoun-antecedent agreement. The antecedent is the word the pronoun is replacing. A pronoun must have a clear antecedent in the sentence. Sometimes the antecedent is present, but will disagree with the pronoun in number. A less common error is the ambiguous pronoun in which a pronoun could represent more than one noun. For example, “The president and his adviser spoke for hours before he reached a decision.” The pronoun ‘he’ could be referring to the president or the adviser, so it is incorrect.

8. MODIFIERS: ADJECTIVES/ADVERBS & MODIFYING PHRASES

Modifiers are words and phrases that describe nouns. Adjectives modify nouns, and adverbs modify verbs, adjectives, or other adverbs. Be on the lookout for suspicious adverb-noun and adjective-verb pairings. Also be aware that many sentences will begin with a modifying phrase and a comma. The subject after the comma must be the person or thing doing the action of the modifying phrase.

9. WORD CHOICE: TRANSITIONS & DICTION

Pay attention to transition words and phrases to make sure they reflect the author’s purpose. Transitions can demonstrate continuation, contrast, or cause-and-effect. In addition, the ACT may try to fool you by using words that sounds similar to the intended words, but do not make sense in context (for example, replacing “could have” with “could of”).

10. ORGANIZATION AND STRATEGY

The ACT English section will ask you to determine the order and focus of sentences or paragraphs. You will also be asked about adding, revising, or deleting sentences as well as how a sentence fits with the purpose, audience, and focus of a paragraph or the essay as a whole.

Edna Gellhorn's "Walkless-Talkless Parade"

In 1916, as[1] the Democratic Party's national convention met in St. Louis, Missouri, to nominate candidates for the presidency[2] and vice-presidency and to establish a platform, a set of positions on issues. Therefore, suffragists[3] (those who advocated extending voting rights to women) wanted the Democrats' platform to support women's right to vote.

[1] Edna Gellhorn, a leader in the Missouri Equal Suffrage League, planned a "silent parade" without movement or music or[4] speech. [2] She gathered together 7,000 St. Louis women. [3] Similar forms of demonstrations, known as "walkless-talkless parades," had been[5] adopted by national woman suffrage organizations in Washington, D.C. [4] Gellhorn made telephone calls and wrote letters. [5] They donned yellow sashes over white dresses and held yellow umbrellas aloft as they lined both sides of Locust Street between[6] the convention delegates' hotel and the meeting hall. 7

At the end of the "Golden Lane," as the event was[8] also called,[8] Gellhorn organized a three-tiered "living tableau," which a live scene was[9] presented by silent, costumed participants. Women wearing white represented states where[10] women could vote. Others wore gray to represent states with partial suffrage (women could vote in school board elections, for example). Women draped in black represented states that refused women the vote. This group held out manacled hands to them as a reminder[11] that, without the vote, women were deprived of their freedom.

At the top of the tiers, stood a woman[12] dressed as Lady Liberty.

Edna Gellhorn witnessed a victory that year when votes for women would became[13] part of the 1916 Democratic Party's set of positions, or[14] platform. Then finally in August 1920, after more than seventy years and countless parades, speeches, letters, and calls, the Nineteenth Amendment, to the U.S. Constitution,[15] was ratified, thus giving all women the right to vote.

1 **Choose the best answer.**

A ○ NO CHANGE

B ○ while

C ○ when

D ○ OMIT the underlined portion.

2 **Choose the best answer.**

E ○ NO CHANGE

F ○ for, the presidency

G ○ for the presidency

H ○ for the presidency,

3 **Choose the best answer.**

A ○ NO CHANGE

B ○ Similarly, suffragists

C ○ However, suffragists

D ○ Suffragists

4. Choose the best answer.

E. ○ NO CHANGE

F. ○ movement or music or,

G. ○ movement or, music or,

H. ○ movement: or music or

5. Choose the best answer.

A. ○ NO CHANGE

B. ○ have been

C. ○ having been

D. ○ OMIT the underlined portion

6. Choose the best answer.

E. ○ NO CHANGE

F. ○ among

G. ○ with

H. ○ amid

7. For the sake of the logic and coherence of the paragraph, Sentence 2 should be:

A. ○ placed where it is now.

B. ○ placed after Sentence 3.

C. ○ placed after Sentence 4.

D. ○ OMITTED from the paragraph.

8. The writer is considering revising the preceding part of this sentence ("At the end of the 'Golden Lane,' as the event was also called.") to read as follows:

At the end of the parade,

If the writer did this, the essay would primarily lose:

E. ○ an indication that Edna Gellhorn preferred the term "Golden Lane" to the term "walkless-talkless parade."

F. ○ a possible point of confusion, as the proposed revision eliminates a term that was not explained.

G. ○ another historical detail about the parade described in the preceding paragraph.

H. ○ details that help establish the time and place of the essay.

9. Choose the best answer.

A. ○ NO CHANGE

B. ○ a live scene

C. ○ a live scene was

D. ○ a live scene that

10. Choose the best answer.

E. ○ NO CHANGE

F. ○ in that

G. ○ that

H. ○ OMIT the underlined portion.

11. Choose the best answer.

A ○ NO CHANGE

B ○ the passing delegates to remind the men

C ○ them as a way to remind them

D ○ remind them

12. Choose the best answer.

E ○ NO CHANGE

F ○ tiers stood a woman

G ○ tiers stood a woman.

H ○ tiers stood, a woman

13. Choose the best answer

A ○ NO CHANGE

B ○ had became

C ○ becoming

D ○ became

14. Choose the best answer.

E ○ NO CHANGE

F ○ set of positions, otherwise known as its

G ○ set of positions—its

H ○ OMIT the underlined portion.

15. Choose the best answer.

A ○ NO CHANGE

B ○ Amendment to the U.S. Constitution

C ○ Amendment, to the U.S. Constitution

D ○ Amendment to the U.S. Constitution,

Edna Gellhorn's "Walkless-Talkless Parade"

Answers

1. **The best answer is D** because the other choices insert subordinating conjunctions (*as*,*while*, *when*), which create sentence fragments. This choice offers the only complete sentence.
2. **The best answer is E.** The phrase "for the presidency" is essential to the meaning of this sentence, and no punctuation is needed in the underlined portion.
3. **The best answer is D.** No transitional word is needed here because the sentence introduces information about the suffragists that is not directly linked back to the preceding sentence.
4. **The best answer is E**. The conjunction *or* is used between the items in this series, so no commas are needed.
5. **The best answer is A.** It provides the correct verb tense and is a complete sentence.
6. **The best answer is E** because it provides the appropriate preposition. The word *between*is best here because the comparison is between two things only: the hotel and the meeting hall
7. **The best answer is C.** This question asks the test taker to determine the most logical arrangement for the sentences in this paragraph. The paragraph is arranged in chronological order. Sentence 2 should be placed after Sentence 4 because Gellhorn would have "gathered together 7,000 St. Louis women" *after* she "made telephone calls and wrote letters."
8. **The best answer is G** because the phrase "Golden Lane" is a historical detail that informs the reader that Gellhorn's "silent parade" had been given a special name.
9. **The best answer is B** because it provides an appropriate sentence structure and offers the clearest wording for this sentence. The other choices have faulty structures resulting in unclear and ambiguous statements.
10. **The best answer is E** because it offers the most precise wording for this sentence.
11. **The best answer is B** because it is the only choice that makes it clear that the women "held out manacled hands" to "the passing delegates." In the other choices, the pronoun*them* has no clear referent.
12. **The best answer is F** because no punctuation is necessary, other than the period at the end of the sentence.
13. **The best answer is D.** It provides the appropriate verb form for this sentence.
14. **The best answer is H** because it provides the most concise wording for this sentence. The phrase "set of positions" should be omitted because it is redundant: it means the same as "platform."
15. **The best answer is B.** The phrase "to the U.S. Constitution" is essential to the meaning of the sentence; therefore, no punctuation should appear in the underlined portion.

Vatican City's Wonders

Surrounded by the ancient city of Rome, Vatican City is an independent nation on the west bank of the Tiber River. This tiny country—about one-sixth of a square mile in all—is also home to a disproportionately large number of sites with great historical, artistic, and which have religious significance.

The Vatican Museums house a great many valuable paintings, sculptures, pieces of jewelry, and tapestries as well as the world's most extensive collections of ancient manuscripts. Scholars often probe the museums' archives of early written works for insights into lives led long ago.

Accordingly, St. Peter's Basilica, the largest cathedral in the Northern Hemisphere, is remarkable. Built upon second-century foundations, St. Peter's features a dome designed by the artist and architect Michelangelo. 10 Intricate mosaics—enormous "paintings" fashioned from millions of tiny cut stones of various colors—lining each of the basilica's several smaller domes. The marble floor, with its intricate designs, covers the cathedral's catacombs, where popes are buried. Sculptures by Michelangelo and Bernini, including Michelangelo's poignant *Pietà*, contributes to the basilica's beauty.

However, to many, the most spectacular part of Vatican City is the Sistine Chapel. This vast chapel displays what many consider some of the most important works of Renaissance art: Michelangelo's awe-inspiring frescoes. These frescoes—paintings made on freshly spread, still-moist plaster—capture the attention of viewers with a complex array of religious images. One of his most famous frescoes, *The Last Judgment*, is painted on the west wall. A series of interrelated frescoes covers the vaulted ceiling.

Despite its small size, Vatican City offers its many visitors a chance to see a wide range of historical and artistic wonders. It is easy to understand why the city has become one of the most frequently visited places in the world.

1. **Given that all of the choices are true, which one best supports the sentence's claim about Vatican City's status as an independent nation?**

   A ○ NO CHANGE

   B ○ with an interesting past.

   C ○ with its own government, banking system, postal service, and army.

   D ○ that has to import most of its supplies, even such necessities as food and water.

2. **Choose the best answer.**

   E ○ NO CHANGE

   F ○ approximately about one-sixth of a square mile, all told—

   G ○ a grand total sum of about one-sixth of a square mile —

   H ○ a total of about one-sixth of a square mile when added together

3. **Choose the best answer.**

   A ○ NO CHANGE

   B ○ having

   C ○ as well as

   D ○ OMIT the underlined portion

4. If the writer were to delete the words *tiny* and *disproportionately* from the preceding sentence, the sentence would primarily lose:

   E. ○ elements of the setting of the essay.

   F. ○ a contrast emphasizing the unusual number of sites.

   G. ○ details that stress how important the sites are.

   H. ○ a comparison between Vatican City and Rome.

5. Given that all of the choices are true, which one best emphasizes the extent and worth of the museums' holdings?

   A. ○ NO CHANGE

   B. ○ thousands of invaluable

   C. ○ numerous important

   D. ○ a group of precious

6. Which of the following alternatives to the underlined portion would NOT be acceptable?

   E. ○ In addition to

   F. ○ Besides

   G. ○ Also there is

   H. ○ And also

7. Choose the best answer.

   A. ○ NO CHANGE

   B. ○ grab an eyeful of

   C. ○ check out

   D. ○ ory

8. Choose the best answer.

   E. ○ NO CHANGE

   F. ○ Indeed,

   G. ○ For instance,

   H. ○ OMIT the underlined portion.

9. Choose the best answer.

   A. ○ NO CHANGE

   B. ○ foundations.

   C. ○ foundations:

   D. ○ foundations,

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

    In addition to being an architect and artist, Michelangelo wrote poetry, including more than 300 sonnets.

    Should the writer make this addition here?

    E. ○ Yes, because it provides further details about Michelangelo, who designed the dome at St. Peter's.

    F. ○ Yes, because it reinforces the paragraph's implication that Michelangelo was extremely talented.

    G. ○ No, because it distracts attention from the paragraph's focus, which is on the architecture and visual art of St. Peter's.

    H. ○ No, because it adds more information about Michelangelo, who made only small contributions to Vatican City's art and architecture.

11. Choose the best answer.

A ○ NO CHANGE

B ○ that line

C ○ line

D ○ lines

12. If the writer were to delete the quotation marks around the word *paintings* in the preceding sentence, the sentence would primarily lose a feature that suggests:

E ○ that mosaics are not paintings in the usual sense of the word.

F ○ how large and complicated the mosaics in St. Peter's actually are.

G ○ how carefully mosaics are put together.

H ○ that the mosaics in St. Peter's are not typical of mosaics in general.

13. Choose the best option.

A ○ NO CHANGE

B ○ does contribute

C ○ has contributed

D ○ contribute

14. Which of the following alternatives to the underlined portion would NOT be acceptable?

E ○ Yet,

F ○ Therefore,

G ○ Still,

H ○ Nonetheless,

15. Choose the best answer.

A ○ NO CHANGE

B ○ consider some.

C ○ consider, some.

D ○ consider, some

Vatican City's Wonders

Answers

1. **The best answer is C.** It informs the reader that Vatican City has "its own government, banking system, postal service," which is supporting evidence that Vatican City operates as "an independent nation."
2. **The best answer is E.** It provides the clearest, most concise wording for this parenthetical phrase. The other choices add unnecessary words.
3. **The best answer is D** because it provides a parallel construction for the three adjectives in the series: "*historical*, *artistic*, and *religious* significance."
4. **The best answer is F.** The adjectives *tiny* and *disproportionately* emphasize the contrast between the very small size of Vatican City and the very "large number of sites with great . . . significance."
5. **The best answer is B.** Within the phrase "thousands of invaluable paintings, sculptures, pieces of jewelry, and tapestries," the word *thousands* emphasizes the extent of the museums' collections, and the word *invaluable* emphasizes their worth.
6. **The best answer is G.** This question asks the test taker to find the word or phrase that would NOT be an acceptable replacement for the underlined portion. This choice is unacceptable because inserting the phrase "also there is" would create a run-on sentence with an awkward structure.
7. **The best answer is A** because it provides the most precise word choice for this sentence. The verb *probe* is best in this context because it suggests that the scholars were examining the museums' archives closely.
8. **The best answer is H.** No transitional word is needed here because this paragraph focuses on a completely different topic, St. Peter's Basilica, than the preceding paragraph does.
9. **The best answer is B.** A comma is the best punctuation because it separates the introductory clause from the main clause of the sentence.
10. **The best answer is G.** The proposed sentence interrupts the logical flow of the paragraph because the main focus is St. Peter's Basilica and not the accomplishments of Michelangelo. The artist is mentioned in the paragraph only because some of his work is featured in St. Peter's Basilica.
11. **The best answer is C.** It creates a complete sentence and has subject-verb agreement.
12. **The best answer is E.** This question essentially asks the test taker to determine why the writer most likely used quotation marks around the word *paintings*. These "paintings" refer to the intricate mosaics that line some of the basilica's dome, so they are not actual paintings. By using quotation marks, the writer signals the reader that the mosaics resemble paintings.
13. **The best answer is D** because the subject and verb in this sentence agree.
14. **The best answer is F.** This question asks the test taker to find the word that would NOT be an acceptable replacement for the underlined portion. The introductory word *Therefore*is unacceptable because it incorrectly suggests a cause-effect relationship between the information in this sentence and the information in the last sentence of the preceding paragraph.
15. **The best answer is A.** No punctuation is needed here. The other choices add unnecessary and potentially confusing commas.

ACT Math

• ACT MATH TIP #10: APPROACH EVERY ACT MATH QUESTION WITH THE SAME METHOD

1) Read the question

2) Look at the information provided in the question and the answer choices

3) Solve:

- Backsolve
- Pick Numbers
- Use Traditional Math
- Strategically Guess

4) Check to make sure that you answered the specific question that was asked.

• ACT MATH TIP #9: PICK NUMBERS TO AVOID COMPLICATED ALGEBRA ON THE ACT

Avoid using algebra by picking numbers for variables. Arithmetic is almost always easier than algebra! Picking numbers is especially helpful for number properties questions. Pick numbers that follow the rules of the question and are small and easy to work with. Avoid picking 0 or 1 because they have special properties.

• ACT MATH TIP #8: BACKSOLVE TO SAVE TIME

You can backsolve when you see integers in the answer choices. The answer choices are arranged in numeric order, so start with answer choice C/H unless the question asks for the smallest or largest value. Let the answer choices work for you.

• ACT MATH TIP #7: TRANSLATE WORDS INTO MATH

Translate the words in the question into math so that you can solve more easily. Take it one word or phrase at a time. Remember that "of" means to multiply.

• ACT MATH TIP #6: KNOW YOUR PROPERTIES

Recognizing number properties will save you time on test day. Number properties rules include odds and evens, prime numbers, and the order of operations. You can pick numbers to help you remember the rules.

• ACT MATH TIP #5: UNDERSTAND MATH RELATIONSHIPS

Know the difference between values, ratios, and percents. A ratio is a relationship between numbers. Make sure you're able to move easily between percents, fractions, and decimals.

• ACT MATH TIP #4: KNOW YOUR TRIANGLES

You must know the 30-60-90 and 45-45-90 rules. The ACT does not provide this information at the beginning of the math section like the SAT does, so be sure to memorize this information ahead of time. Also look out for Pythagorean triplets (3:4:5 and 5:12:13 and their multiples); these will save you time on Test Day!

- **ACT MATH TIP #3: FIND COMMON SHAPES**

Find common shapes on the ACT to help you break complex figures into simple polygons. Look in particular for triangles; they're full of valuable information.

- **ACT MATH TIP #2: RECOGNIZE RED FLAGS**

Be on the lookout for common trap answers on the ACT. Watch out for answers to steps along the way to the final answer. Be careful with negative signs!

- **ACT MATH TIP #1: MAKE SURE YOUR CALCULATOR IS ALLOWED ON TEST DAY**

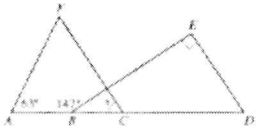
Check the official ACT website to make sure the calculator you plan to use on the ACT math section is allowed.

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

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

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

1. In the figure below, A, B, C, and D are collinear, $\overline{FC}$ is parallel to $\overline{ED}$, $\overline{BE}$ is perpendicular to $\overline{ED}$, and the measures of $\angle FAB$ and $\angle EBA$ are as marked. What is the measure of $\angle FCB$?



A ○ 33°

B ○ 57°

C ○ 63°

D ○ 84°

E ○ Cannot be determined from the given information

2. Which of the following is an equation of the circle with its center at (0,0) that passes through (3,4) in the standard (x,y) coordinate plane?

F ○ $x + y = 1$

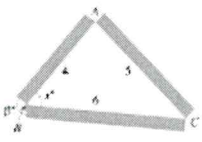
G ○ $x + y = 25$

H ○ $x^2 + y = 25$

I ○ $x^2 + y^2 = 5$

J ○ $x^2 + y^2 = 25$

Use the following information to answer questions 3–5. Taher has decided to create a triangular flower bed border. He plans to use 3 pieces of rectangular lumber with lengths 4, 5, and 6 feet, as shown in the figure below. Points A, B, and C are located at the corners of the flower bed.



3. Taher plans to cut the 3 pieces of lumber for the flower bed border from a single piece of lumber. Each cut takes $\frac{1}{8}$ inch of wood off the length of the piece of lumber. Among the following lengths, in inches, of pieces of lumber, which is the shortest piece that he can use to cut the pieces for the flower bed border?

A ○ 178

B ○ 179

C ○ 180

D ○ 181

E ○ 182

4. The measure of $\angle ABC$ in the figure is $x°$. Which of the following is an expression for $\beta°$?

F ○ $x°$

G ○ $2x°$

H ○ $(90 + x)°$

I ○ $(180 - x)°$

J ○ $(180 - \frac{1}{2})°$

5. After arranging the flower bed, Taher decides that the flower bed would look more attractive if 1 of the angles in the triangle were a right angle. He decides to place the right angle at vertex A and to leave the lengths of $\overline{AB}$ and $\overline{AC}$ as 4 and 5 feet, respectively. To the nearest 0.1 foot, how long of a piece of lumber would he need to replace the 6-foot piece represented by $\overline{BC}$?

A ○ 3.0

B ○ 3.3

C ○ 6.0

D ○ 6.4

E ○ 7.8

6. Which one of the following expressions has an even integer value for all integers a and c ?

F ○ $8a + 2ac$

G ○ $3a + 3c$

H ○ $2a + c$

I ○ $a + 2c$

J ○ $ac + a^2$

7. A neighborhood recreation program serves a total of 280 children who are either 11 years old or 12 years old. The sum of the children's ages is 3,238 years. How many 11-year-old children does the recreation program serve?

A. 55

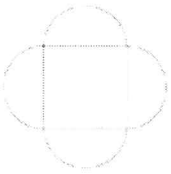
B. 122

C. 132

D. 158

E. 208

8. The geometric figure shown below consists of a square and 4 semicircles. The diameters of the semicircles are the sides of the square, and each diameter is 10 centimeters long. Which of the following is the closest approximation of the total area, in square centimeters, of this geometric figure?



F. 100

G. 160

H. 260

I. 400

J. 730

9. Which of the following expressions is the closest approximation to the height h, in feet, of the roof truss shown below?

A. 15 tan 20°

B. 15 sin 20°

C. 30 tan 20°

D. 30 sin 20°

E. $\frac{15}{\sin 20°}$

10. Quadrilateral $ABCD$ is drawn on the standard (x,y) coordinate plane as shown below, with points E and F on $\overline{AD}$. Point G is the center of rectangle $BCEF$. How many coordinate units long is $\overline{AG}$?

F. $\sqrt{10}$

G. $\sqrt{11}$

H. $\sqrt{85}$

I. $\sqrt{97}$

J. 11

11. What is the x-intercept of the graph of $y = x^2 - 4x + 4$?

A. −2

B. −1

C. 0

D. 1

E. 2

12. For all nonzero real numbers p, t, x, and y such that $\frac{t}{y} = \frac{3p}{2t}$, which of the following expressions is equivalent to t?

F. $\frac{y}{2}$

G. $\frac{3xy}{2y}$

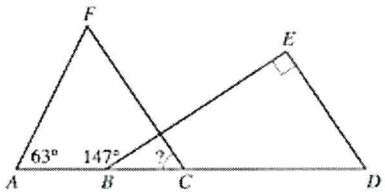
H. $\frac{6xy}{x}$

I. $\frac{3xy}{x}$

J. $\frac{3xy}{2x}$

Math Set 4 Answers

1. B is the correct answer. Since *FC* and *ED*are two parallel line segments cut by transversal *BE*, □*E* and □*BGC* are corresponding angles. So, the measure of □*BGC* is 90°. Since □*ABG* □*GBC* are supplementary angles, the measure of □*GBC* = 180° – 147° = 33°. Looking at Δ*BGC*, the sum of the measures of angles □*GCB*, □*BGC*, and □*GBC* is 180°. So, the measure of □*GCB* + 90° + 33° = 180°, or 180° – 90° – 33° = 57°.



2.The correct answer is K. The radius of the circle is the distance between (0,0) and (3,4), which is $\sqrt{((3-0)^2+(4-0)^2)} = 5$. An equation of a circle where (h,k) is the center and r is the radius is $(x-h)^2 + (y-k)^2 = r^2$. So $(x-0)^2 + (y-0)^2 = 5^2$ or $x^2 + y^2 = 25$.

3. D is the correct answers. The number of inches of wood needed if there were no cuts is 4 + 5 + 6 = 15 feet, or 180 inches. However, you need to add 2(< $\frac{1}{8}$) for 2 cuts that are needed so that you have lumber for each of the 3 sides. Since 180 + 2($\frac{1}{8}$) = 180 + $\frac{1}{4}$, the minimum piece needed to construct the flower bed border including the 2 cuts would be 181 inches.

4. I is correct. The angles of the rectangular pieces of lumber measure 90°, so the sum of the measure of the angles at β is 360°. β + 90 + *x* + 90 = 360, or β = 180 – *x*.

5. 6.4 is the correct answer. Using the Pythagorean theorem, $4^2 + 5^2 = (BC)^2$. Then $BC = \sqrt{(4^2 + 5^2)} = \sqrt{41} \approx 6.4$.

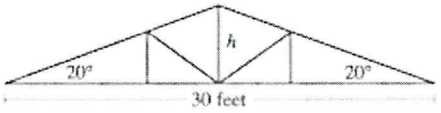
6. The correct response is F. 8*a* + 2*ac* is even because it is divisible by 2, 8*a* + 2*ac* = 2(4*a*+ *ac*), and 4*a* + *ac* is an integer because *a* and *c* are integers.

7. B is the correct answer. You correctly found the number of 11-year-olds to be 122. If you let *e* = number of 11-year-olds and *t* = number of 12-year-olds, then you can solve the system *e* + *t* = 280 and 11*e* + 12*t* = 3,238. Substitution, elimination, and matrices are just some of the methods you could use to solve the system. Just remember, in the end, you want to solve for *e*.

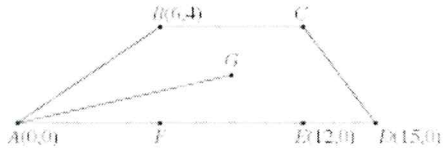
8. The correct answer is H. You found the area of the square, the area of 4 semicircles (or the area of 2 full circles), and added

them. $10^2 + 2 \quad (5)^2$ 257. The closest answer is 260.

9. A is the correct response. *YZ* = $\frac{1}{2}$ *XZ* = $\frac{1}{2}$ 30) = 15. So, tan 20° = $\frac{h}{YZ} = \frac{h}{15}$. Then *h* = 15 tan 20°.



10. H is the correct answer. By drawing in rectangle *BCEF* and diagonal *BE*, you can find the coordinates of *G* by finding the midpoint of *BE*. So *G* is at $\left(\frac{6+12}{2}, \frac{4+0}{2}\right)$, or (9,2). Using the distance formula, $AG = \sqrt{((9-0)^2 + (2-0)^2)} = \sqrt{(81+4)} = \sqrt{85}$.



11. 2 is the *x*-intercept. One way to find the *x*-intercept is to replace *y* with 0 and solve for *x*. If $0 = x^2 - 4x + 4$, then $(x-2)^2 = 0$, and *x* = 2. Another way of doing this problem is to look at the graph of the equation and see where the graph crosses the *x*-axis.

12. J is the correct answer. If you cross multiply, 2*xt* = 3*py*. Then dividing each side by 2*x*, you get *t* = $\frac{3py}{2x}$.

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

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

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

1. Ms. Hernandez began her math class by saying:

> I'm thinking of 5 numbers such that their mean is equal to their median. If 4 of the numbers are 14, 8, 16, and 14, what is the 5th number?

What is the 5th number Ms. Hernandez is thinking of?

A ○ 13

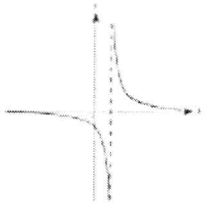
B ○ 14

C ○ 15

D ○ 16

E ○ 18

2. The graph of a certain hyperbola, $y = h(x)$, is shown in the standard (x,y) coordinate plane below.

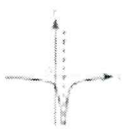


Among the following graphs, which best represents $y = -h(x)$?

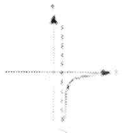
F ○

G ○

H ○



I ○



J ○

3. In the figure below, $\angle H \cong \angle F$; E, G, and I are collinear; and G is the midpoint of $\overline{FH}$

To prove that $\overline{HI} \cong \overline{FE}$ given the conditions stated above, which of the following is a logical order for the 5 steps in the table below?

Statement	Reason
1. $\overline{HG} \cong \overline{FG}$	The midpoint of a line segment divides the segment into 2 congruent segments
2. $\angle EGF \cong \angle IGH$	Vertical angles are congruent
3. $\Delta GHI \cong \Delta GFE$	Angle-side-angle congruence theorem
4. $\angle EGF$ and $\angle IGH$ are vertical angles	Definition of vertical angles
5. $\overline{HI} \cong \overline{FE}$	Corresponding parts of congruent triangles are congruent

A ○ 1, 2, 3, 4, 5

B ○ 1, 2, 3, 5, 4

C ○ 1, 2, 4, 3, 5

D ○ 1, 4, 2, 3, 5

E ○ 1, 5, 4, 2, 3

4. Each of the variables t, w, x, y, and z represents a different *positive* real number. Given the equations below, which of the 4 variables w, x, y, and z necessarily has the greatest value?

$1.23w = t$
$1.01x = t$
$0.99y = t$
$0.23z = t$

F ○ w

G ○ x

H ○ y

I ○ z

J ○ Cannot be determined from the given information

5. Which of the following is equivalent to $\frac{5}{x} - \frac{x-3}{x+5}$?

A ○ $\frac{x+5}{2x+5}$

B ○ $\frac{x-8}{x(x+5)}$

C ○ $\frac{5(x+3)}{x(x+5)}$

D ○ $\frac{8x+38}{x^2+25}$

E ○ $\frac{x^2+8x-25}{x(x+5)}$

6. In the 2 × 2 matrix below, b_1 and b_2 are the costs per pound of bok choy (Chinese greens) at Market 1 and Market 2, respectively; r_1 and r_2 are the costs per pound of rice flour at these 2 markets, respectively. In the following matrix product, what does q represent?

$$\begin{bmatrix} b_1 & r_1 \\ b_2 & r_2 \end{bmatrix} \begin{bmatrix} p \\ q \end{bmatrix}$$

F ○ The cost of r_1 pounds of rice flour at $0.50 per pound

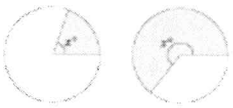
G ○ The cost of a half-pound of rice flour at Market 1

H ○ The total cost of a half-pound of bok choy and a half-pound of rice flour at Market 1

I ○ The total cost of a half-pound of bok choy and a half-pound of rice flour at Market 2

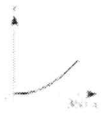
J ○ The total cost of a half-pound of rice flour at Market 1 and a half-pound of rice flour at Market 2

7. The 2 diagrams below show a circle of radius 1 inch with shaded sectors of angle $x°$, for 2 different values of x.



One of the following is the graph in the standard (x,y) coordinate plane of the area, y, of a shaded sector with angle $x°$, for all values of x between 0 and 360. Which is that graph?

A ○ 

B ○ 

C ○ 

D ○ 

E ○ 

8. If $h(x) = x^2 - x$ and $g(x) = 2x - 3$, then $g(h(2)) = ?$

F ○ 7

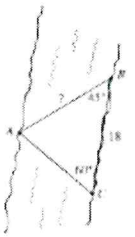
G ○ 10

H ○ 17

I ○ 19

J ○ 23

9. In the figure below, points A and B are on opposite banks of a small stream. Point C is on the same bank of the stream as point B and approximately 18 meters from B. The measure of $\angle CBA$ is 45°, and the measure of $\angle BCA$ is 60°.



Which of the following expressions gives the approximate distance, in meters, between point A and point B (Note: For ΔPQR, where p, q, and r are the lengths of the sides opposite $\angle P$, $\angle Q$, and $\angle R$, respectively, $\frac{\sin \angle P}{p} = \frac{\sin \angle Q}{q} = \frac{\sin \angle R}{r}$.)

A ○ $\frac{\sin 60°}{18 \sin 45°}$

B ○ $\frac{\sin 60°}{18 \sin 75°}$

C ○ $\frac{18 \sin 45°}{\sin 60°}$

D ○ $\frac{18 \sin 60°}{\sin 45°}$

E ○ $\frac{18 \sin 60°}{\sin 75°}$

10. Each side of the smaller square in the figure below is x inches long, and each side of the larger square is c inches longer than a side of the smaller square. The area of the larger square is how many square inches greater than the area of the smaller square?

F ○ c^2

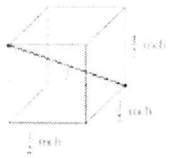
G ○ xc

H ○ $4c$

I ○ $(x + c)^2$

J ○ $2xc + c^2$

11. A cube with edges ½ inch long is shown below. What is the length, in inches, of a diagonal that runs from one corner of the cube to the opposite corner?



A ○ $\frac{1}{4}$

B ○ $\frac{3}{4}$

C ○ $\frac{3}{2}$

D ○ $\frac{\sqrt{2}}{2}$

E ○ $\frac{\sqrt{3}}{2}$

12. Which of the following is equivalent to $\sin\theta \csc(-\theta)$ wherever $\sin\theta \csc(-\theta)$ is defined?

F ○ -1

G ○ 1

H ○ $-\tan\theta$

I ○ $\tan\theta$

J ○ $-\sin^2\theta$

ACT Math Set 5 Answers

1. The correct answer is E. Since there will be an odd number of terms, the median will have to be the middle number. Write out the numbers in the original set in numerical order. You will see no matter where you place the 5th term, the median will be 14. Ms. Hernandez said that the mean is equal to the median, so the mean is also going to be 14. If x = the 5th number, then the mean is 14 = $\frac{14+8+16+14+x}{5}$. So, $14(5) = 52 + x$, or $x = 18$.

2. F is correct. This is the correct answer. $y = -h(x)$ is an equation for the original graph reflected across the x-axis.

3. D is the correct answer. If you selected D, you realize that you need to show that 2 pairs of angles and the included sides are congruent. Once this is done, you can claim that the triangles are congruent by ASA (angle-side-angle congruence). After that, you can say $HI \cong FE$ because corresponding parts of congruent triangles are congruent.

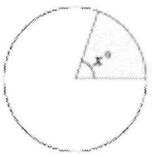
4. J is the correct answer. If you solve each of the equations in terms of t, you get $w = \frac{t}{1.23} \approx 0.81t$; $x = \frac{t}{1.01} \approx 0.99t$; $y = \frac{t}{0.99} \approx 1.01t$; and $z = \frac{t}{0.23} \approx 4.35t$. Since the value of t is fixed, $4.35t$ will give the largest number, so z will have the largest value.

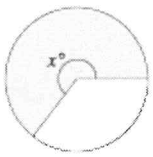
5. The correct response is E. To add fractions, you need a common denominator. In this problem, $k(k + 5)$ can be used as the common denominator. Then you need to convert each fraction to an equivalent fraction with the common denominator: $\frac{5(k+5)}{k(k+5)}$ and $\frac{k+3}{k+5} = \frac{k(k+3)}{k(k+5)}$.

So, $\frac{5(k+5)}{k(k+5)} + \frac{k(k+3)}{k(k+5)} = \frac{5k+25+k^2+3k}{k(k+5)} = \frac{k^2+8k+25}{k(k+5)}$.

6. This is the correct answer. Using matrix multiplication here: $[0.5\ 0.5] * \begin{bmatrix} b_1 & r_1 \\ b_2 & r_2 \end{bmatrix} = [0.5b_1 + 0.5b_2\ 0.5r_1 + 0.5r_2] = [p\ q]$. Setting corresponding entries equal, $0.5r_1 + 0.5r_2 = q$. Since $0.5r_1 + 0.5r_2$ is the cost for a half pound of rice flour at Market 1 and a half pound of rice flour at Market 2, K is the correct response.

7. The correct answer is A. The area of the sector of a circle with radius r is $\frac{x}{360}\ \pi\ r^2$. With $r = 1$, $\frac{x}{360}\ \pi\ (1^2) = \frac{x}{360}\ \pi = \frac{\pi}{360}x$. This is a linear function with positive slope since $\frac{x}{360} \approx 0.002777x > 0$. This means that the function will graph as a line.



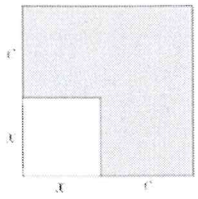


8. The correct answer is 23. $h(2) = 2^3 + 2 = 10$. Then $g(h(2)) = g(10) = 2(10) + 3 = 23$.

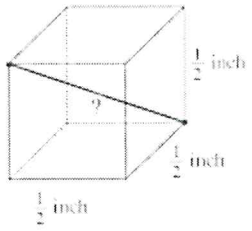
9. E is the correct answer. You first need to find the measure of $\angle A = 180° - 60° - 45° = 75°$. Then $\frac{\sin 75°}{18} = \frac{\sin 60°}{AB}$. So, $AB = \frac{18 \sin 60°}{\sin 75°}$.

Set 5 Answers continued…

10. $2xc + c^2$ is correct. You need to subtract the area of the smaller square from the area of the larger square. The area of the larger square is $(x + c)^2$ and the area of the smaller square is x^2. So $(x + c)^2 - x^2 = x^2 + 2xc + c^2 - x^2 = 2xc + c^2$.



11.



The correct response is E since $\frac{\sqrt{3}}{2}$ is the length of the diagonal that runs from one corner of the cube to the opposite corner. $(PR)^2 = (PS)^2 + (SR)^2 = (\frac{1}{2})^2 + (\frac{1}{2})^2$. $(XR)^2 = (PR)^2 + (XP)^2 = (\frac{1}{2})^2 + (\frac{1}{2})^2 + (\frac{1}{2})^2 = \frac{3}{4}$. Since $(XR)^2 = \frac{3}{4}$; $XR = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$.

12. –1 is the correct answer. $\csc(-\theta) = -\csc\theta = -\frac{1}{\sin\theta}$. So, $\sin\theta \csc(-\theta) = \sin\theta(-\frac{1}{\sin\theta}) = -1$.

ACT Science

10 MUST-KNOW ACT SCIENCE TIPS

On Test Day, the ACT Science Test will always be the fourth test you'll take. It will have 6-7 passages with 5-8 questions each; you'll have 35 minutes to complete them.

ACT SCIENCE TIP #10: KNOW THE ACT SCIENCE PASSAGE TYPES

Research Summary *(3 of this type): presents a series of experiments*
Data Representation *(2 of this type): presents information about a topic*
Conflicting Viewpoints *(1 of this type): discusses multiple theories about a single topic*

ACT SCIENCE TIP #9: ADOPT A STRATEGY FOR EACH OF THE 3 FORMATS

ACT Science Test passages come in three forms: ***Data Representation, Conflicting Viewpoints,*** *and* ***Research Summaries****. You will need to modify your approach slightly for each one.*

Data Representation focuses mostly on charts, graphs, and tables, so you will need to practice identifying variables, units, and trends. The Conflicting Viewpoints passage typically has no diagrams and is more like the paired passage you will encounter on the Reading Test. Research Summaries describe one or more experiments. You will need to understand the Purpose, Method, and Results for each experiment and know what the similarities and differences are between them.

Don't treat these 3 formats all the same; they are each quite unique.

ACT SCIENCE TIP #8: MARK UP THE PASSAGE

As you are reading, do not hesitate to underline, circle, and make small notes in your test booklet. This type of note-taking is an efficient way to help you stay focused and on target with your pacing. Noting similarities and differences between multiple experiments will help you when it comes time to deal with the questions.

ACT SCIENCE TIP #7: KNOW THE ACT SCIENCE QUESTION TYPES

Interpretation of Data *— examine tables & graphs*
Evaluation of Models, Inferences, and Experimental Results *— make judgments about theories, data, and other scientific information*
Scientific Investigation *— understand the reasons behind an experimental setup*

ACT SCIENCE TIP #6: PRACTICE YOUR TIMING

Don't wait until two weeks before your test to get started. You will only have about 5 minutes per passage, so you may want to start by only doing 5 passages, allotting 7 min per passage.
Once you can confidently do 5 passages with reasonable accuracy, work your way up

to 6 and then 7. If you have a limited time to study and your accuracy significantly drops after 5 passages, just stick to 5 on Test Day. Better to do 5 really well and use your "Letter of the Day" on the last one than to do all of them haphazardly.

ACT SCIENCE TIP #5: ALWAYS REFER BACK TO THE PASSAGE

You won't be able to memorize the information presented in the passages; it's too overwhelming. Read the passages to understand the gist and the data that is presented, but also move back to the passage to locate the information you need to answer the questions. Memory alone will not suffice. You may find it helpful to jot down a few short notes on each passage. Drawing arrows and circling important info is also a great idea. Specifically, circle detail words in the question stem, such as "NOT," "Experiment 1," or "Table 1."

ACT SCIENCE TIP #4: TRENDS CONTINUE

When asked about a data point that is not explicitly shown on a table or graph, you can assume that the trends presented in the passage will continue. Use this to extend the line or to estimate the value of the new point. Don't be afraid to draw in your test booklet!

ACT SCIENCE TIP #3: KNOW COMMONLY-USED TERMS

***Independent variable**: the variable that scientists change on purpose*
***Dependent variable(s)**: the variable(s) that the scientists are measuring*
***Constants**: parts of the experiment that the scientists keep the same*
***Direct relationship**: As the independent variable increases or decreases, the dependent variable does the same*
***Indirect relationship**: As the independent variable increases or decreases, the dependent variable does the opposite*

ACT SCIENCE TIP #2: HAVE AN OVERALL EXAM STRATEGY

When tackling the ACT science section, ask yourself:

What did the scientists study and how did they do so?
Why is the experiment set up this way?
What is measured? What is controlled by the scientists?
What did the scientists find? What are the patterns?
What are the similarities? What are the differences?

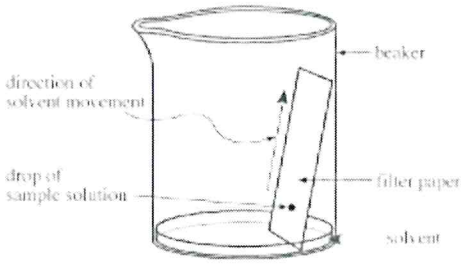
ACT SCIENCE TIP #1: MASTER YOUR TIMING

Set a timer the next time you work on an ACT Science practice test, and see if you can stick to these checkpoints. This is the ideal timing for the actual exam:

:00 … Set the clock and begin!
:06….Finish gridding in the answers for Passage
:12….Finish gridding in the answers for Passage 2

Passage V

Paper chromatography can be used to identify metal ions in wastewater. A drop of sample solution is placed on filter paper. The bottom of the paper is set in a solvent that travels up the paper (see Figure 1).



The solvent carries the ions up the paper. Some ions move faster, and therefore farther than others, resulting in a separation as they move up the paper. The paper is dried, then stained, causing the ions to appear as colored spots. *Rf values* are calculated for each spot:

$$R_f = \frac{\text{total linear distance traveled by ion}}{\text{total linear distance traveled by solvent}}$$

Table 1 shows Rf values for 5 ions. Table 2 shows Rf values from 3 samples of wastewater. The same solvent was used for all ions and samples.

Table 1

Ion	Molar mass (g/mole)	Distance traveled (cm)	Rf	Spot color
Nickel(Ni^{2+})	58.7	0.8	0.08	pink
Cobalt(Co^{2+})	58.9	3.5	0.35	brown-black
Copper(Cu^{2+})	63.5	6.0	0.60	blue
Cadmium(Cd^{2+})	112.4	7.8	0.78	yellow
Mercury(Hg^{2+})	200.6	9.5	0.95	brown-black

Table 1 adapted from Thomas McCullough, CSC, and Marissa Curlee, "Qualitative Analysis of Cations Using Paper Chromatography." ©1993 by the American Chemical Society.

Table 2

Sample	Rf	Spot color
1	0.60	blue
	0.78	yellow
2	0.35	brown-black
	0.95	brown-black
3	0.08	pink
	0.78	yellow
	0.95	brown-black

Note: Samples contain only the metal ions listed in Table 1.

1. The information in Tables 1 and 2 supports the conclusion that Sample 3 contains:

   A ○ Cu^{2+} and Cd^{2+} only.

   B ○ Co^{2+} and Hg^{2+} only.

   C ○ Ni^{2+}, Co^{2+}, and Cd^{2+} only.

   D ○ Ni^{2+}, Cd^{2+}, and Hg^{2+} only.

2. Based on the information in Tables 1 and 2, one can conclude that Sample 2 contains:

   E ○ 1 metal ion only.

   F ○ 2 metal ions only.

   G ○ either 1 or 2 metal ions.

   H ○ more than 2 metal ions.

3. Based on the information in Table 1, which of the following lists the metal ions in order from the fastest to slowest speed with which they moved up the paper?

   A ○ Hg^{2+}, Cd^{2+}, Cu^{2+}, Co^{2+}, Ni^{2+}

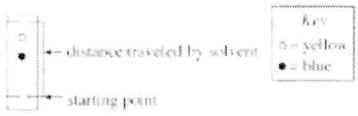
   B ○ Cd^{2+}, Cu^{2+}, Co^{2+}, Hg^{2+}, Ni^{2+}

   C ○ Ni^{2+}, Hg^{2+}, Co^{2+}, Cu^{2+}, Cd^{2+}

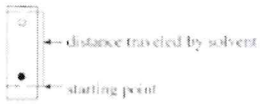
   D ○ Ni^{2+}, Co^{2+}, Cu^{2+}, Cd^{2+}, Hg^{2+}

4. Based on the information in Table 2, which of the following figures best illustrates the appearance of the filter paper after Sample 1 was analyzed?

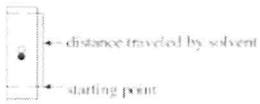
E ○



F ○



G ○



H ○

5. Based on the information in Table 1, to best identify a metal ion using paper chromatography, one should know the:

A ○ spot color for the ion only.

B ○ distance the solvent traveled only.

C ○ Rf value and spot color for the ion only.

D ○ distance the solvent traveled and spot color of the ion only.

Science Passage V

Answers

1. D is the best answer. Sample 3 had 3 colored spots: a pink spot with an $R_f = 0.08$, a yellow spot with an $R_f = 0.78$, and a brown-black spot with an $R_f = 0.95$. These 3 spots correspond with 3 spots from Table 1: the pink spot with an $R_f = 0.08$ for Ni^{2+}, the yellow spot with an $R_f = 0.78$ for Cd^{2+}, and the brown-black spot with an $R_f = 0.95$ for Hg^{2+}. So Sample 3 contains Ni^{2+}, Cd^{2+}, and Hg^{2+}.

2. F is the best answer. Sample 2 had 2 colored spots: a brown-black spot with an $R_f = 0.35$ and a brown-black spot with an $R_f = 0.95$. These 2 spots correspond with 2 spots from Table 1: the brown-black spot with an $R_f = 0.35$ for Co^{2+} and the brown-black spot with an $R_f = 0.95$ for Hg^{2+}. Co^{2+} and Hg^{2+} are metal ions, so Sample 2 contains 2 metal ions.

3. A is the best answer. As the R_f value increased, the speed that an ion moved up the paper also increased. Hg^{2+} had the largest R_f, so Hg^{2+} traveled the fastest. Cd^{2+} had the second largest R_f, so Cd^{2+} traveled the second fastest. Cu^{2+} was the third fastest. $Co^{2+}$was the fourth fastest. Ni^{2+} was the slowest of the 5 ions.

4.E is the best answer. According to Table 2, Sample 1 had a blue spot and a yellow spot. Based on the formula, the blue spot traveled a distance of (0.60) × (distance traveled by the solvent) and the yellow spot traveled a distance of (0.78) × (distance traveled by the solvent). This figure shows the correct location of both spots.

5. C is the best answer. Spot color can be used to restrict the range of options used to identify a metal ion. However, some metals, such as cobalt and mercury, have the same spot color (brown-black). To determine the identity of a brown-black spot, one also needs to know the R_f of the spot.

Passage IV

Spent fuel (SF), a radioactive waste, is often buried underground in canisters for disposal. As it decays, SF generates high heat and raises the temperature of the surrounding rock, which may expand and crack, allowing radioactivity to escape into the environment. Scientists wanted to determine which of 4 rock types—rock salt, granite, basalt, or shale—would be least affected by the heat from SF. The thermal conductivity (how well heat is conducted through a material) and heating trends of the 4 rock types were studied.

Study 1

Fifty holes, each 0.5 m across and 20 m deep, were dug into each of the following: a rock salt deposit, granite bedrock, basalt bedrock, and shale bedrock. A stainless steel canister containing 0.4 metric tons of SF was buried in each hole. The rock temperature was measured next to each canister after 1 year had passed. The results are shown in Table 1, along with the typical thermal conductivity of each rock type, in Watts per meter per °C (W/m·°C), at 25°C. The higher the thermal conductivity, the more quickly heat is conducted through the rock and away from the canisters.

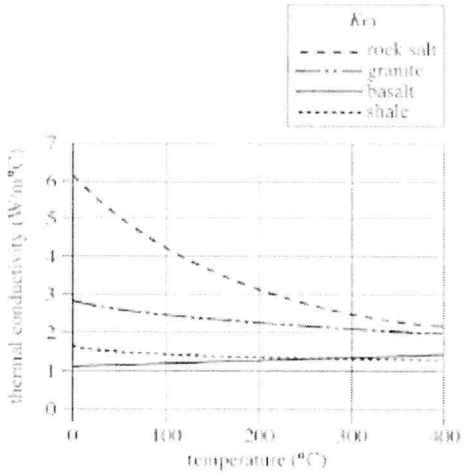
Table 1

Rock	Thermal conductivity (W/m·°C)	Rock temperature (°C)*
Rock salt	5.70	110
Granite	2.80	121
Basalt	1.26	165
Shale	1.57	146

*All rock types had an initial temperature of 10 °C.

Study 2

The scientists determined the thermal conductivity of the 4 rock types at a number of different temperatures between 0°C and 400°C. The results are shown in Figure 1.



Study 3

The scientists calculated the temperature increase that would be expected over a period of 100,000 yr in each rock type at a point within a site holding buried SF. The results are shown in Figure 2.

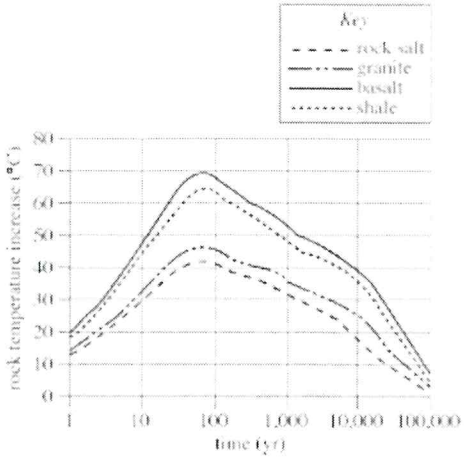


Table and figures adapted from J. S. Y. Wang, D. C. Mangold, and C. F. Tsang, "Thermal Impact of Waste Emplacement and Surface Cooling Associated with Geologic Disposal of High-Level Nuclear Waste." ©1988 by Springer-Verlag New York Inc.

1 According to Study 2, the thermal conductivity of rock salt measured at a temperature of 500°C would be closest to which of the following values?

A ○ 1.0 W/m°C

B ○ 2.0 W/m°C

C ○ 3.5 W/m°C

D ○ 4.0 W/m°C

2 According to Study 3, if another set of temperatures had been calculated for a time 1,000,000 years in the future, the calculated temperature increase in any of the 4 rock types would most likely be closest to:

E ○ 0°C

F ○ 10°C

G ○ 20°C

H ○ 30°C

3 *Welded tuff* (another rock type) has a thermal conductivity of 1.8 W/m°C at 25°C. If measurements of the temperature of this rock type adjacent to SF canisters were taken as in Study 1, the recorded temperature would be closest to:

A ○ 100°C

B ○ 110°C

C ○ 120°C

D ○ 130°C

4 According to the results of Study 1, which of the following best describes the relationship between thermal conductivity and rock temperature? As thermal conductivity increases, the rock temperature recorded adjacent to buried SF canisters:

E ○ decreases only.

F ○ increases only.

G ○ increases, then decreases.

H ○ remains the same.

5 Based only on the information provided, which of the following rock types would be the safest in which to bury SF?

A ○ Rock salt

B ○ Granite

C ○ Basalt

D ○ Shale

6 Which of the following procedures, in addition to Studies 1, 2, and 3, would best test whether the amount of heat generated by SF is related to the mass of the SF?

E ○ Following the design of Study 1 but using concrete canisters containing 0.4 metric tons of SF.

F ○ Following the design of Study 1 but using stainless steel canisters containing 0.5 metric tons of SF.

G ○ Following the design of Study 2 but determining the thermal conductivities of twice as much of each rock type.

H ○ Following the design of Study 3 but determining the rock temperatures 0.5 km from the sites of SF burial.

Science Passage IV

Answers

1. **B is the best answer.** In Study 2, as temperature increased from 0°C to 400°C, thermal conductivity of rock salt decreased from about 6.1 W/m°C to about 2.2 W/m°C. In addition, the rate of the decrease slowed as temperature increased. For example, as temperature increased from 300°C to 400°C, thermal conductivity decreased by about 0.4 W/m°C (from about 2.6 W/m°C to about 2.2 W/m°C). Based on this trend, thermal conductivity at 500°C would be about 0.2 W/m°C less than the thermal conductivity at 400°C (2.2 W/m°C). So, the best estimate is 2.0 W/m°C.
2. **E is the best answer.** In Figure 2, each curve represents 1 of the 4 rock types. Each curve starts to decrease after about 70 yr. To determine the rock temperature increase (°C) at 1,000,000 yr, extrapolate each curve. Because the x-axis is a semi-log scale, the distance along the x-axis between 10,000 yr and 100,000 yr will equal the distance along the x-axis between 100,000 yr and 1,000,000 yr. So, when time is 1,000,000 yr, each of the curves will be at 0°C.
3. **D is the best answer.** Table 1 shows how the recorded rock temperature varied with thermal conductivity. Granite has a thermal conductivity of 2.80 W/m°C and it had a temperature of 121°C. Shale has a thermal conductivity of 1.57 W/m°C and it had a temperature of 146°C. Since welded tuff has a thermal conductivity (1.8 W/m°C) between the thermal conductivities of granite and shale, welded tuff will have a temperature between the temperatures observed for granite and shale: 121°C and 146°C. 130°C falls between these 2 values.
4. **E is the best answer.** Table 1 shows how the recorded rock temperature varied with thermal conductivity. Higher thermal conductivities are associated with lower rock temperatures. For example, the rock type with the lowest thermal conductivity (basalt) had the highest rock temperature, and the rock type with the highest thermal conductivity (rock salt) had the lowest rock temperature. So as thermal conductivity increases, rock temperature decreases only.
5. **A is the best answer.** The scientists wanted to determine which of the 4 rock types would be least affected by heat from SF. Heating can cause rock to expand and crack. So the rock type that showed the least amount of heating would be the safest rock type in which to bury SF. The studies show that rock salt had the smallest increase in temperature. So rock salt would be the safest rock type to use.
6. **F is the best answer.** To determine whether the amount of heat generated by SF is related to the mass of the SF, the amount of heat generated by SF should be determined as the mass of the SF is varied. To do this, Study 1 should be repeated with a different mass of SF. In Study 1, 0.4 metric tons of SF were tested, so using 0.8 metric tons of SF would provide a comparison to determine how the mass of the SF affects the amount of heat generated by the SF.

ACT Writing

You get 40 minutes to write, but ACT graders have to grade each essay in less than five.

The way to get a great ACT writing score is to make the graders' jobs easy. So, don't sweat the small stuff. Focus on the big picture: a clear position, logical organization, and strong examples.

ACT Writing Rubric

The ACT essay is scored by two graders who will each assign a score of 1–6 for a total score of 2–12.

View a sample ACT essay prompt. Your ACT writing score will be based on how well you can do the following:

SUBSCORE	WHAT IT IS	HOW TO SCORE BIG
Ideas and Analysis	Can you build an argument and assess the argument of others?	You won't be graded on whether you pick the "right" answer. Instead, you'll be graded on how complex and sophisticated your answers are.
Development and Support	Can you support your ideas with examples?	Graders want to see that you can justify your position. Nothing damages the opposing argument like a killer counterexample.
Organization	Can you make your points in an order that makes sense?	Make sure your essay is organized. Must-haves: introduction, body paragraphs, conclusion.
Language Use and Conventions	Can you write clearly?	Graders will forgive a few stray errors, but if your grammar and spelling get in the way of what you're trying to say, those mistakes could cost you.

More ACT Writing Tips

Your argument, organization, and supporting examples are the most crucial pieces of your essay, but these four writing tips can help boost your score.

1. Go Long

Yes, ACT graders really do tend to reward longer essays. Try to write at least four paragraphs spanning two to three pages. If your handwriting is large, make sure you write an extra page to compensate!

2. Keep It Interesting
Vary your sentence structure to improve the rhythm of your essay. If you write a really long sentence with lots of modifiers and dependent clauses, it sometimes helps to follow it with a shorter, more direct sentence. It really works.
3. Watch Your Word Choice
Sprinkle some nice vocabulary words throughout your essay (make sure to spell them correctly!). If you're uncertain about the meaning or spelling of a word, it's best just to pick a different word. Using a big word incorrectly makes a worse impression than using a smaller word correctly.
4. Practice Your Best Handwriting
Though graders shouldn't take neatness into consideration when determining your ACT writing score, the bottom line is that a neat, legible essay is easier to read. And a happy grader is a good thing! For an essay that's truly easy on the eyes, make sure you ident each paragraphs and avoid messy cross-outs

ACT Essay Format: A Quick Recap
Remember, your essay should be in the following format:

- **Introduction** (with your thesis)—2-3 sentences
    - Your point of view on the essay topic (easiest to choose one of the three perspectives the ACT gives you).
- **Body Paragraph 1** (Opposing perspective)—5-7 sentences
    - Reason why it's true (with reasoning or examples for support)
    - Reason why it's not as true as your perspective (with reasoning or examples for support)
- **Body Paragraph 2** (Other opposing perspective or, if not discussing multiple other perspectives, continued discussion of first opposing perspective)—5-7 sentences
    - Reason why it's true (with reasoning or examples for support)
    - Reason why it's not as true as your perspective (with reasoning or examples for support)
- **Body Paragraph 3** (Your perspective)—5-7 sentences
    - One last reason why your perspective is true (with reasoning or examples for support).
- **Conclusion** (with your thesis restated)—1-2 sentences

Essay Template:
In order to do well on ACT Writing, your essay will need to have the following **five elements**:

#1: An Introduction

The first thing the grader will see is your opening paragraph, so you should make a good impression. Don't just jump right into the meat of your essay—**introduce your perspective (your thesis statement) and how it relates to the other perspective(s) you'll be discussing.** You don't necessarily have to start out by writing your introduction (you can always leave a few lines blank at the top of your essay and come back to it after you've written your example paragraphs), but you MUST include it.

#2: Your Thesis Statement (should be in your introduction)

You must **take a perspective on the issue presented in the prompt paragraph and state it clearly**. I advise using one of the three perspectives the ACT gives you as your position/perspective; you can come up with your own perspective, but then you'll have less time to spend on writing the essay (which is not ideal with a time constraint). Your thesis statement (the statement of your perspective) should go in the introduction of your essay.

#3: A Discussion of the Relationship Between Perspectives

In your essay, you must **discuss the relationship between your perspective and at least one other perspective**. Make sure to discuss pros as well as cons for the perspectives you don't agree with to show you understand the complexities of the issue.

#4: Examples or Reasoning to Support Each Point

To support your arguments for and against each perspective, you need to draw on **reasoning or specific examples**. This reasoning should be in the same paragraph as the arguments. For instance, if your argument is about how globalization leads to greater efficiency, you should include your support for this argument in the same paragraph.

And it's not enough to just say "Because freedom" or "Because Stalin" or something like that as your support and leave it at that. You need to actually explain how your reasoning or examples support your point.

#5: Clear Organization

Avoid discussing multiple points in one paragraph. Instead, our recommended strategy is to discuss **one perspective per paragraph**. This organization will not only make it easier for you to stay on track, but will also make it easier for your essay's scorers to follow your reasoning (always a good thing).

ACT PRACTICE WRITING PROMPT

Intelligent Machines

Many of the goods and services we depend on daily are now supplied by intelligent, automated machines rather than human beings. Robots build cars and other goods on assembly lines, where once there were human workers. Many of our phone conversations are now conducted not with people but with sophisticated technologies. We can now buy goods at a variety of stores without the help of a human cashier. Automation is generally seen as a sign of progress, but what is lost when we replace humans with machines? Given the accelerating variety and prevalence of intelligent machines, it is worth examining the implications and meaning of their presence in our lives.

Read and carefully consider these perspectives. Each suggests a particular way of thinking about the increasing presence of intelligent machines.

Perspective One
What we lose with the replacement of people by machines is some part of our own humanity. Even our mundane daily encounters no longer require from us basic courtesy, respect, and tolerance for other people.

Perspective Two
Machines are good at low-skill, repetitive jobs, and at high-speed, extremely precise jobs. In both cases they work better than humans. This efficiency leads to a more prosperous and progressive world for everyone.

Perspective Three
Intelligent machines challenge our long-standing ideas about what humans are or can be. This is good because it pushes both humans and machines toward new, unimagined possibilities.