Bluebook 5

Question explanations to accompany SAT practice test #5

Tina Pierce
PerseusPrep.com

Problem 1

Official Answer: A

This is the second half of a contrast. Before the comma, information flow is intensified. After the comma, information flow is _____. What is the opposite of "intensified"? Assuming that you know the meanings of "reduce", "evaluate", "determine", and "acquire", the correct answer should be obvious. "Reduced" is a very bland word choice, but it is the only one that provides the necessary contrast to "intensified".

Problem 2

Official Answer: B

If you aren't sure what the words mean, ignoring the suffixes might help. Would time measurements be precarious? Exact? Resilient? Inconspicuous? If you need another clue, look at the second sentence, which describes how "precisely" they were able to identify dates. Which of the four answer choices sounds most like "precision"? "Exactitude" is just a stuffy word for "precision".

Problem 3

Official Answer: B

Notice the phrase "in contrast to". That's your clue. The end of the sentence says that the others were "less deliberately signaled", so we need something that means "more deliberately signaled", i.e. more blunt or direct or obvious.

If the adverbs bother you, try turning them into adjectives. Would the "feminist mode of writing" (whatever that is) best be described as prudent, overt, cordial, or inadvertent? If you aren't sure what "overt" means but none of the others make sense, pick "overt". It's the opposite of "covert". It means "out in the open", or "not hidden", and it is the most appropriate word to use here.

Problem 4

Official Answer: B

This one has some obscure words. Maybe you've heard of "perpetual motion". "Innocuous" sounds like "innocent" and has a similar meaning. (You might think that it also sounds like "inoculate", but hopefully you'll realize that that meaning has no relevance here.) Perhaps you've heard the phrase "impending doom". And if you've studied antebellum periods or the antecedents of pronouns or ante meridiem vs post meridiem, you may realize that "antecedent" means "coming before something else".

Which word belongs in the blank? The clue is in the sentence introduction: "preceding a flare, ..." The flare hasn't occurred yet, but it is about to. Which word describes this situation? Like doom, and like your upcoming SAT test, this flare is impending. (It's very unusual to use "impending" as a predicate adjective, so this usage may sound ineloquent and awkward, but the SAT writers love awkward and unfamiliar constructions.)

Problem 5

Official Answer: D

What's this passage about? Summarizing it briefly in simple language, we could say something like this: The narrator thinks she is small but quick, and therefore has a chance at the basketball team. More broadly, she's analyzing her chances at being picked for the team. Do any of the answer choices say something like this?

You'll probably pick answer D easily, because none of the others are even close. There's no mention of any other sport in the passage, so answer A is inaccurate, and there's no explanation of how to play the sport nor of the selection method for the team, so answers B and C miss the basket by a mile as well.

Problem 6

Official Answer: D

How would you summarize this paragraph? The main topic is a conventional idea about woolly mammoths and an experiment designed to test this conventional idea.

A casual reading might not reveal an obvious answer, so we'll have to look more closely at the significant words: "Ongoing debate"? Not mentioned. "Advantages and disadvantages of the method"? No. "A major finding associated with each one?" There was no "finding" for the conventional hypothesis, and there was no alternate hypothesis, merely a test of the conventional hypothesis. So this rules out answers A through C. Is D ok? Did the paragraph describe an experiment? Yes, an anthropologist (and apparently a fan of Mythbusters) used a machine to fire spears into clay. Did the results cast doubt on an established hypothesis? Yes, they called into question the idea that spear-hunters caused the mammoth's extinction. So D is the correct answer.

Problem 7

Official Answer: A

This is a fact-finding question. After reading the prompt, go back and scan the paragraph for historians suggesting things about Maya civilization. You'll find it in the final sentence: The Mayans inherited it (i.e. the use of zero) from the Olmec civilization, and this is exactly what answer A says. The other answer choices aren't even close.

Problem 8

Official Answer: A

If you had to summarize what's going on in simple language, what would you say? There are some curious lines on Europa, and they're similar to lines in Greenland? The comparison between Europa and Greenland seems important. Answer choices A-C all involve a comparison of these two places, although D does not, so we can probably start by ruling that one out.

To choose among the remaining three, let's dive a little more deeply into the comparison. Answer A sounds good, although we should probably double-check the second part for factual accuracy. The paragraph does in fact state that Europa lacks surface water, so answer A looks promising. The paragraph says that the ridges on Europa are parallel, but it doesn't mention explicitly whether those in Greenland are parallel or not, so let's rule out answer B. The paragraph says nothing about the ages of the ridges, so answer C doesn't work, either, confirming that A is the correct choice.

Problem 9

Official Answer: D

What's the main topic of discussion in this paragraph? In a nutshell, we might summarize it this way: Some researchers wanted to know how cavemen got around in the dark, and they decided that the cavemen probably used different kinds of lights for different purposes. Do any of the answer choices sound like this?

You can probably rule out answers A through C without too much trouble. Cave art was mentioned only once in an incidental way, and it was never specifically linked to fireplaces. There was also no discussion of how frequently any of the light sources were used, and no discussion of any difficulties the researchers may have faced replicating light sources. Answer D is vague and doesn't mention the specific conclusion that different lights were used for different purposes, which occupied most of the second half of the paragraph, but otherwise it's a perfectly fine summary of the paragraph. So of our options, answer D is the best choice.

Problem 10

Official Answer: D

This one has a chart, and the answers involve numbers, so let's start by checking the answers against the graph for accuracy. Answers A through C are all blatantly false. If you want to confirm that answer D does in fact "support the claim", start by checking the claim: Medicine and health research (open circles) was highest in 2019. It is difficult to confirm the exact number of 285 from the graph, but otherwise answer D is fine.

Alternatively, you could start by checking the claim, and then look for answer choices that say "Medicine and health research was highest in 2019". Only answer B and D mention the medicine and health research category, and answer B compares it to a different category, rather than comparing it to different years.

Problem 11

Official Answer: C

Which statement shows that the author likes her hometown better than other places?

Answers A, B, and D don't refer to any particular place. They all sound like positive appraisals of some place, but which place isn't mentioned. Answer B refers to "the village", but we still don't know which village. And most importantly, none of these answers involve any kind of comparison of some place to some other place. They all refer to one place only.

Answer C explicitly mentions "my native town", and compares this place to other places visited during her journeying, so this must be the correct answer.

Problem 12

Official Answer: A

What's the "explanation" that we need to support? That customers will buy more merchandise if they are forced to wander around more. (So if you manage a retail store, you should move everything around once a month and force your customers to hunt for stuff?) Now we need to choose from some made-up customer quotes to "support" this theory. Despite sounding like a scripted advertisement, answer A amounts to one customer's description of buying something extra after hav-

ing been forced to search for something, so that's probably the correct answer.

Answer B doesn't involve buying more merchandise, answer C involves buying more merchandise for the wrong reason, and answer D has nothing to do with rearranging the store's layout.

Problem 13

Official Answer: D

"You might wonder how a novel would have been different if the author had used a computer, but every novel is unique, so _____." (You might also wonder how a certain standardized test would be different if the authors didn't pretend that random speculation is interesting.) If you had to fill in the blank yourself, what would you put there? "We'll never know"? Do any of the answer choices say anything that looks like "we'll never know"? Answer D does, more or less.

Answers A through C all involve the relative effectiveness of the two writing methods, but which method is better than the other method was never brought up in the paragraph.

Problem 14

Official Answer: A

What's the gist of the paragraph? It's a bit confusing because the experiments seem to be mixing conditions, without establishing any kind of baseline or "normal situation" or control. It looks like a list of random circumstances and results.

Let's focus on the long sentence with the semicolon in the middle, because that seems to be giving the relevant information about the results. We can also try scanning through the four answer choices to see if we can glean what it is that they are looking for. Apparently, the researchers were trying to find out if there are any significant differences between wild spiders and spiders reared in captivity. The first half of the sentence before the semicolon states that wild spiders were more aggressive when they ate more protein, and that captive spiders were more aggressive when they ate more fat. It does not explicitly state that lab-reared spiders did *not* show the same correlation between protein and aggression as wild spiders, nor that wild spiders did *not* show the same correlation between lipids and aggression as lab spiders. One is also left wondering what the female spiders were doing this whole time. But if we chalk this up to bad writing, then this seems to indicate a significant difference between wild and captive spiders. If we look at the second half of this verbose sentence, the part after the semicolon, and if we again allow for bad writing, it seems to be indicating another difference: wild spiders prefer fluorescent flowers over non-fluorescent flowers, and the reverse is true for captive spiders. (The fact that one dye was red and the other ultraviolet is either an intentional misdirection, or more bad writing. Or maybe both.)

So, what they seem to be trying to say is that raising spiders in captivity does affect the spiders. It results in significant differences in their biological characteristics.

Answer choice A says this, more or less, and the other three are all complete non sequiturs.

Problem 15

Official Answer: C

This one should be obvious. If you hesitate, just try splitting the compound question into two separate questions: "What are atmospheric rivers? How do they affect our weather?"

Problem 16

Official Answer: D

We have two decisions to make: should the first word be "it's" or "its", and should the last word be "protagonists" or "protagonist's"?

When in doubt about a pronoun with an apostrophe, try expanding it as if it were a contraction. "It is" doesn't make sense here, so this is a possessive pronoun, not a contraction, and it should not have an apostrophe.

Is "protagonists" a normal noun or a possessive? This one is a normal noun. It's the subject of the clause "protagonists meet". (Ignoring the irrelevant distraction in parentheses might make this clearer.) Normal nouns should not have apostrophes.

So neither word should have an apostrophe, and D is the correct answer.

Problem 17

Official Answer: C

If you try splitting the sentence into two pieces at the blank, you'll discover that neither portion can stand on its own. This entire paragraph is one single clause,

with one subject and one verb, and splitting it at the blank separates the subject from the verb, resulting in two sentence fragments. So there's no justification for any punctuation on the grounds of separating a main clause from introductory stuff or followup stuff. But what about parentheticals?

What's the skeleton of the sentence? "Alvarez's novel can serve as a starting point." The words "a fictionalized account of the lives of the Mirabel sisters" form a parenthetical, an extra comment stuck inside the middle of the sentence, and they need to be separated from the rest of the sentence by a matched pair of bookends. Literal parentheses would work, and so would a pair of commas. The first comma is already given, and we need to supply the second one. So there needs to be a comma after "sisters" to close the parenthetical.

But what about the conjunction? Should we have an "and" or not? If, instead of adding the comment as a parenthetical, they had said "The novel *is* a fictionalized account...", then the "and" would have worked. It would have been a conjunction joining two verbs in a compound predicate. "The novel is an account and can serve as a starting point." But as written, there is no other verb for the conjunction to conjoin "can serve" to.

So there should be a comma but no "and", and C is the correct answer.

Problem 18

Official Answer: B

With most punctuation questions involving a blank in the middle of a long sentence, it is useful to try splitting the sentence at the blank to see if we are dealing with full clauses that can stand on their own, or lesser bits of supplementary fluff. In this case, "the vessel took six days to dislodge" and "it's as heavy as 2000 whales" can both stand on their own. They are independent clauses, and they require something stronger than a comma to join them together. The only "strong punctuation" we are offered is a colon, so that must be the correct answer.

The words "in part due to its sheer size" are a supplement to the first clause about how long the vessel took to dislodge, and they belong with the first clause before the colon but need to be separated from it by a comma. Placing a colon after "size" is perfectly appropriate, because the stuff before the colon is an independent clause, and it introduces or sets the context for the stuff that comes after the colon.

Problem 19

Official Answer: A

This is a grammar question with long answer choices that all look like reworded versions of the same thing. When you see this, always look for the "Introductory Description, Main Clause" pattern, and make sure the subject of the sentence is actually the same thing that is being described in the introduction. In this case, "Woven from yarn..." means that the subject has to be a woven object, not a person. Answers B and D imply that a person was woven from yarn. Answer C does the same thing, but confuses the situation even more by adding an extra subordinate clause before it finally gets to the subject of the sentence...which is still a person. Answer A is the only one that makes "tapestries" the subject of the sentence.

Problem 20

Official Answer: C

Unless we split it up by choosing answer C, this entire passage is one long sentence. Can it be broken into two separate sentences? "Willard Wigan is known for his microsculptures" is a valid sentence. "Creations so small you need a microscope, his sculptures are made from tiny materials" is also a valid sentence, if a bit wordy. We are dealing with two independent clauses here, meaning we need something stronger than a comma or a plain conjunction. We need the period. Answers A, B, and D are all insufficient attempts to join together two independent clauses.

Problem 21

Official Answer: D

How are the sentences related? The first sentence describes how a dig "begins", and the second sentence begins with "then". We are dealing with a chronological sequence here, so the final sentence needs to begin with "finally".

Problem 22

Official Answer: B

How are the sentences related? The paragraph contains four sentences, and the last three present a sequence. Sentence two tells what happens "first", and sentence four tells what happens "lastly". So the sentence with the blank in it should include a chronological word, like "secondly" or "next".

Problem 23

Official Answer: D

How are the two sentences related? The first makes a claim, and the second elaborates with more details. The two sentences do not contrast with each other, so neither "regardless" nor "however" are appropriate. The second sentence does not occur later than the first, so "soon" isn't appropriate, either. "Specifically" might not be the most engaging or eloquent word, but the second sentence does "specify" the improvement mentioned in the first sentence, so it is an appropriate choice.

Problem 24

Official Answer: B

How are the two sentences related? The first is quite wordy, but at heart it's a description of an object combining stuff from different cultures. The second sentence mentions a blend of arts and crafts. The first is not a broad generalization for which the second is an example or a specification, so "for instance" and "in particular" are not appropriate.

Both sentences describe something that Gibson's "object" does, and A and B might both sound like they could work. So let's look more closely. "In so doing" would be appropriate if the second thing that the piece does is a consequence or corollary of the first thing that it does. This seems appropriate here, since "blurring the distinction between contemporary art and traditional crafts" could be a consequence of being covered with cultural beads and fringes. "Conversely" would be more appropriate if the two things that the piece does were opposites in some way, which isn't really the case here. So B is the most appropriate of the four choices.

Problem 25

Official Answer: C

What's the goal? To emphasize a similarity between the two groups of Code Talkers. The correct answer should mention both groups, preferably by name, and state something that they have in common. We don't even need to read the bullet points for this one. Answers A and B only mention one group, and answer D mentions a difference, not a similarity. Only answer C mentions a similarity between the two groups.

Double-checking the bullet points just to be sure, we can see that answer C does accurately present a similarity given in the bullet points, namely, that the two groups both communicated in their native language.

Problem 26

Official Answer: B

What's the goal we need to accomplish? To explain an advantage of this archive being digital instead of physical. Searching the bullet points, we find the advantage in the last point: more access. (The fourth bullet point also presents a positive thing, but a careful look shows that it is not an advantage of having a digital database, merely a positive aspect of how the database was created.) There is only one answer choice containing the words "more access". None of the other answer choices present an advantage of any kind, merely information about the archive's contents or about how it was created.

Problem 27

Official Answer: C

What's the goal we need to accomplish? To use a quotation to support some unspecified claim about Tharpe's contribution to rock 'n' roll. The only two bullet points to include quotations are the last two, and the first of those two does not mention any contribution to rock 'n' roll. So the correct answer should probably include this quote. Only answer choice C does this.

(You could assume that giving moving performances would have made a good contribution to rock 'n' roll, and thus the other quote in the fourth bullet point could also sorta work, but that's reading too much into it.)

Problem 1

Official Answer: C

You probably don't need any help with this one. The literal, physical, obvious meaning is the correct one. A person wouldn't "join with", "gain on", or "arrive at" a bowl.

Problem 2

Official Answer: B

We need an adjective to describe statues' noses. The clue here is the final sentence, which elaborates on the adjective. What is the best word for something that is "delicate" and "easy to break"? You'll probably realize without trouble that it's "fragile". If you don't know what "fragile" means, you'll probably at least recognize the other words, because they are fairly common and not that sophisticated, and thus you can probably rule them out.

Problem 3

Official Answer: D

What would a team of scientists do after finding something new? They would learn new things. If you learn something new, would you "occupy information", "hoard information", "reserve information", or "obtain information"? The answer should be obvious.

Problem 4

Official Answer: A

Try stripping down the clause and reading the four choices in the blank: "Managing matters along the border _____ coordination between governments." Only one word makes sense in the blank.

Problem 5

Official Answer: D

The question asks about some animals sharing something with other animals. Have you ever talked about something sharing something with something else and not used the preposition "with"? Thing A shares something *with* thing B. Pick the answer choice with "with".

If you read hastily, you might be tempted by answer A. You could say that the tenrecs share *examples of characteristics*...but they share these examples *with true hedgehogs*. The object of the preposition has to be hedgehogs, not characteristics, so we need to pick "similarities with hedgehogs", not "examples of characteristics".

Problem 6

Official Answer: A

This is a "main purpose" question. Blur your eyes a little and try to get a sense of the forest for the trees. What does this passage convey to you? Somebody with an outdoor occupation likes to sing. Only answer A resembles "he likes to sing."

You should be able to rule out D without trouble. There is no mention of any particular pieces of music. What about C? The speaker does seem excited, but is he excited about farming? What about B? The passage does mention a shepherd, but is the speaker comparing himself to the shepherd?

Problem 7

Official Answer: B

What's the main idea? Roughly summarizing the passage in simple language, we could say something like this: It's mostly about El Paso and how it had lots of Spanish-language newspapers. El Paso is the subject of three separate sentences and one subordinate clause within the passage. At this point, we can probably rule out answers A and D, because they don't contain the words "El Paso". To narrow in on the correct answer, let's start nitpicking:

A – This one doesn't mention El Paso. It compares modern newspapers to the old ones, and that wasn't discussed at all in the passage.

B – This one makes Texas the primary geographic focus, but it does say "especially El Paso", and the paragraph did mention Texas and the late 1800s in the introduction, so this one is quite reasonable.

C – The paragraph did mention San Antonio briefly, but there was no discussion of any newspapers influencing any others.

D – There was no mention in the paragraph of Mexico south of the border, and no discussion of popularity.

Problem 8

Official Answer: D

What's the gist of the underlined claim? The author claims that *The Nutcracker* is old-fashioned, and he

makes the rather radical claim that it shouldn't even be produced any more. What's the second author's attitude towards *The Nutcracker*? He acknowledges that it's "outdated", but then says we should keep producing it anyway. The first author is anti-*Nutcracker*, and the second is more or less pro-*Nutcracker*.

If we were to imagine the opinion of Author 2 in regards to the claim that the *Nutcracker* is old-fashioned and should no longer be produced, what would that opinion look like?

Answer A has it backwards. The author didn't question the idea that the play is stuck in the past, he agreed with it, and he didn't reject the suggestion of updated versions, he supported it. The second author mentioned a growth in popularity, not a shrinking in popularity, so we can rule out B. Neither author mentioned revenue, so C is off-topic. Only answer D offers modernization as an alternative to complete rejection, which seems to be Author 2's point of view.

Problem 9

Official Answer: C

Ignore the paragraph. Read the prompt and the final sentence, and then study the graph. The black triangles are the three highest marks on the graph, and the "park with the highest monthly recreation visits in all three months" is clearly Yellowstone.

Problem 10

Official Answer: C

Just compare the prices in the 2019 column with those in the 2022 column. Sweaters, dresses, and jackets were all cheaper in 2022 than in 2019, but button-down shirts went up in price. We're looking for a price that was lower in 2019, so button-down shirts is the answer.

Problem 11

Official Answer: C

What's the conclusion that we need to support? That carbon dioxide doesn't "serve as a cue", meaning that it doesn't attract midges. We're looking for something that supports the idea that CO_2 does not attract midges, and that midges are indifferent to CO_2.

The first part of answer A concerning the total number of midges trapped is irrelevant, and the second part about the majority being found in the CO_2 trap would *weaken* the claim instead of support it. It would support the idea that midges *are* attracted by CO_2.

Answer B, besides making it sound as if the midges played calls, also weakens the claim, and supports the idea the midges are attracted to CO_2. If midges only enter the trap when CO_2 is nearby, that would suggest that they like CO_2.

Answer C makes it sound like the midges are actually *repelled* by the CO_2. If CO_2 makes no difference, then shouldn't the numbers be about equal? This answer isn't exactly what we want, but it might be ok. We could say that this supports their conclusion, while at the same time introducing additional questions about what's repelling the midges.

Answer D, like A and B, weakens the claim instead of supporting it. If more CO_2 means more midges, then that would support the idea that midges are attracted to CO_2.

Answers A, B, and D would all support the idea that midges are attracted to CO_2, and would thus weaken the claim that CO_2 makes no difference. Answer C sorta supports the claim while introducing extra unknowns and uncertainties. We'll have to choose C.

Problem 12

Official Answer: D

The answer choices all mention data from the graph, so let's start by checking them for factual accuracy. Answers A and C are both untrue. To distinguish between B and D, we'll have to check the claim.

We are looking to support the claim that a repopulation program has been successful, and the graph shows a pretty clear upward trend in the (presumably estimated) population of wild condors. The correct answer choice should point this out, and that's what answer D does. Answer B focuses on the slight decline in the final year, rather than the comparatively large increase in the preceding years, and this is not a good way to support the claim that the program has been successful. So D is the most appropriate answer.

The part about "exceeding the number of those living in captivity" in answer D might confuse you, but it seems to have confused the test-writers as well. They may have been thinking that a control of some kind is needed. The population of wild condors could have risen for a number of reasons, so we need to compare the wild population to that of a control group to confirm that the rise was actually due to the repopulation program and not some-

thing else. But condors living in captivity hardly constitute an appropriate control group for wild condors. For one thing, the researchers are changing the population of the captive condors simply by releasing some of them into the wild. Perhaps the test-writers were thinking that the researchers could make it look like the wild population was increasing simply by releasing lots of captive condors, but that this would have caused the captive population to decrease, so they wanted to point out that the captive population did not decrease. In any case, they should have either omitted the final comment, or said that the wild population increased *while the captive population remained steady.* The fact that there were always more wild condors than captive condors doesn't support or weaken anything.

Problem 13

Official Answer: C

"A student notes a trend, but that trend wasn't universal. For example, _____." We need to find an example of an exception. The trend is that tourism revenue goes up each year, so we need to find an example of a country for which the revenue went down at least once. Consulting the table, we see that Japan, Thailand, and Malaysia all had regular increases, but South Korea had a drop from 2016 to 2017, so that's the only thing we can use as an example. Only one answer choice mentions South Korea and the years 2016 and 2017.

Answer D is true but irrelevant, answer B is false, and answer A comes out of left field. We have no way to judge answer A, since we aren't given any data about tourism revenue from local residents.

Problem 14

Official Answer: D

What's the assertion we need to support? That fish escaping from fish farms into the wild would have bad effects. (Perhaps we could say that freed fluorescent former farm fish might interfere with the native flora and fauna?)

In lieu of actual data, we are relying on quotes from researchers for "evidence". Which claim, assuming it is true, would support the assertion that fluorescent fish would alter the ecosystem?

A – This compares males and females in two populations of fluorescent fish. It does not compare two ecosystems with and without fluorescent fish, and it doesn't mention any significantly bad discoveries.

B – This *weakens* the assertion, by saying that we don't know what's going on.

C – This says that the fish may be more widespread than we thought they were, but it doesn't say whether the effects will be good or bad.

D – This quote provides a concrete (though hypothetical) mechanism by which harm might occur to the native fish, and thus supports the assertion that fluorescent fish would cause harm.

Problem 15

Official Answer: A

If you had to predict the conclusion, or draw your own conclusion, what would you say? The paragraph describes how logging may actually result in healthier, or at least "more robust", forests. Therefore ... what? We shouldn't be so worried about logging? Logging is ok? Answer A says that "logging may be useful", and adds the sensible precaution that we shouldn't get carried away.

There was no comparison of logging to any other "forest management strategy", so we can rule out answer B. Answer C makes a prediction about the future, and these are almost never the correct answer on the SAT. Besides, how would the results of a massive study, for which the benefits of logging were presumably a major concern, suggest that we may never know whether logging has any benefits? Answer D contradicts the preceding sentence. If limited logging makes forests "more robust", then wouldn't limited logging be a better way to support forest health than leaving them alone?

Problem 16

Official Answer: A

The main clause of this sentence is "The saloon was known to offer good stuff." The blank is in the introductory phrase, meaning that we need a "verbal" rather than a true verb. Technically, we need the past participle, which is "created".

Problem 17

Official Answer: C

This is a pronoun question. What is the pronoun referring to? It is referring to an event – the time when someone was appointed. This is one event, and needs

to be referred to by a singular pronoun. Answers A, B, and D are all plural, making these answers incorrect.

Problem 18

Official Answer: C

The spine of this sentence is "Her poems popularized the use of Creole." The verb is "popularized" and the verb's direct object is "the use of Creole." A verb and its object belong together and should not be separated by any punctuation. The correct answer is the one with no punctuation.

Problem 19

Official Answer: D

If you asked, "How do people perceive acts of kindness?", that would be a question, and it should have a question mark. If you said, "They investigated how people perceive acts of kindness", that would be a statement, and it should end with a period. Between B and D, you'll probably realize that D sounds better. Technically, adding the "do" turns the clause from a "declarative clause" into an "interrogative clause", and subordinate clauses should always be declarative.

Problem 20

Official Answer: A

Perhaps you can pick the best answer here because it just "sounds best". But what's the rule? In the "Standard English" section, there is always a rule that makes three choices definitely wrong and one definitely right.

If you think that some of these choices sound awkward, what your brain is reacting to is the dangling modifier. The introductory phrase is describing an explorer. If the subject of the subsequent sentence is anything other than a person, that represents a sentence glitch. In answer B, the subject is a pair of years, in answer C, the subject is Greenland, and in answer D, the subject is several treks. None of these things are African American explorers. Only answer A makes an actual person the subject of the sentence, harmonizing with the introductory description and removing the sentence glitch.

Problem 21

Official Answer: D

What subject needs to be paired with this verb? Be careful, because it is buried in a relative clause. What is coming into contact with the toxin? The nematodes. Now try pairing nematodes with the four choices:

Nematodes has come in contact...
Nematodes comes in contact...
Nematodes is coming in contact...
Nematodes come in contact...

"Nematodes" is a plural subject, and the first three answer choices are all singular verbs.

Problem 22

Official Answer: D

The first sentence says that we shouldn't use the word "life". The second sentence says that we should use the made-up word "lyfe". (Where do these people get their funding?) The second sentence provides a replacement or alternative to the first, so "instead" is the natural transition.

Problem 23

Official Answer: D

How are the sentences related? The first sentence makes a statement about scientists in general, and the second refers to a particular kind of scientist, so you might think that "for example" would work. However, that's not one of the answer choices, and if you look closely, you'll see that the second sentence does not provide an example of relying on precise standards. It discusses how scientists invented a whole new system of standards to help them make better measurements. The second sentence follows from or is a consequence of the first, making "for this reason" the best choice. The second sentence is not a contrast to the first, making A and B inappropriate, and it is not a parallel or complementary addition, making C inappropriate.

Problem 24

Official Answer: B

The first sentence describes an extensive effort to find libraries. The second sentence describes a failure to find a library. That's a contrast, and the only contrasting word among the answer choices is "nevertheless".

The second sentence is not a consequence of the first sentence, so "as a result" is not appropriate. The second sentence is not a restatement of the first sentence, so "in other words" is not appropriate. And it does not describe an earlier event, so "earlier" is not appropriate.

Problem 25

Official Answer: D

What's the goal? To emphasize the mass of Sirius A. Searching the bullet points, we find this piece of information in the last one: Sirius A is 2.063 times as massive as the Sun. There is only one answer choice that includes the number 2.063 (or the name Sirius A, for that matter).

Problem 26

Official Answer: D

What's the goal? To contrast first-class levers and second-class levers. Searching the list, we find the two types of lever described in the last two bullet points. The difference has to do with where the fulcrum is placed. Only two answers includes the words "first-class", "second-class", and "fulcrum". Answer B might be acceptable as a vague and wishy-washy answer, but answer D restates the two relevant bullet points word for word. Whenever you have to choose between a weak answer and one that restates the bullet points verbatim, choose the latter.

One has to wonder at the people who write the official "explanations". The "explanation" for this one states that in answer B, "the sentence could be read as emphasizing a similarity—that in both types of levers, the fulcrum and load are in different locations." *Different from what?!* The most sensible interpretation of the sentence as written is that the two forces each have their own place on one lever, and each of them is in a different place on the other lever. That means it's a difference between the two levers, not a similarity. However, you could also read the sentence as saying that the two forces are not in the same place as each other on one lever, nor are they in the same place as each other on the other lever. This ambiguity is probably what the "explanation" writer was trying to point out. Could this be an example of the SAT writers admitting that their writing is not always clear?

Problem 27

Official Answer: B

What's the goal? To emphasize a similarity between glaciers and icebergs in Greenland. The correct answer should probably mention Greenland, glaciers, and icebergs, and it should definitely feature a comparison between glaciers and icebergs front and center.

Answer A includes Greenland, icebergs, and glaciers, but does not give a similarity between glaciers and icebergs. Answer D doesn't mention icebergs at all. Answer C mentions a difference between glaciers and icebergs, not a similarity. Only answer B mentions a similarity, and it states the similarity very clearly as the main topic of the sentence.

Problem 1

Official Answer: B

This entire passage is one sentence, and it compares two people. If Kwolek will "long be remembered", then Pennington's "place in our historical memory" would be more ... what? The words before "but" indicate that she was important, but the "but" implies that she was nevertheless not recognized. So in comparison to Kwolek, she is less well known? More obscure?

If you know the meanings of all four words, you probably realize that the best answer is "tentative". It's not a great answer, since we usually apply the adjective "tentative" to actions done by people, rather than places in "historical memory". But it's the best of the four. "Permanent", "warranted", and "prominent" are all positive, affirmative words, which represent the opposite of what we want.

Problem 2

Official Answer: D

What would you do with a metal's characteristics? The clue comes after the colon: The team used the metal's behavior to study stress in pipes. They _____ metal's tendencies in order to do this. So what needs to go in the blank? Used? Relied on? Those aren't options, but "exploited" is.

You probably know approximately what a "hypothesis" is, and what it means to "redefine" something. You also know what a "discount" is when you are shopping. Perhaps you've heard of someone "discounting the possibility" of something. In this usage, the verb means to disregard or ignore as unlikely or insignificant, and it doesn't work in the blank. You've probably heard of people being "exploited", which means they are used or taken advantage of, and this meaning can also be applied to inanimate matter, which it is in this case. The researchers are taking advantage of the metal's characteristics to do something useful.

Problem 3

Official Answer: B

The first sentence describes a problem, and the second describes what needs to happen to solve the problem or improve the situation. Do any of the answer choices mean "solve" or "improve"?

You might not know the meanings of several of the words, but you may at least have a sense of what "sanction" and "rationalize" mean, and maybe you'll feel that they don't work in the blank. You may have heard of "postulates" in math class, and you may have a sense that this word has something to do with guessing or knowledge, in which case it doesn't work, either. This leaves only "ameliorate". If you have three words that don't feel right, and you have no idea what the fourth one means, you might as well guess the fourth one. "Ameliorate" means to make a bad situation better, and it words perfectly in the blank.

Problem 4

Official Answer: D

The question asks about some animals sharing something with other animals. Have you ever talked about something sharing something with something else and not used the preposition "with"? Thing A shares something *with* thing B. Pick the answer choice with "with".

If you read hastily, you might be tempted by answer A. You could say that the tenrecs share *examples of characteristics*...but they share these examples *with true hedgehogs*. The object of the preposition has to be hedgehogs, not characteristics, so we need to pick "similarities with hedgehogs", not "examples of characteristics".

Problem 5

Official Answer: D

This one is very confusing because of the string of contrasts and negations. While ... undermined ... indisputable ... This sounds like it was written for an elite academic journal, where they like long, confusing sentences that nobody else can understand.

Let's start by examining the main clause, and then we'll see if we can figure out what in the world the introductory clause is saying. The main clause, in a nutshell, says that this guy's works were primarily available far away. The introductory clause begins with "while", so it must contrast with distant scholarship. It needs to acknowledge a counterpoint of some kind, and say something like "despite being so far away, he still had an effect". If we attempt to rewrite this mess into something a tiny bit clearer, we might write it something like this: "We used to think that he _____ other philosophers, but even though we now realize this wasn't entirely true, it's still obvious that most of his books were only available far from the other philosophers." If we put "had no effect on" or "was inconsequential to" in the blank, it makes sense. Answer D is correct.

You might also notice that the first three answer choices have to do with whether other philosophers liked this guy or not. His works were "controversial", or they generated antagonism, or they were worthy of imitation. The fourth answer choice merely has to do with the strength of his effect on other philosophers. And if you can learn anything from the paragraph at all, you'll see that geography is an important part of it. Why would geography affect people's opinions of him? It probably wouldn't, but being a long distance away would definitely affect the strength of his effect on others.

Problem 6

Official Answer: B

You might notice that the underlined words are all contained between two dashes and therefore form a parenthetical. The parenthetical comment is giving us some information about Israel. That doesn't really help us to narrow down the answer choices, however, because all four of them discuss Israel's characteristics. We'll have to check the answer choices one by one, being extra careful to ask whether the underlined parenthetical actually describes Israel in the way what the answer choice says it does.

A. Does the underlined phrase imply that Israel *treasures* anything? The underlined words give us some information about Israel's characteristics, but they don't say whether Israel likes his own characteristics or not.

B. This is a mess of negatives and qualifiers. Look closely. Do the underlined words suggest that a particular aspect of Israel's character kept him from establishing a farm? This choice might not look like a good answer at first glance, but as you'll discover, none of the others look good, either. If you take a closer look at this one, and take account of the surrounding context, it might look better. The parenthetical acknowledges some strong-willed qualities of Israel at first, but the bulk of it is telling us about his mildness. The surrounding context tells us that he was denied land that he had a right to, and that he was unable to right this wrong. His mildness presumably played a role in this. So the "certain aspect of his character" is his mildness, and if it were not for this, he "might not have been as easily thwarted in his ambition to establish a farm." So answer B could work, after all, and of the four choices, it is the most appropriate.

C. Does the underlined sentence contain anything about labor, farming, or property? It might be difficult to rule this one out with 100% confidence, but it just doesn't seem right. The underlined sentence does mention some qualities of Israel, but laziness or disability are not among them.

D. Does the underlined sentence explain how or why Israel is able to be exceptionally courageous? It does mention that he is "brave-hearted", but then it contrasts this with "patience and mildness", and it never explains *how* Israel is able to be courageous.

Problem 7

Official Answer: B

This is an "overall structure" question. Read the passage, ignoring specific facts and figures, and focusing on the general pattern. Think of it like a fiction passage, and try to summarize the plot. What is the sequence of major points?

A. This is sneaky. Answer A looks perfect ... until you get to the very end. Did the team ever actually refine their hypothesis? That wasn't part of the passage.

B. This is more or less the same as A, but without the flaw at the end. This one is an acceptable answer.

C. You can question whether the scientists were really concerned with a *process* that they didn't understand, but the passage definitely does not present *competing theories*, and the team concluded that the hypothesis was *incorrect*, not correct.

D. This is similar to A. It is quite plausible until you get to the end. Does the passage present data? Maybe, but it definitely does not present data that *validates the hypothesis*.

Problem 8

Official Answer: A

The first text is very pessimistic about automated painting classification. The underlined sentence claims that efforts haven't been and won't be successful, and the subsequent sentence says that this endeavor probably isn't even useful.

The second text is mostly about a particular counterexample. The second author points out that in at least one instance, success is possible.

Now, which of the answer choices expresses an opinion that is most consistent with Author 2's text? How might

this author respond to the claim that success isn't possible? Are there any counter-arguments to the underlined sentence contained in the second passage? Yes: "there is at least one counter-example". That's what answer A says, more or less. The rest is verbal gunk.

Problem 9

Official Answer: C

Scan the paragraph, searching for any information about microbe demographics and why the discovery was important. The word "crucially" seems to indicate something important, and reading around that word, we find that the composition didn't change. This allowed the researchers to attribute the effects to temperature ... instead of attributing them to changes in microbe community composition, presumably. The second sentence contains all of the important information: Soil activity went up, but the kinds of microbes didn't change, so the warmer temperatures were probably the reason.

Don't waste time trying to figure out the stilted jargon in the answer choices. Just ignore the ones that sound wrong, and if you don't find any that sound right, start over again. Answer C doesn't specify the "alternative explanation", but the idea that the kinds of microbes might have made a difference certainly qualifies, and this was "ruled out" by the discovery the the microbe composition didn't change.

Problem 10

Official Answer: D

There is a table, and there are numbers in the answer choices, so let's begin by checking the answers for factual accuracy. We can rule out B and C for falsely presenting the data, leaving A and D for us to choose between.

The statement that we need to complete involves a comparison between the two columns. Answer D observes the relationship between the columns, while answer A only points out variations within the column, so D must be the correct answer. More precisely, answer D points out that the numbers in the first column are all higher than the corresponding numbers in the second column and points out that the higher numbers mean "greater well-being" (at least in the minds of the participants). Answer D is the best summary of what the table is telling us and is the officially sanctioned answer.

Problem 11

Official Answer: C

This is a good candidate for a "throw-away question". It's a confusing mess.

You could try checking the answer choices against the graph for factual accuracy, but the answer choices are long and involve comparisons, and would take some time to wade through. Whether or not this will save time is a judgement call. If you do try checking them for accuracy, you'll discover that they are all accurate, but you might at least discover that you can rule out answer A for making no sense. It tries to compare apples and oranges.

Taking a more direct approach, let's look at the conclusion we need to support. Longer leave times "might not" confer a greater cognitive benefit than shorter leave times do. (Talk about a vague and unhelpful conclusion!) In other words, one might expect that longer vacations would make you more productive, but this may not be so. So the answer choice should point out that longer leave times (1-5 weeks, i.e. black bars) are not necessarily higher than the others.

Answer A compares the light gray bars with the dark gray bars in one "test administration", but compares the dark gray bars versus the black bars in another "test administration", which isn't helpful.

Answer B points out that the medium amount of leave gives lower scores than no leave or long leave...which does seem to support an ambiguous conclusion.

Answer C points out that people who took short leaves performed better than people who took long leaves...which also seems to support an ambiguous conclusion.

Answer D points out that people who took short leaves performed better than people who took no leave, which is hardly surprising, and would support the conclusion that taking vacations is a good thing. It doesn't support the conclusion that taking vacations isn't necessarily a good thing.

So both answers B and C seem like they could work. If you feel you're getting overwhelmed or bogged down, this might be a good time to take a break, work on some easier questions for a while (if you can find any in this module), and then come back.

Taking a closer look at answers B and C, we see that answer B only referred to the first "test administration", which was administered before the employees took their vacations, and therefore isn't really meaningful. Answer C referred to the second and third administrations,

which were administered after the employees returned from vacation, and would therefore be expected to show differences.

Furthermore, if we inspect the "conclusion" closely, it compares long leave times to short leave times and doesn't mention the no-leave condition. We are apparently therefore supposed to ignore the dark gray bars in the graph, and focus only on the black and the light gray bars. If you caught this subtlety at the beginning, you might have been able to jump straight to the correct answer, since A, B, and D all contain the words "no leave". Only answer C does not contain "no leave".

Problem 12

Official Answer: B

This is similar to the previous question. There's a graph, and this one is comparatively easy to understand, but it is hard to tell if we should spend time checking the answers for accuracy or not. If you try, you'll discover that you can rule out answer A for being inaccurate, but this still leaves the other three.

Reading the question, and translating the dense prose, we see that we need to provide evidence that it isn't always beneficial to run as fast as you can, even if you are trying to escape from getting eaten. Looking at the graph, we can focus our attention on "escaping" (light bars), and we see that many lizards do run as fast as they can, or nearly so, but there are also many that don't. (One wonders how they measured "percent of maximal speed", and how they accounted for variability in individual cases. Do *you* always run at exactly the same percentage of your maximal speed? One might also wonder, if a lizard species never runs at 100%, then what is that extra capacity for? But these questions are not important here.) So the answer choice should probably point out that, according to the given graph, many lizard species don't run as fast as they could, and this is exactly what answer B says.

If anything, answer C actually supports the opposite conclusion. Instead of pointing out that many species don't run as fast as they can, it points out that most species still run very fast. The light gray bar is by far the highest at 90-100%. Answer D might sound good until you reach the last couple of words. It makes a statement about pursuing, not about being pursued.

Problem 13

Official Answer: D

What's the "claim"? In a nutshell, we might say that the author has mixed feelings about poetry. So the correct answer should include positive and negative feelings about poetry.

Answer A doesn't mention poetry at all. Answer B is unclear. We don't know what we must distinguish, nor what is being dragged. The most we can say is that this choice seems to be more about poets than poetry, and it definitely does not display mixed emotions. Answer C mentions poems, and it seems to be pretty negative, but there are no positives. This leaves answer D, which mentions "contempt" for poetry, which is pretty negative, and also says that it has "a place for the genuine", which sounds positive. So it may not be a fantastically clear answer, but D is the only one of the four which can be said to express positive and negative feelings towards poetry.

Incidentally, many students nowadays seem to be unfamiliar with the word "contempt", perhaps because it is in a sense the opposite of "tolerance". If you don't know the meaning of "contempt", you'll miss the negativity in answer D, but hopefully you'll at least realize that the first three choices are inadequate, which may enable you to assume that contempt is a negative emotion. It's similar to "disdain" or "disgust", but a little stronger.

Problem 14

Official Answer: D

Scanning the paragraph and trying to make sense of the jargon, we see that there is a dinosaur with a large head, larger than its flying cousins, and scientists aren't sure whether it could fly or not. After discovering a fuller skeleton, they found more characteristics that would have made flying unlikely. Therefore ... what? It couldn't fly? It probably walked instead of flying?

Answer A says that it flew more, so that's not right. Answers B and C compare the sizes of body parts, and draw no conclusions about whether the dinosaur could fly or not. Answer D says that they flew less and walked more, making it the most reasonable conclusion.

Problem 15

Official Answer: A

What would you expect in the blank? The paragraph presents a view that "some ethicists hold", and then

discusses how Aztec philosophy was different. What's the view? We don't have any clear writing to go on, but in a nutshell, it seems to be the view that you can judge someone's actions without knowing or caring about the context. Actions are good or bad absolutely, and context makes no difference. (So, presumably, shooting a thug who has broken into your home in order to defend yourself is just as bad as shooting someone on the street and taking his wallet? Is this a widespread view? How many people are in this group of "some ethicists"? One might have all kinds of questions about this view, but it's what we are given, and it's what we have to compare Aztec philosophy to.) Now, how is the Aztec view different from this? Again, more elaboration would have been helpful (or maybe not, since this is the SAT), but in a crude nutshell, they seem to have believed that context matters. So it's "context doesn't matter" versus "context matters". Now, let's check the answer choices:

A. If we boil down this pile of words into something simpler, we could say "the Aztecs would have disagreed with the idea that context doesn't matter". And that is perfectly true, based on the information that we are given. Given the length and density of the answer choices, you might want to enter "A" at this point and move on to the next question, flagging this one for further review and coming back to it later only if you have time.

B. This one amounts to "Can outsiders judge you? Aztecs would say no." This one focuses on *who is doing the judging*, not on whether or not *context* is taken into account.

C. If we boil this one down, it amounts to "position in society matters". It's not immediately clear whether we should count "position in society" as part of the "context" or not, but the final line of this dreck seems to be saying "context doesn't matter". Perhaps we could say that this statement is "inconsistent with the discussion that has been provided by the College Board in the earlier portions of the present problem." Actually, the official "explanation" says this: It "contradicts the text's claim that the Aztecs believed that the morality of an individual's action is dependent on the action's effects on the community and the person's specific circumstances."

D. This one, if you can digest it, amounts to "Social position doesn't matter, but the effects on the community do matter." This is not a clear statement that context matters.

Problem 16

Official Answer: A

The main clause of this sentence is "The saloon was known to offer good stuff." The blank is in the introductory phrase, meaning that we need a "verbal" rather than a true verb. Technically, we need the past participle, which is "created".

Problem 17

Official Answer: D

What is it that is doing the revealing? The quotidian objects. Try pairing each of the verb choices with this subject.

The objects was revealing ...
The objects has revealed ...
The objects reveals ...
The objects reveal ...

The correct answer should be obvious. "Objects" is a plural noun, and answers A-C all contain singular verbs.

Problem 18

Official Answer: C

Notice the long series of words with a blank in the middle. Start by seeing if you can split the words into two separate sentences. "Clear glass allows light to pass through" and "wax paper allows some light to pass through" are both valid sentences on their own, so we are dealing with two independent clauses. We need a strong joint to link them. A comma plus a conjunction would work. So would a period or a semicolon. Among these options, the only one we are offered is a semicolon, so C must be the correct answer.

Problem 19

Official Answer: C

What subject needs to be paired with this verb? This one is a little trickier than usual, because the entire paragraph is one long, messy sentence. The subject-verb pair in question is buried in a dependent clause, with lots of messy stuff in between the two. What is underlying the emotional reactions? Look closely. It is not "idea", but "frameworks". Hochschild's idea is that various frameworks underlie emotions. So throw away the rest and just try the subject "frameworks" with the four choices. Or, since "frameworks" is plural, you could also just use "they".

Frameworks underlies...
Frameworks is underlying...
Frameworks underlie...
Frameworks has been underlying...

"Frameworks" is plural, but answers A, B, and D all contain singular nouns. Only C contains a plural noun.

Problem 20

Official Answer: A

The pattern here is as follows:

First sentence. Main clause of second sentence, however: list of examples – followup comment.

The second sentence begins with a complete independent clause which introduces the list, so this is a perfectly valid use of a colon. The main clause also contrasts with the first sentence, so it is natural to attach the "however" to the main clause, before the colon. The extra comment after the dash is just a complicating distraction.

Everything after the "however" is a sentence fragment, making the semicolon inappropriate and ruling out answers C and D, and you can't use a comma to introduce a list, so B is also incorrect.

Problem 21

Official Answer: D

Lots of words with a blank in the middle? Start by finding out where the independent clauses are. Try splitting the words into two separate sentences and see what happens. "Goats are indiscriminate" and "they will devour stuff" are both valid independent clauses, so we need something other than a comma or conjunction to join them. The only "strong joint" that we are offered is the colon. The colon is ok, because it passes the two colon tests: the stuff that comes before the colon is (or contains) an independent clause, and the clause introduces the stuff that comes after. Thus we have arrived at the correct answer: choice D.

Problem 22

Official Answer: C

How are the sentences related? The previous one refers to lower elevations, and the sentence with the blank refers to higher elevations, so we need a "compare or contrast" phrase. Since the paragraph points out a difference between the two elevations, a contrasting phrase like "on the other hand" is appropriate.

Problem 23

Official Answer: B

How are the sentences related? The first describes two-party systems, and the second describes proportional-representation systems. The emphasis is on their differences rather than their similarities, so a contrasting word like "conversely" is needed in the blank. The second sentence is not a consequence, an example, or a restatement of the first, making the other three choices inappropriate.

Problem 24

Official Answer: D

How are the two sentences related? The sentence before the blank describes an appearance, and the sentence containing the blank describes an assumption based on that appearance. The second follows the first as a consequence, making "hence" the appropriate choice. "That being said" and "however" are used to signify contrasts and "for instance" introduces an example, and neither of these situations apply here.

Problem 25

Official Answer: D

How are the sentences related? The sentence before the blank states that many things influence genes, including proteins. The sentence containing the blank states that modern research studies proteins as well as genes. The two sentences complement each other. They are in accord, making D an appropriate choice. The second is not a restatement of the first, making A inappropriate. It is not a contrast, making B inappropriate, and it does not provide a specific example of a previous generalization, making C inappropriate.

Problem 26

Official Answer: B

What's the goal? To emphasize a similarity between the two sculptures. The answer should name or at least allude to the two sculptures and state something that they have in common. Now let's scan the four answer choices and see if they do this.

A. Nope. This mentions two figures ... but only one sculpture.

B. Yep. This mentions both sculptures by name, and states something that they have in common.

C & D. Nope. These two mention both sculptures, but they both identify a difference, not a similarity.

Problem 27

Official Answer: C

What's the goal? To indicate which category most routine diplomatic correspondence belongs in. Searching the bullet points, we find in the fourth bullet point that "most routine diplomatic correspondence" could cause "damage" but not "serious damage". This doesn't tell us the classification, but we can find the Classification names in the second and third bullet points. Such correspondence is classified as Confidential. The correct answer has to include the words "most routine correspondence" and "Confidential". Only answer C contains all of these words.

Answer A includes most of these words, except for the word "most". It mentions diplomatic correspondence incidentally, and it tells us what "Confidential" means, but it doesn't actually say that the majority of routine diplomatic correspondence belongs in this category. Answer B mentions "most routine diplomatic correspondence" but fails to indicate which category it belongs to, and Answer D doesn't mention it at all.

Problem 1

Official Answer: D

When using linear equations as a model for something, the constant term or "y-intercept" always represents a starting point, initial value, or offset of some kind, and the coefficient or "slope" parameter always represents a rate of some kind. In this case, 25 calories per pound is the rate, and 11 calories is the offset, so 25 needs to be the coefficient on x, and 11 needs to be the number by itself. In other words, $c = 11 + 25x$ or $c = 25x + 11$, which is answer choice D.

The total number of calories	is	25 calories per pound · the number of pounds	plus	11 more
c	=	25 · x	+	11

Problem 2

Official Answer: A

If the camera is 39 fathoms down, and there are 6 feet in every fathom, then the camera must be $39 \cdot 6 = 234$ feet below the surface.

If you want to use the formal method of unit multipliers, it looks like this:

$$39 \text{ fathoms} \cdot \left(\frac{6 \text{ feet}}{1 \text{ fathom}} \right) = 234 \text{ feet}$$

Problem 3

Official Answer: C

What jumps out at you when you look at this figure? x is obviously a vertical angle with 145, and therefore equal to 145. (And line m is irrelevant.) The only answer choice that agrees with this obvious fact is C.

Problem 4

Official Answer: 11

You can just reason this through and say that the 14 must represent the cover fee or other flat fee, and 4 must be the number of dollars per game. So from the \$58 available, we deduct \$14 for the entry fee, leaving \$44 available for games. Dividing this by \$4 gives us 11 games.

More formally, we can also set the function equal to the available total, and then reverse the equation, solving it for x. (And you may notice that we end up following the same arithmetic steps. We designed algebra to be a careful and formal way to reason with arithmetic.)

$$\begin{aligned} f(x) &= 14 + 4x \\ 58 &= 14 + 4x \\ 4x &= 58 - 14 = 44 \\ x &= 44/4 = 11 \end{aligned}$$

Problem 5

Official Answer: C

We could solve the first equation for x and then substitute this value into the second expression:

$$\begin{aligned} 4x - 28 &= -24 \\ 4x &= -24 + 28 = 4 \\ x &= 4/4 = 1 \\ x - 7 &= 1 - 7 = -6 \end{aligned}$$

In this case, however, we can transform the left side of the first equation into the second expression in a single step, simply by dividing the entire equation by 4:

$$\begin{aligned} 4x - 28 &= -24 \\ x - 7 &= -6 \end{aligned}$$

Problem 6

Official Answer: 10

10% of \$50 is \$5, and twice this is \$10.

Problem 7

Official Answer: A

How does the new number, 121, compare to all the previous numbers? It is considerably less. In other words, it's an "outlier". What will happen to the mean value if you add a new number that is far below the previous mean? It will shift the mean down towards the new value. The new mean will be lower than the old mean. Saying it the other way around, the old mean will be larger than the new mean, which is answer A.

Problem 8

Official Answer: D

The shaded region is above the line, so we can rule out A and B, because they have the chevrons pointing in the wrong direction. All four choices have the correct y-intercept, and the correct magnitude for the slope, so all that remains to check is the sign of the slope. We need a negative slope, ruling out A and C and leaving only D.

Problem 9

Official Answer: B

We simply need to remove the parentheses and then simplify. Subtracting parentheses should be a danger signal, however, so let's be extra careful to get the signs right:

$$(8x^3 + 8) - (x^3 - 2) = 8x^3 + 8 - x^3 + 2 = 7x^3 + 10$$

This matches answer B.

Problem 10

Official Answer: D

We can tell from the point (0,9) that the y-intercept must equal 9, ruling out answers B and C. Does this line have a steep slope or a gentle slope? In going right one, from $x = 0$ to $x = 1$, the line goes up 8, from $y = 9$ to $y = 17$, so it has a pretty steep slope. (It has a slope of 8, to be precise). Thus D is the correct answer.

Problem 11

Official Answer: 30, -30

You could expand, produce a quadratic equation, and then try to solve the equation. Or you could notice that this is very nearly in factored form already, and you can just add 7 to both sides to produce a quadratic equation in factored form:

$$(d - 30)(d + 30) = 0$$

The two solutions to this equation are 30 and -30, and either one will be accepted as a correct answer.

Problem 12

Official Answer: 4.51, 451/100

Since 896.86 represents a sum of dollars, the two terms $4.51x$ and $6.07y$ represent partial sums, i.e. the separate revenues from the two different sizes of containers. If x counts the smaller containers and y counts the larger containers, then 4.51 must be the price of the smaller containers and 6.07 must be the price of the larger containers. The correct answer is 4.51. The feedback provided after you take the practice test states that 451/100 is also an acceptable answer, which is strange, since the answer box only allows you to enter 5 characters.

Problem 13

Official Answer: A

In an exponential function, the constant coefficient always represents an "initial value" of some kind, and that is all that they are asking for here. The intensity is 500 at the surface, and decreases as the beam passes deeper into the sample. (More precisely, it decreases by half every 12 mm.) They ask for the number at the surface, so the answer is just 500.

Realizing that $t = 0$ at the surface, you could also plug $t = 0$ into the given expression, which would produce $f(0) = 500(0.5)^0 = 500$.

Problem 14

Official Answer: D

The given graph shows you a certain function, and you need to pick the graph which shows the same function shifted up by 5. All graphs are set to the same scale, so you can just examine them by eye. Just look for shifts in the horizontal asymptote. Answer choices A and B have clearly been shifted (or compressed) down, and answer choice C has been shifted (or stretched) up, but not enough. Answer D has been shifted up by 5, so that's the correct answer.

Problem 15

Official Answer: D

We need to solve the given equation for C.

$$P = N(19 - C) \tag{1}$$

$$\frac{P}{N} = 19 - C \tag{2}$$

$$C = 19 - \frac{P}{N} \tag{3}$$

Thus D is the correct answer.

Problem 16

Official Answer: 4205

If every edge has the same length, then we are dealing with a cube. Except there's no lid, so there are only five sides instead of six. The surface area is therefore the same as five squares with a side length of 29, or $5 \cdot 29^2 = 4205$ in^2.

Problem 17

Official Answer: 18

$$\begin{aligned} |x-9|+45 &= 63 \\ |x-9| &= 63-45 = 18 \\ x-9 &= \pm 18 \\ x &= 9 \pm 18 = 27 \text{ OR } -9 \end{aligned}$$

They ask us for the sum of the solutions, which is 27-9, or 18.

Problem 18

Official Answer: A

What happens if you just plug this in to your calculator? You get a negative decimal number. (More precisely, you obtain -1.732... If you don't, make sure your calculator is in radian mode.) That rules out C and D. Now you can just calculate $-\sqrt{3}$ and $-\frac{\sqrt{3}}{3}$ and see which one matches the value for the tangent. Or you could just square the result of your tangent calculation to see if it gives you 3 or 1/3.

If you want to do this without your calculator, you have to do some fraction arithmetic, and then remember your unit circle. An angle larger than 2π radians means that you have gone all the way around the circle and passed your starting point. We can throw away multiples of 2π from such an angle, and all trigonometric functions of the angle will stay the same. Discarding 15 full circles, i.e. $90\pi/3$ radians, reduces the angle from $92\pi/3$ to the "principal angle" of $2\pi/3$. If you remember your unit circle, two-thirds of π means two-thirds of a half turn, or 120°, for which the tangent is -$\sqrt{3}$. (If you've forgotten the unit circle, you might also be able to deduce the result using "special triangles", which are given on the reference page.)

Problem 19

Official Answer: D

All four answer choices consist of a single fraction with k in the denominator, so let's combine the two terms in the given expression into a single fraction and see what happens.

$$\begin{aligned} \frac{42a}{k} + 42ak &= \frac{42a}{k} + \frac{42ak(k)}{k} \\ &= \frac{42a + 42ak^2}{k} \\ &= \frac{42a(1+k^2)}{k} \end{aligned}$$

This matches answer choice D, so we're done.

As usual with domain restrictions on the SAT, this one is irrelevant. Telling us that $k > 0$ is their way of saying that we don't have to worry about divide-by-zero problems.

Problem 20

Official Answer: B

If you remember the form of the equation of a circle in the coordinate plane (and you should), you can read the center and the radius directly from the parameters: $(h,k) = (-4,19)$ and $R = \sqrt{121} = 11$. We are asked for possible values of the x-coordinate of a point on the circle. Since the circle spans a horizontal range from -4-11 = -15 to -4+11=7, possible values of the x-coordinate must lie within this range. Only one answer choice does.

(If you've forgotten the equation of a circle, here it is: $(x-h)^2 + (y-k)^2 = R^2$, where (h,k) gives the coordinates of the center of the circle, and R gives the radius.)

Problem 21

Official Answer: D

The volume of a "normal" box is simply the product of its three measurements, although the SAT gives you the formula on the reference page if you've forgotten this basic fact. The problem statement gives you the three measurements, except that some of them have an x in them. The height is 9, so you can rule out answer choices A and B right away, since they do not include 9 as a factor by itself. The other two dimensions are x for the length, and $x-7$ for the width. (Be careful not to get that backwards. The length is more than the width.) Therefore the three measurements are 9, x, and $(x-7)$, and their product is $9x(x-7)$.

Problem 22

Official Answer: D

What a mess. Let's look at the first specific numerical fact that they give us: $f(-24) = 0$. The only way that the given function can equal zero is if the argument of the radical is zero. (We can rule out the possibility that $a = 0$, because then we'd have the constant function $f(x) = 0$ and $f(24) < 0$ could not be true.) So when $f(x) = 0$, $x + b = 0$. Since the curve passes through (-24,0), this means that when $x = -24$, $x + b = 0$, and thus we deduce that $b = 24$.

Do we need to worry about square roots being positive or negative? If we allow both signs, then $f(x)$ is a dual-valued function, which is non-standard. Presumably, the College Board wants us to follow the convention that $\sqrt{}$ means the positive root. This means that the function $f(x)$ must always have the same sign...the same sign as a. Since they tell us that $f(24) < 0$, this means that $a < 0$.

Since $b = 24$ and $a < 0$, $a < b$ must always be true, and D is the correct answer.

Problem 1

Official Answer: B

Go over to 3, up to the line, and left to the y-axis. The value is between 10,000 and 15,000 and a little closer to the latter, so somewhere in the ballpark of 13,000. Only answer B is anywhere close to this.

Problem 2

Official Answer: C

Just read the coordinates of the dot: (4,5).

Do college admissions committees really need to know if you can read the coordinates of a dot on a graph? Presumably they are testing your ability to recognize that the solution of a system of equations corresponds to the intersection of the curves on a graph...but then they shouldn't have marked the intersection with the only dot in the graph.

Problem 3

Official Answer: B

They ask for the x-intercept, so just find the point where the curve crosses the x-axis. It's at $x = 5$, or the point (5,0), which is answer B.

Problem 4

Official Answer: B

Two blue houses out of seven gives a fraction (i.e. a probability) of 2/7, which is answer B.

Problem 5

Official Answer: A

It's clearly a straight line that rises as you read from left to right. It's "increasing linear", which is answer A.

Problem 6

Official Answer: 6

Dividing the given equation by 6 gives $n = 2$, then adding 4 gives $n + 4 = 6$.

Problem 7

Official Answer: B

$$f(x) = 4x - 3$$
$$f(10) = 4(10) - 3 = 37$$

Problem 8

Official Answer: B

The "y-intercept" means "the place where the line crosses the y-axis", which happens at $y = -4$ in this case. If you really must express this as a coordinate pair, it's (0,-4).

Problem 9

Official Answer: A

We can immediately rule out answers C and D, because we can see that $y = 28$, and answers C and D have the wrong y-values. We can determine the correct x-value by substituting the given y-value into the first equation.

$$y = 12x - 20$$
$$28 = 12x - 20$$
$$12x = 28 + 20 = 48$$
$$x = \frac{48}{12} = 4$$

Thus the solution is (4,28).

Problem 10

Official Answer: 29

Just find the smallest and largest data values, and calculate the difference. The data values are already organized from smallest to largest, so you can just subtract the first from the last, producing 52-23, or 29.

Problem 11

Official Answer: 4

They don't even ask us for y in this question. Just locate the x-coordinate of the intersection. It's at $x = 4$.

This is a free-response question, so they should have marked the intersection with a dot, or given us some confirmation that the solution is a whole number and not $x = 4.003$ or some such thing. They mark all geometric figures with "Note: Figure not drawn to scale"

even when they don't need to, and they save us from worrying about divide-by-zero problems in algebra by giving us all kinds of domain restrictions whenever there are variables in the denominator, but in this case they decided to force us to make an assumption, for some reason.

Problem 12

Official Answer: .5, 1/2

$$h(x) = \frac{8}{5x+6}$$
$$h(2) = \frac{8}{5(2)+6} = \frac{8}{16} = \frac{1}{2}$$

Problem 13

Official Answer: D

The point (0,0) is the origin, meaning that the given relationship is a strict proportion, with no initial value and no y-intercept offset. The function has to have the pattern $f(x) = mx$, and this rules out answer C. Since the slope is 39, m in the formula must have the value 39, and thus our function is $f(x) = 39x$.

Problem 14

Official Answer: D

The snowfall rate varies between a minimum of 0.6 and a maximum of 1.8, so we need to pick the only compound inequality containing the numbers 0.6 and 1.8, which is answer D. In other words, if we symbolize the snowfall rate with s, then the proper way to express this range is $0.6 \leq s \leq 1.8$

Why this is classified as "Medium" difficulty is baffling.

Problem 15

Official Answer: D

$$f(t) = 14t + 9$$
$$\text{Current Value} = \text{Rate} \cdot \text{Time} + \text{Starting Value}$$

Since t is measured in months and f in inches, the plant apparently grows at a rate of 14 inches per month, and it started out with a height of 9 inches.

Problem 16

Official Answer: 7.5, 15/2

If you've forgotten how to calculate the area of a triangle, you can find the formula on the reference page. You just take half of the rectangle with the same base and height. $\frac{1}{2} \cdot 3 \cdot 5 = \frac{15}{2} = 7.5$

Problem 17

Official Answer: A

All four answer choices are expressed in slope-intercept form, so let's try to deduce the slope and intercept from the data. In going from $x = 1$ to $x = 2$, y goes from 11 to 16, so the rise is 5 for a run of 1, i.e. the slope is 5. This rules out C and D. We know the y-intercept can't be 11, since that's the value for $x = 1$, not $x = 0$, so that rules out B and leaves A.

If we wanted to extrapolate backwards from $x = 1$ to confirm the correct intercept, we could just subtract 5, leaving 11-5=6, confirming that A is the correct answer.

Problem 18

Official Answer: 6

Just equate the two expressions for y, producing a quadratic equation that can be solved for x.

$$4x = x^2 - 12 \quad (4)$$
$$x^2 - 4x - 12 = 0 \quad (5)$$
$$(x-6)(x+2) = 0 \quad (6)$$
$$x = 6 \text{ OR } -2 \quad (7)$$

They (obliquely) ask us for the positive solution, which means that the correct answer is 6.

Problem 19

Official Answer: B

$$\frac{\text{coaches}}{\text{athletes}} = \frac{1}{26} = \frac{x}{?}$$
$$\frac{26}{1} = \frac{?}{x}$$
$$? = 26x$$

If for some strange reason you needed an algebraic expression for the number of athletes at this track meet as a function of the number of coaches, it would be $26x$.

Problem 20

Official Answer: A

In other words, we need to recast the first formula so that it looks like the second formula, and then we can see what number is in the numerator of the fraction. There are two changes we need to make: We need to re-scale the independent variable from $x/4$ to x (which will change the base), and then we need to split the base of the exponential function into separated form.

$$\begin{aligned} f(x) &= (1.84)^{x/4} \\ &= ((1.84)^{1/4})^x \\ &= (1.16467...)^x \\ &\approx (1 + \frac{16}{100})^x \end{aligned}$$

Matching this expression against the requested expression, we see $p \approx 16$, and the correct answer is A.

Calculator tip: A quick way to take the fourth root of something is to hit the square root button twice.

Problem 21

Official Answer: A

You might suspect at first that you'll need to worry about angles. The triangles touch at point R, and the obtuse angle at R plus twice x must add up to a straight angle. But all of this is irrelevant. They tell us some lengths, and they ask for another length, and they tell us that the triangles are similar, so that's all we need to know. We can just set up the appropriate proportion. There are a couple possible proportions we could set up. Here's one:

$$\begin{aligned} \text{Diagonal} : \text{Vertical} &= QR : QP = SR : ST \\ 25 : 15 &= x : 14 \\ x &= 25 \cdot \frac{14}{15} = \frac{5}{3} \cdot 14 = \frac{70}{3} \end{aligned}$$

This isn't among the answer choices, because they didn't express the answer choices in simplest terms. So we have to pick 350/15, which is equivalent to 70/3.

Problem 22

Official Answer: B

It might help to doodle a sketch to help keep all of the information organized, but this problem isn't that complicated. They give us the lengths of two sides of a right triangle, and we have to calculate the third. The only snags are that we don't know which side is which, and we have messy radicals to work with.

Side AC is opposite to angle B, which they tell us is the right angle. In other words, side AC is the hypotenuse, and we can calculate its length with a straightforward, if messy, application of the Pythagorean Theorem.

$$\begin{aligned} AC^2 &= AB^2 + BC^2 \\ &= (10\sqrt{37})^2 + (24\sqrt{37})^2 \\ &= 100 \cdot 37 + 576 \cdot 37 \\ &= 676 \cdot 37 \\ AC &= \sqrt{676} \cdot \sqrt{37} \\ &= 26\sqrt{37} \end{aligned}$$

You might also notice that $\sqrt{37}$ is a common factor in everything—in both given sides and in all four answer choices. So you could also just ignore it, and calculate $\sqrt{10^2 + 24^2} = 26$. It's even easier if you remember your Pythagorean triples, and recognize that the sides of the given triangle are in the ratio of 5:12:13. They just multiplied everything by $2\sqrt{37}$. So the answer must be $13 \cdot 2\sqrt{37} = 26\sqrt{37}$.

Problem 1

Official Answer: B

This is a direct application of the Pythagorean Theorem:

$$\sqrt{11^2 + 9^2} = \sqrt{121 + 81} = \sqrt{202}$$

Problem 2

Official Answer: B

In moving from point (7,21) to point (9,25), we move over 2 and up 4, so the slope of the line is 4/2=2. Only one answer choice has a slope of 2.

If you want to confirm that 7 is the correct y-intercept, you can extrapolate backwards from $x = 7$. Moving backwards by 7 units horizontally will bring us down 14 units vertically. Subtracting 14 from 21 gives 7, which confirms that answer B is correct.

If you like doing things the formal way, you can also plug the coordinates into the slope formula to deduce the slope, then plug the slope and one point into the point-slope form of a linear equation, then rearrange.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{25 - 21}{9 - 7} = \frac{4}{2} = 2$$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 21 &= 2(x - 7) \\ y &= 2x - 14 + 21 = 2x + 7 \end{aligned}$$

You could also plug the two coordinate pairs into the two-point form of a linear equation, but who remembers that?

Problem 3

Official Answer: B

All "margin of error" questions involve a plausible range of values. In this case, 12 ± 3.62 gives a range of 8.38 to 15.62, which is answer B.

Problem 4

Official Answer: A

Let's start by checking the directions of the arrows. We need the total weight to be less than (or equal to, but that's irrelevant here) 5630 pounds, meaning the symbol has to look like this: $\leq$. There are two different numbers on the right side, but $\geq$ is definitely wrong, so we can rule out B and D. We can choose between A and C if we can decide either the proper value of the total or the proper pairing of coefficients.

The truck has a maximum capacity of 5630, but we need to deduct the extra piece of equipment. The sum is only for the crates, not the total weight including the extra equipment, so the number on the right needs to be 5630-190 = 5440. This rules out C and leaves A.

The lighter crates weigh 25 pounds and are enumerated by x, so 25 needs to go with x. Likewise, 62 needs to go with y. Thus the expression on the left, expressing the summation of the weight of the crates, needs to be $25x + 62y$, confirming that A is the correct answer.

Problem 5

Official Answer: C

The answer choices are all numerical and relatively simple, so you could just use trial-and-error. Substitute the four pairs of values into either equation (the second is easier), and you'll find that only one answer choice works.

You can also solve the system formally. Within the answer choices, all of the x-coordinates are different and so are all of the y-coordinates, meaning you can solve for either variable and that by itself will lead you to the correct answer. Any route you see to one or the other of the two variables will work.

One comparatively painless way would be to rewrite the first equation as $y = 13 + 9x$, double it, and then equate the two expressions for $2y$.

$$\begin{aligned} y &= 13 + 9x \\ 2y &= 26 + 18x \\ 5x &= 26 + 18x \\ -26 &= 13x \\ x &= -2 \end{aligned}$$

There is only one answer choice with $x = -2$.

Problem 6

Official Answer: 29

Just find the smallest and largest data values, and calculate the difference. The data values are already organized from smallest to largest, so you can just subtract the first from the last, producing 52-23, or 29.

Problem 7

Official Answer: D

If we let b stand for the number of loaves of bread and e the number of egg cartons, then we can sum up the two bills like this:

$$b + 2e = 12.45$$
$$4b + e = 19.42$$

Would this be easier to solve by substitution or elimination? If we use substitution, we'll end up mixing decimal numbers into the left side of the equation, so let's try elimination. Since we are only interested in the cost of a dozen eggs, let's eliminate b by subtracting the second equation from four times the first equation:

$$4b - 4b + 8e - e = 4 \cdot 12.45 - 19.42$$
$$7e = 30.38$$
$$e = 4.34$$

The eggs cost $4.34 per dozen, and D is the correct answer.

Problem 8

Official Answer: D

We can rule out C right away. There is no way for a constant and a quadratic function to have "infinitely many" solutions. To choose the correct answer, we could just graph these two equations using Desmos and then count the intersections. Or we could notice that the first will give a horizontal line at $y = 18$, and the second, judging from the numbers, will be a downwards-facing parabola with a vertex at (18,15). This means that the parabola is entirely below the line, the graphs will never intersect, the system will have no solutions, and D is the correct answer.

If you want to work through this problem in a traditional, algebraic way, you can equate the two expressions for y, which will produce a single quadratic equation in x.

$$18 = -3(x - 18)^2 + 15$$
$$-6 = (x - 18)^2 - 5$$

At this point, you might notice that you can rewrite the equation as $(x - 18)^2 = -1$, which has no solutions. Unless you want to work with imaginary numbers (which the SAT never does), there is no way to square any number and obtain a negative number. Or you could continue to expand the expression, rewrite the equation in standard form, and then evaluate the discriminant.

$$-6 = x^2 - 36x + 18^2 - 5$$
$$x^2 - 36x + 325 = 0$$
$$\Delta = b^2 - 4ac = (-36)^2 - 4(1)(325)$$
$$= 1296 - 1300 = -4$$

The discriminant is a negative number, meaning that there are no real solutions to the quadratic equation, and no intersections in the system.

Problem 9

Official Answer: A

If we equate the two expressions for y, we'll have a quadratic equation that we can solve for x, and then we just have to pick the largest solution.

$$x + 9 = x^2 + 16x + 63$$
$$x^2 + 15x + 54 = 0$$
$$(x + 6)(x + 9) = 0$$
$$x = -6 \text{ OR } -9$$

The greatest of these is -6, i.e. answer A.

Problem 10

Official Answer: -10

The straightforward way to answer this would be to substitute the given slope and x-intercept into the template equation of a line, and deduce the y-intercept:

$$y = mx + b$$
$$0 = -\frac{5}{3}(-6) + b$$
$$b = -\frac{6 \cdot 5}{3} = -10$$

So the answer is -10. Alternately, one could use the slope formula, and substitute the coordinates (-6,0) and (0,b) for the x- and y-intercepts:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$-\frac{5}{3} = \frac{b - 0}{0 - -6}$$
$$b = -\frac{5}{3} \cdot 6 = -10$$

Problem 11

Official Answer: A

There is nothing high-tech about this equation. It's just messy. Simplify and see what happens:

$$\begin{aligned} 12(x-3) &= -3(x+12) \\ 12x-36 &= -3x-36 \\ 15x &= 0 \\ x &= 0 \end{aligned}$$

There is one solution, it equals zero, and the correct answer is A.

Problem 12

Official Answer: D

If interpretive word problems confuse you, one thing you might try is to write a "pseudo-equation", with mixed words and symbols. In this case, since the number of suits has been named x ("n" might have been a better choice), and the total length of fabric has been named y ("l" might have been more helpful), when we can write:

Starting Total	-	5 Yards Per Suit	·	Number of Suits	=	Leftover
y	-	5	$\cdot$	x	=	6

The number "6" clearly represents the amount of fabric left over after Kaylani makes all of her suits. This is what answer D says ... although it could have been expressed far more succinctly.

Problem 13

Official Answer: D

You might notice that answer B can easily be factored into $(x-7)^2=0$, which clearly has the solution $x=7$. So answer B cannot be the correct answer. Wrestling with the other choices, however, will be more challenging.

When dealing with quadratic equations and the number of solutions, always think of the discriminant. If you've forgotten it, you should memorize it: b^2-4ac. In this problem, we need to find the equation with no (real) solutions, meaning that the discriminant must be negative. You might notice that all four answer choices have ± 14 for b, so $b^2=196$. Therefore, we need to find the equation for which $4ac$ is greater than 196. A and B won't work, because $1\cdot(\pm 49)=\pm 49$. Answer C won't work because $5\cdot -49$ gives a negative number, which can't be greater than positive 196. This leaves us with answer D.

It wouldn't be too hard just to get out your calculator and calculate the discriminant in full for each of the four cases. Plugging the respective coefficients into b^2-4ac gives:

A)	$14^2-4(1)(-49)$	=	392
B)	$(-14)^2-4(1)(49)$	=	0
C)	$(-14)^2-4(5)(-49)$	=	1176
D)	$(-14)^2-4(5)(49)$	=	-784

Only answer D gives a negative discriminant.

Problem 14

Official Answer: A

In other words, we need to recast the first formula so that it looks like the second formula, and then we can see what number is in the numerator of the fraction. There are two changes we need to make: We need to re-scale the independent variable from $x/4$ to x (which will change the base), and then we need to split the base of the exponential function into separated form.

$$\begin{aligned} f(x) &= (1.84)^{x/4} \\ &= ((1.84)^{1/4})^x \\ &= (1.16467...)^x \\ &\approx (1+\frac{16}{100})^x \end{aligned}$$

Matching this expression against the requested expression, we see $p\approx 16$, and the correct answer is A.

Calculator tip: A quick way to take the fourth root of something is to hit the square root button twice.

Problem 15

Official Answer: 10

This is sneaky and annoying. It looks like a system of linear equations, so you might be tempted to rewrite both in slope-intercept form and then compare slopes. But which letter should you solve for? There are three letters (r, p, and w...be careful not to overlook p), and p is a constant. So let's just try solving both equations for w and see what happens.

$$\begin{aligned} 6+7r &= pw \\ w &= \frac{7}{p}r+\frac{6}{p} \\ 7r-5w &= 5w+11 \\ 7r-11 &= 10w \\ w &= \frac{7}{10}r-\frac{11}{10} \end{aligned}$$

If we were to graph these two functions as $w(r)$, we'd see two lines, and for the system to have no solution, the slopes must be equal.

$$\frac{7}{p} = \frac{7}{10}$$
$$p = 10$$

We could solve the two equations for r instead of w, but the reasoning and the conclusion regarding p would be identical.

Problem 16

Official Answer: -24

We can find c easily enough by locating the y-intercept. (Be careful not to confuse the vertex with the y-intercept.) The y-intercept of a quadratic function in standard form is always equal to c, i.e. the constant term.

By locating the intercept dot on the graph, we see that $c = -6$. We can find b by using the vertex formula and plugging in the x-coordinate of the vertex dot:

$$x = \frac{-b}{2a}$$
$$-1 = \frac{-b}{2(2)}$$
$$b = 4$$

The products of coefficients of quadratic expressions are never useful in real life, but just to give us one more step to perform, they nonetheless ask us for the product bc, which is (-6)(4)=-24.

Problem 17

Official Answer: A

Sneaky! You might look at the graph, decide that the equation must have a positive y-intercept and a negative slope, and pick answer B. But you'd lose a point if you did that.

Whenever they give you a graph and ask for an equation, especially if the problem is near the end of the test, always check for offsets or translations. The given graph is *not the graph of* $f(x)$. It is the graph of $f(x) + 19$, and it is therefore 19 units too high. The y-intercept of $f(x)$ is not 3, but -16, making answer B incorrect and answer A correct.

Problem 18

Official Answer: 480

It will probably help to draw a sketch and label everything that you know. We are asked for the area of the large triangle, and if we add together 3 and 21, we have the base of the large triangle. To calculate the area of the large triangle, we need to also find its height, DE.

We could calculate AD or BD using proportions, and then use the Pythagorean Theorem to calculate the height of the large triangle, or we could use the Pythagorean Theorem first to calculate the height of the smaller triangle, and then use proportions to find the height of the larger triangle. Doing it the latter way, Pythagoras first and then proportions, we can calculate thusly:

$$BC = \sqrt{(\sqrt{34})^2 - 3^2} = \sqrt{34 - 9} = \sqrt{25} = 5$$

$$\frac{DE}{BC} = \frac{21 + 3}{3} = 8$$

$$DE = BC \cdot 8 = 5 \cdot 8 = 40$$

Now that we have both the base and height of the large triangle, we can calculate the area. It's just half the product of the two perpendicular dimensions:

$$\text{Area} = \frac{1}{2} \cdot 24 \cdot 40 = 480$$

Problem 19

Official Answer: A

Sometimes it helps to ask simple questions: Does x need to be larger or smaller than 60? Since we increased it to get 60, x must be smaller than 60. This allows us to rule out answer choices C and D right away.

As long as you notice that we are dealing with percents larger than 100, and you are extra careful with the multiplication factor, calculating the exact value of x is pretty simple. If you realize that increasing a quantity by 400% corresponds to multiplying it by a factor of 5, then you can reason like this:

$$5x = 60$$
$$x = 12$$

Thus the correct answer is A. If you mistakenly used 4 as the multiplication factor, you would have arrived at answer B and lost a point. $4x$ gives the amount by which the quantity increased, but we can't forget the

original x that we started with, so we have a final total of $5x$.

One could argue that percents were designed to deal effectively with *fine divisions of a whole*, and that if you need to deal with percents larger than 150 or so, other tools would be better. Nevertheless, the SAT likes to give you percentages of several hundred, and they are trying to see if you'll forget to add 1 to the multiplication factor. So be extra careful with large percents.

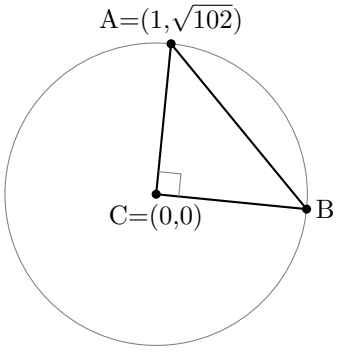
Problem 20

Official Answer: A

This is a tricky one. You have to reason your way through it. A sketch might help.

The coordinates of the center make no difference. The important thing to notice is that in moving from the center to point A, we go right one unit and up $\sqrt{102}$ units. This is slightly more than $\sqrt{100} = 10$ units, so if you are doodling, draw point A just to the right of the top of the circle.

Next, they tell us that $\angle ACB$ is a right angle, meaning that points A and B lie on perpendicular radii, and points A, B, and C form an isosceles right triangle, or a 45-45-90 right triangle. If you are doodling, you can draw point B just above the left side of the circle, or just below the right side. It doesn't matter which. Ignoring the irrelevant center coordinates and drawing point B on the right side, a summary sketch should look something like this:



Do you see now how we can calculate the length of AB? We can obtain the length of the circle's radius, i.e. the length of the legs of the triangle, from the coordinates of A, and the hypotenuse of the triangle will be this multiplied by $\sqrt{2}$.

$$\begin{aligned} CA &= \sqrt{1^2 + (\sqrt{102})^2} \\ &= \sqrt{103} \\ AB &= \sqrt{2} \cdot \sqrt{103} = \sqrt{206} \end{aligned}$$

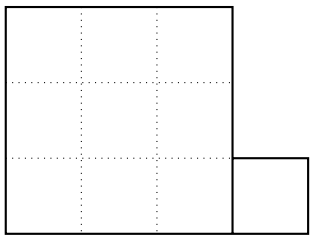
The radius of the circle is $\sqrt{103}$, the chord of the circle and the hypotenuse of the triangle are $\sqrt{206}$, and the correct answer is A.

Problem 21

Official Answer: 4176

This is another physics problem in which the physics doesn't matter. The physics is merely context for a geometry problem. The first sentence explains a little of the physics involved. All you need from this sentence is the fact that Flux = Field · Area. In other words, flux is proportional to area, and we can probably deal with fluxes by dealing with areas.

Now we come to the geometric setup. We have two adjacent squares, one of which is three times as large (in side length) as the other. So the situation looks like this:



So in terms of area, the larger square is nine times as large as the small square, or 9/10 of the total. (Incidentally, if one thing is three times as long as another thing, it is three times as long no matter what units you measure in. There was no reason to say "in meters" twice, other than to bloat the text with useless words.) They tell us that the field strength is 29.00 Vpm, but it turns out that this fact is totally unnecessary as well. If the flux through the total surface is 4640, and flux is proportional to area, then the flux through the larger square will simply be 9/10 of the total flux. Arithmetically, all we need to do is multiply 4640 by 9/10, which gives us 4176.

You could divide 4640 by 29 to deduce that the the area of the entire surface is 160 m^2, then multiply this by 9/10 to calculate that the area of the large surface is 144 m^2, and finally multiply this by 29 again to discover that

the flux through the large surface is 4176 Volt-meters. But it's more work than you need to do.

Problem 22

Official Answer: A

The equations all have positive slopes and positive y-intercepts, so a simple sign check doesn't help. We'll have to dig deeper.

They give us a graph for one (nearly linear) data set, and then they ask us for the equation of another data set. Let's start by trying to write the equation for the first data set, at least approximately. Judging from the graph, the intercept is around 12, and the slope is about 3/2, so the equation should be close to $y = 1.5x + 12$. The second data set is equal to the first, but all values are to be quadrupled, more or less. If all values are quadrupled, the slope and y-intercept will also be quadrupled, and the new equation will therefore be close to $y = 6x + 48$. Answer A is pretty close to this, and none of the others are even in the ballpark.

You could also estimate the coordinate pairs for two dots on the line, multiply the y-values by 3.9, and then plug those two ordered pairs into the two-point form of a linear equation to work out the equation of the line, but that's too much work.