

# 2008: Form 61C

## English Test

**1. Answer: D. E113 Short and Simple**

The words *associated* and *connected* are synonyms, so there is no reason to include both. Redundant phrases should be removed.

**2. Answer: F. E113 Short and Simple**

Again, all options here are unnecessarily complicated and add no new ideas to the statement. As such, the simplest choice is correct.

**3. Answer: B. E103 Independent Clauses: Period, Semicolon, Comma and FANBOYS**

Don't be fooled by the fact that **A** and **D** both use a semicolon! Despite the words following being rearranged, both are correct as they are still independent clauses. The only answer in which two independent clauses are not validly separated is **C**, which lacks the necessary FANBOYS conjunction.

**4. Answer: J. E101 Verbs: Agreement/Tense; E102 Commas**

The modification of *music* only needs a comma to differentiate it from the main clause. Make sure the verb agrees, as **H** has a correct comma but an incorrect conjugation.

**5. Answer: A. E102 Commas**

There is no need to include a comma here, as no new clause or article is presented. *Itself* is a simple modification of *word*, and does not warrant separation.

**6. Answer: G. E101 Verbs: Agreement/Tense**

Note that the active verb does not match the subject. The dance does not perform itself, nor dance itself. The subject must be the dancers in some respect, which is only an option in **G**.

**7. Answer: A. E115 Modification: Dangling Modifiers**

*Long past* is used not to describe *play*, but *midnight*. They are adjectives within a modification, requiring no punctuation. They should not be separated from that which they are describing.

**8. Answer: G. E101 Verbs: Agreement/Tense**

The start of this sentence sets the tense with the present *step*. The word *as* is an important clue that the following verb needs to match in tense, so the present *are also stepping* is correct.

**9. Answer: A. E106 Apostrophes: Possessive, Plural, Contractions**

The plural possessive *there* is correct for the history as possessed by the plural noun *dancers*. Forms of *it* are incorrect because they do not agree with the antecedent.

**10. Answer: J. E110 Relevancy: Adding, Deleting, and Replacing Information**

Remember to prioritize the supporting evidence, not the *yes* or *no*, when determining answers for this type of question. In this case, the sentence is not relevant, as properly recognized only in answer J.

**11. Answer: C. E116 Modification: Moving Modifiers**

The fact that *of Spanish mercenaries* is a modifier of *guitars* necessitates that they stay together, so the phrase may not be placed between them, lest the modification be invalidated.

**12. Answer: J. E101 Verbs: Agreement/Tense**

The simple past tense, conjugated with only the *-ed* ending, is correct in this sentence. There is no sense of continuity or ongoing action, nor any need for the reflexive *were borrowed* which would cause the O'odham to be no longer the acting subject but instead the acted-upon object.

**13. Answer: A. E110 Relevancy: Adding, Deleting, and Replacing Information**

The point of this sentence is to explain the introduction of woodwinds to waila, and this is made clear only by the parenthetical. No replacement similarly reflects the intent of the sentence.

**14. Answer: G. E102 Commas**

This sentence has a very simple structure despite the compound subject. *Around this time* is a non-essential transitional clause, *the polka music and button accordion* is a compound subject, *played by German immigrant railroad workers* is a modifier, and *left their mark on waila* is the predicate. Though the subject is very large, this sentence essential follows basic subject-predicate structure and thus has no need for additional punctuation.

**15. Answer: C. E118 Moving Paragraphs**

The clue in this sentence is the pronoun *those*. Where is there an antecedent matching? It must be a mention of German influences, because *those* are the *same*. The only appropriate placement is after the mention of German railroad workers' music in paragraph 3.

**16. Answer: J. E111 Word Choice: Correct Word**

The word *difference* implies more of a state of being rather than an action. *Contest* and *dispute* both imply this active nature, while *change* clearly indicates a shift of states.

**17. Answer: B. E104 Nonessential Information: Commas, Dashes, Parentheses**

The extra clause *according...system* should be nested within commas to separate it from the necessary parts of the sentence and prevent any warping of clauses.

**18. Answer: J. E110 Relevancy: Adding, Deleting, and Replacing Information**

It is not relevant to this paragraph to make this statement. As such, it is better removed. The replacement options are no better, as they offer similarly irrelevant statements regarding the universal nature of birthdays.

**19. Answer: A. E111 Word Choice: Correct Word**

The difference is subtle, but *heightened* is the most correct option. *Raised* and *lifted* imply an actual vertical movement, and *lighted* an element of illumination. *Heightened* is used as an intensifier rather than an actual measure of height, thus is most correct.

**20. Answer: F. E110 Relevancy: Adding, Deleting, and Replacing Information**

To find what would be lost, one must consider what is added by this sentence. It both states and explains the added importance of New Year's Day in Korea. It is not a *repetitive reminder*, nor a *defense*, nor an *illustration* of counting. The only valid option is that it comments on the significance of New Year's in Korea.

**21. Answer: C. E114 Transition Words/Phrases**

The implications of each transition are subtle, but greatly impact the meaning of the sentence. The correct *in fact* builds off of the prior point and adds a new point or example. *Though* implies contradiction, *otherwise* similarly notes an exception, and *then* a chronological ordering.

**22. Answer: F. E111 Word Choice: Correct Word**

The prepositions can be difficult to differentiate. They are best determined through common-sense and familiarity. While we know the combination *points on* is wrong, determination between *points at* and *points to* is only clear through knowledge of English.

**23. Answer: A. E106 Apostrophes: Possessive, Plural, Contractions**

Because *a person* is singular and this person is in ownership of *age*, a singular possessive is necessary. This means there will likely be an apostrophe followed by an *s*. Option **D** is incorrect due to the extraneous comma following *age*, so **A** is correct.

**24. Answer: J. E105 Pronouns: Agreement/Case**

All of the incorrect options are possessive with ambiguous antecedents. Because it is not clear what is said to be owning the idea, it is best foregone in favor of *this*, which allows it to exist independent of any possession.

**25. Answer: B. E115 Modification: Dangling Modifiers**

*By* is the only option which creates a grammatically correct sentence. *When*, *while*, and *as if* all fail to create a complete predicate. Those modifications mandate a second action for comparison, and as there is none the sentence is incomplete. *By* does not require a comparative article, and thus is a valid sentence.

**26. Answer: F. E111 Word Choice: Correct Word**

Options **G-J** do not provide any indication of *positive attitude*. The *great enthusiasm* mentioned in **F**, however, portrays just that.

**27. Answer: A. E111 Word Choice: Correct Word**

Although the difference between *which* and *that* can be subtle, fortunately they are not both options here. *Whose* is incorrectly possessive. *Whom* is used in reference to people, not objects. *This* is not a relative pronoun, as is necessary here.

**28. Answer: H. E110 Relevancy: Adding, Deleting, and Replacing Information**

The most significant indicator here is the word *details* leading option **H**. It should be identified right away that both phrases in question are details, so this should stand out as a strong option. The others can be ruled out due to lack of humor, preference, and personal input from the author.

**29. Answer: D. E113 Short and Simple**

In this case, the words *refuse* and *hesitate* are unnecessary and in fact scarcely far from nonsensical. The shortest option amongst like choices is often correct, and the simple *balk* is appropriate and does not sacrifice any meaning.

**30. Answer: G. E111 Word Choice: Correct Word**

The word *apparently* implies something not being as it appears, which is precisely what this sentence discusses. It is by far the most appropriate option for this sentence.

**31. Answer: C. E111 Word Choice: Correct Word**

Option C provides examples which help to illustrate the term *dress code* in this context. The other options do not help promote understanding of the term because they offer no insight into *what* was being prohibited.

**32. Answer: J. E112 Word Choice: Tone**

In this essay, it is inappropriate to include slang terms and colloquialisms such as *blow off* or *bored to tears*. Instead, descriptive and professional adjectives such as those in J are ideal.

**33. Answer: A. E110 Relevancy: Adding, Deleting, and Replacing Information**

The replacement options do not effectively introduce this paragraph. If you read ahead, you will note that this paragraph deals with the constitutional implications of the case. Options B-D do not address this, and are largely irrelevant.

**34. Answer: H. E102 Commas**

*The United States District Court of New Hampshire* should not have any internal commas because it is all one title. No punctuation is necessary following it, either, because the subject is followed immediately by the predicate, and no extraneous clauses or modifications need be denoted.

**35. Answer: C. E111 Word Choice: Correct Word**

One does not have a right *for* or *of* something nearly as often as *to* something. In this case, that is indeed correct. This is a matter of context, with no hard-set rules to dictate answers.

**36. Answer: G. E104 Nonessential Information: Commas, Dashes, Parentheses**

The *however* in question is not a necessary clause, and thus is best nested between commas to denote its properties as an addition.

**37. Answer: D. E113 Short and Simple**

The non-essential clauses here are all irrelevant and best deleted.

**Tip:** Remember: *Shorter is better!* If a short option seems just as valid as a long option, the short option is almost always correct.

**38. Answer: H. E106 Apostrophes: Possessive, Plural, Contractions**

The possessive form is *Its*, which is correct here. The apostrophe should always remind you that *It's* is a contraction, because the missing space and *i* are replaced with it.

**39. Answer: A. E111 Word Choice: Correct Word**

The correct option is the existing *that*, as it is expanding upon the word *claim* in such a way as to require this relative pronoun. Forms of *which* are not correct because there is not a question of specification, nor is *where* because it unduly implies location (physical or not).

**40. Answer: J. E114 Transition Words/Phrases**

Although moved into the middle of the sentence, this is still a transition. It would make sense at the start of the sentence, too, which should be a strong indicator. *However* is appropriate because it shows an unexpected contrary, whereas *thus*, *therefore*, and *moreover* would all show some sort of result or further example.

**41. Answer: C. E101 Verbs: Agreement/Tense**

The simple present conjugation *wearing* is adequate for this sentence because it presents the action as a noun, as in *the act of wearing*. This is the only correct option in this context.

**42. Answer: F. E110 Relevancy: Adding, Deleting, and Replacing Information**

In this paragraph, the existing sentence is the best option. The question looks both for a strong opener and a conveyance of *the importance of this case*. The only option which addresses both aspects of this question correctly is **F**; the others fail to meet one or both requirements.

**43. Answer: C. E102 Commas**

*A review* is the noun being acted upon here by the active verb *initiated*. The following *of students' rights...* is simply a modification, and as such requires no commas to separate it.

**44. Answer: F. E111 Word Choice: Correct Word**

The correct preposition here is *in*, because one does not have responsibility *on*, *with*, or *about* public education. It is the only answer which makes sense in context.

**45. Answer: D. E119 Writer's Goal**

Be careful not to be caught up in the *yes* and *no* part of these questions, but instead to focus on the supporting evidence. The only option which both addresses the question's *urging students and* correctly connects it to the passage is **D**. While others may do one or the other, they do not adequately fulfill both.

**46. Answer: G. E114 Transition Words/Phrases**

*Because of* is the appropriate transition because it correctly portrays the correlation between cause and effect. The other options do not, and cause the sentence to become confusing.

**47. Answer: A. E110 Relevancy: Adding, Deleting, and Replacing Information**

While option **D** is almost correct, in that it does provide an important description, it is not one of setting. As such, option **A** is the best answer because the contrast is indeed very important to the paragraph and almost entirely set up by the opening sentence.

**48. Answer: G. E106 Apostrophes: Possessive, Plural, Contractions**

Because the noun is plural (multiple girls) and possessive (faces belonging to them), there must be an apostrophe following the letter *s*.

**49. Answer: D. E113 Short and Simple**

The shortest, simplest answer is often correct. When it does not lose out on any important meanings, it is definitely correct. In this case, *apparent* is a single word which is just as appropriate as the entire phrases in other options, making the sentence much more concise and readable.

**50. Answer: G. E111 Word Choice: Correct Word**

The pronoun *who* is appropriate here to refer to a human antecedent. While *they* can also be used for humans, it is not a relative pronoun and thus creates a new independent clause. Without a conjunction to make a compound sentence, this new clause is incorrect.

**51. Answer: C. E111 Word Choice: Correct Word**

While it is important to understand the preposition+pronoun relationship, you can still answer this question without understanding it. The correct answer is significantly shorter than the other options, so it is not hard to guess it safely.

**52. Answer: H. E104 Nonessential Information: Commas, Dashes, Parentheses**

The clause starting with *who* is very similar to one starting with *which*. In both cases, the clause must be nested between commas so as to be separate from the functional parts of the sentence.

**53. Answer: B. E110 Relevancy: Adding, Deleting, and Replacing Information**

While option **C** is tempting, note that it specifically offers a *reason* for Houdini's skepticism. The sentence itself does not offer such a reason, but only explains said skepticism. Instead, **B** is correct because this information is necessary context for the following sentence.

**54. Answer: J. E116 Modification: Moving Modifier**

Note that the clause at the start of the sentence does not in fact *need* to be at the start. As it could be at the end, if we imagine the sentence rearranged we can better understand the subject and predicate, identifying this clause as a modifier. As such, there is no need for a conjunction, only a comma to separate the essential and nonessential clauses.

**55. Answer: D. E113 Short and Simple**

The correct option is significantly shorter than the others, which should immediately strike you as a hint. The wordiness of options **A** and **B** is absurd, and though **C** is a little shorter there is no reason not to shorten it further.

**56. Answer: J. E114 Transition Words/Phrases**

Transitioning also means knowing when, where, and how to split up ideas. In this case, the shift of focus from Houdini to the hoax's reveal is cause enough to create a new paragraph. The transition *since* is unnecessary, and while another, more appropriate transition word could be included, it is optional.

**57. Answer: C. E105 Pronouns: Agreement/Case**

When determining the correct pronoun for a situation with multiple pronouns, imagine the one in question by itself. Without *her cousin*, the sentence would read *...admitted that she had staged...* This means, even with her cousin added in, the correct pronoun is still *she*.

**58. Answer: H. E101 Verbs: Agreement/Tense**

Four out of the five options use the same tense for the verb: this should be a pretty strong indicator to look at the fifth. The present-tense *using* is not correct for an action which was very much in the past.

**59. Answer: B. E110 Relevancy: Adding, Deleting, and Replacing Information**

The question specifically seeks a link to the opening sentence. If you don't remember the opening, flip back and look: it's about Sherlock Holmes. As such, **B** is the appropriate link.

**60. Answer: J. E119 Writer's Goal**

Remember to prioritize the supporting evidence when analyzing these answers. **J** is correct because it both addresses the concern of the question *and* accurately references the text: no incorrect answer manages both.

**61. Answer: C. E105 Pronouns: Agreement/Case**

The reference to *her invalid mother* in this sentence introduces a second possible antecedent to any following pronouns. As such, it is best and least ambiguous to state the antecedent instead of repeating potentially confusing pronouns.

**62. Answer: F. E107 Colons and Dashes**

The colon is used following an independent clause to lead into an example or explanation. In this case, the count of letters and recipients furthers the explanation of the preceding independent clause. Note that a dependent clause does not need anything else to follow a colon!

**63. Answer: B. E114 Transition Words/Phrases**

There is no reason to create a new paragraph here. Leaving one sentence by itself is poor form, and should be a good clue that this should remain one paragraph. Between options **A** and **B**, only **B** correctly places the comma after the transitional modification phrase.

**64. Answer: F. E120 Parallel Structure**

When multiple prepositions are used like this (both linked to the same action), they should be the same or similar. As such, Dickinson *wrote of* \_\_\_ *and of* \_\_\_ is the correct wording. Options **H** and **J** are wordy and easily eliminated.

**65. Answer: D. E110 Relevancy: Adding, Deleting, and Replacing Information**

The question state's the paragraph's focus (*roles that letters played in Emily Dickinson's life*). This should be the foremost consideration in determining an answer. In addition, the sentence should make sense in context. The best option is **D**, which fits very well in this place as well as develops the focus of the paragraph.

**66. Answer: H. E102 Commas**

The underlined portion separates a modification from its subject. As such, all that is necessary is a comma. Were the sentence to continue past the modification, a comma would be necessary on both sides; the period, however, supersedes the comma.

**67. Answer: B. E111 Word Choice: Correct Word**

*Whom* is only used after a preposition. *Who* is correct here: **C** creates an entirely new meaning, and **D** incorrectly changes the subject of the verb phrase *had died*.

**68. Answer: G. E103 Independent Clauses: Period, Semicolon, Comma and FANBOYS**

There is no need to include any punctuation in the underlined portion. It is organized in a basic subject-predicate order with no extra clauses or modifications.

**69. Answer: C. E105 Pronouns: Agreement/Case**

The fact that Susan and Emily are both mentioned means the antecedent to *her* is ambiguous. Whenever an ambiguous pronoun is present, it is best resolved by including the antecedent, as in C.

**70. Answer: J. E113 Short and Simple**

None of the additional descriptions provided are relevant to the sentence. While they may well be factual, this is not the place to include them. The shortest answer is often correct, so consider J extensively right off the bat.

**71. Answer: D. E110 Relevancy: Adding, Deleting, and Replacing Information**

The question asks for a replacement which *clearly describe[s] the interaction. . . during the writing process*. Only option D shows an interaction and not just an action; that is, shows both women taking part in different ways.

**72. Answer: F. E113 Short and Simple**

The other options here are redundant and wordy. None of them offer any extra insight, only unnecessary restatements and phrasing.

**73. Answer: B. E101 Verbs: Agreement/Tense**

The plural *years* needs a plural verb conjugation (*reveal*) to match. C and D can be IMMEDIATELY ruled out because they said *would/will of* instead of *could/will have*.

**74. Answer: H. E105 Pronouns: Agreement/Case**

*Her* is the correct pronoun because the intended antecedent is Dickinson. The other options change the meaning of the sentence incorrectly.

**75. Answer: D. E102 Commas**

There is no need to include any commas in the underlined portion. Do not be tempted to put a comma after *perhaps* as with most transitions; it is not correct in this context.

## Mathematics Test

### 1. Answer: A. M212 Linear Function: Rate

Pick an equation! This is a linear function with \$2.00 to make each balloon bouquet. The \$39.99 is the y-intercept, a one-time cost.

A.  $\$2.00b + \$39.99$

### 2. Answer: K. M201 Algebraic Operations

$$(x - y)^2, x = 5, y = -1$$

$$(5 - (-1))^2 = 6^2 = 36$$

K. 36

**Tip:** Be careful when substituting negative numbers. Use parentheses!

### 3. Answer: B. M212 Linear Function: Rate

5 words day one, 3 words each day for 20 days minus the first day

$$5 + 3(19) = 62$$

B. 62

### 4. Answer: G. M205 Exponents & Roots

$$(4x^2)^3 = 4^3 \times x^{2 \times 3} = 64x^6$$

G.  $64x^6$

### 5. Answer: E. M103 Properties of Integers



E. 1, 2, 4, 8

**Tip:** Factors are numbers that divide evenly into integers. Don't get mixed up between multiples and factors.

### 6. Answer: H. M201 Algebraic Operations

$$2(4x + 7) - 3(2x - 4)$$

$$8x + 14 - 6x + 12$$

$$2x + 26$$

H.  $2x + 6$

**7. Answer: E. M501 Mean, Average**

62, 78, 83, 84, 93  

$$\frac{78+83+84+93}{4} = \frac{338}{4} = 84.5$$

E. 84.5

**8. Answer: G. M211 System Word Problems**

\$120 + \$25/month, \$60 + \$35/month

$$120 + 25x = 60 + 35x$$

$$\begin{array}{r} -60 \\ 60 + 25x = 35x \end{array}$$

$$\begin{array}{r} +10 \\ 60 = 10x \end{array}$$

$$6 = x$$

G. 6

**9. Answer: B. M308 Multiple Figures**

Since all the sides meet at right angles, this becomes the same as the perimeter of a rectangle,

$$2l + 2w.$$

$$12 + 8 = 20$$

$$2(20) + 2(20) = 80$$

B. 80

**Tip:** Know the above problem; it shows up a lot!

**10. Answer: J. M101 Word Problems - Translation & Vocabulary; M210 Systems of Equations**

$$x + y = 11$$

$$+ x - y = 5$$

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$$2x + 0y = 16$$

$$\begin{array}{r} +2 \\ 2x = 16 \end{array}$$

$$x = 8$$

$$y = 3$$

$$8 \times 3 = 24$$

J. 24

**11. Answer: E. M217 Factoring & FOIL**

$$(3x + 7)^2$$

$$(3x + 7)(3x + 7)$$

$$9x^2 + 21x + 21x + 49$$

$$9x^2 + 42x + 49$$

**E.**  $9x^2 + 42x + 49$

**12. Answer: J. M207 Linear Functions: Slope**

$$m = \frac{7-2}{6-(-5)} = \frac{5}{11}$$

**J.**  $\frac{5}{11}$

**13. Answer: B. M202 Solving Equations; M104 Fractions**

$$\frac{1}{3}k + \frac{1}{4}k = 1$$

$$\frac{4}{12}k + \frac{3}{12}k = 1$$

$$\frac{7}{12}k = 1$$

$$\frac{7}{12}k \div \frac{7}{12} = 1 \div \frac{7}{12}$$

$$k = \frac{12}{7}$$

**B.**  $\frac{12}{7}$

**14. Answer: G. M302 Triangles**

Pythagorean Theorem!

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

$$c = \sqrt{a^2 + b^2}$$

$$c = \sqrt{6^2 + 7^2}$$

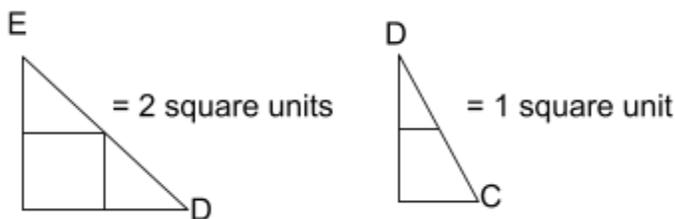
$$c = \sqrt{36 + 49}$$

$$c = \sqrt{85}$$

**G.**  $\sqrt{85}$

**15. Answer: C. M308 Multiple Figures**

The easiest way to do this problem is to isolate the two right triangles with hypotenuses  $\overline{ED}$  and  $\overline{DC}$ . Count the remaining square units = 17.



$$17 + 2 + 1 = 20$$

**C.** 20

**16. Answer: G. M308 Multiple Figures; M302 Triangles**

The answer is **G** because  $\triangle ADE$  is a right triangle with  $\overline{AE}$  as the hypotenuse. The hypotenuse is always the longest side of a right triangle and never congruent with either leg.

**G.**  $\overline{AD} \cong \overline{AE}$

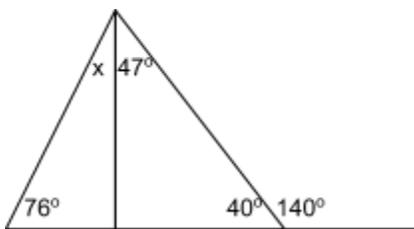
**17. Answer: A. M110 Percent**

Wow, this is an old test. Leticia is buying CD's!

23% off  $\rightarrow D = .23p$

**A.**  $p - .23p$

**18. Answer: H. M308 Multiple Figures; M302 Triangles**



$\angle ABC = 180 - 140 = 40$

$180 - (47 + 76 + 40) = 17$

Trick: Last digit math! Notice that each of the answers ends with a different number in the units digit. For a good math student looking to shave a few seconds off a problem, just look for the correct last digit.

$180 - (47 + 76 + 40)$

$7 + 6 = 13$  The last digit is 3.  $10 - 3 = 7$ , so the answer HAS to end in 7. So, **H** HAS to be correct.

Practice this technique; it often works!

**H.**  $17^\circ$

**19. Answer: C. M213 Distance/Rate/Time**

$D = RT$

900 miles at 50mph

$900 = 50t$

$\div 50 \quad \div 50$

$18 = t$

To reduce her time by 3 hours:  $18 - 3 = 15$

$D = RT$

$900 = R(15)$

$\div 15 \quad \div 15$

$60 = R$

How much faster?

$60 - 50 = 10$

**C.** 10

**20. Answer: K. M103 Properties of Integers**

Use the calculator!

$$9 : gcd(216, 180) = 36$$

To solve the old-school way, notice that both numbers are even and multiples of 3 (you know this by the sum of the digits). Divide both by 6.

$$216 \div 6 = 36 \quad \text{and} \quad 180 \div 6 = 30$$

36 and 30 are both multiples of 6

$$36 \div 6 = 6 \quad \text{and} \quad 30 \div 6 = 5$$

Therefore, 216 and 180 are multiples of  $6 \times 6 = 36$

**K. 36x**

**Tip:** Greatest common factor (or divisor) is a function on the Ti-84/83 calculator!  
`MATH>NUM>9:gcd`

**21. Answer: B. M212 Linear Function: Rate; M506 Tables**

To spend the least amount of money you need to buy 1 bag of 12, 1 bag of 6, 2 single lemons.

$$12 + 6 + 2 = 20$$

$$1 \times (2.10) + 1 \times (1.20) + 2 \times (.30) = \$3.90$$

**B. \$3.90**

**22. Answer: K. M204 Absolute Value; M203 Inequalities**

Maximum:

$$|d - 3| \leq 0.001$$

$$d - 3 = 0.001$$

$$d = 3.001$$

Trap: H. 2.999 is the minimum diameter.

**K. 3.001**

**23. Answer: A. M217 Factoring & FOIL**

$$5x^2 - 13x - 6$$

$$(x - 3)(5x + 2)$$

Trick: Plug in your own numbers. When there is a variable in the question and variables in the answers, plug in a number for  $x$ .

Pick  $x = 1$

$$5(1)^2 - 13(1) - 6 = -14$$

Now find the answer that equals  $-14$  when  $x = 1$ .

- A.  $(1 - 3)(5 + 2) = -14$  ✓  
 B.  $(1 - 2)(5 - 3) = -2$  ✗  
 C.  $(1 - 2)(5 - 3) = -8$  ✗  
 D.  $(1 + 2)(5 - 3) = 6$  ✗  
 E.  $(1 + 3)(5 - 2) = 12$  ✗

A.  $(x - 3)(5x + 2)$

**24. Answer: F. M503 Probability**

6 red, 5 yellow, 7 green = 18 total

$x$  = new red marbles

$$\frac{(6+x)}{(18+x)} = \frac{3}{5} \quad \text{cross multiply}$$

$$5(6 + x) = 3(18 + x)$$

$$30 + 5x = 54 + 3x$$

$$\begin{array}{r} -30 \quad -3x \quad -30 \quad -3x \\ 30 + 5x = 54 + 3x \end{array}$$

$$2x = 24$$

$$\begin{array}{r} +2 \quad +2 \\ 2x = 24 \end{array}$$

$$x = 12$$

Trick: Last digit math. WARNING! Only for students with math scores >30 (or for steaky students who love to go quickly. This solution is fast!

Ok, you know that there are 6 red marbles and 18 total. Probability is  $\frac{6}{18}$  or  $\frac{1}{3}$  to randomly pull a red. To change the probability to  $\frac{3}{5}$  the denominator must be a multiple of 5 because it is reduced to 5. Let's use the Last Digit Math technique to get to a multiple of 5 before most students can even pick up their calculators!

Denom.    Last digit of  
 ↓            ↙  
 answer choice

- A. 12     $8 + 2 = 10$  (winner)
- B. 16     $8 + 6 = 14$  (loser)
- C. 18     $8 + 8 = 16$  (loser)
- D. 24     $8 + 4 = 12$  (loser)
- E. 36    already know it's a loser from B.

Also works for  $\frac{1}{3}$ . (Why? Because it HAS to!)

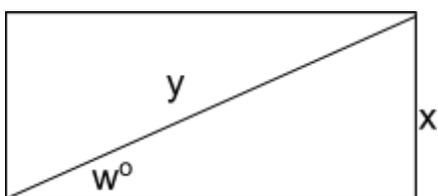
- $3 + 2 = 5$
- $3 + 6 = 9$
- $3 + 8 = 1$
- $3 + 4 = 7$

(This trick is not for the faint of heart, but if you want a lot of extra time, look for this. The ACT is super-friendly to this trick because they often make the answer choices end in different digits.

F. 12

**25. Answer: D. M401 SOHCAHTOA**

S  $\frac{O}{H}$  C  $\frac{A}{H}$  T  $\frac{O}{A}$



$\frac{x}{y}$  is  $\frac{\text{opposite}}{\text{hypotenuse}}$  which is  $\sin(w^\circ)$

**D.**  $\sin(w^\circ) = \frac{x}{y}$

**Tip:** You can do right triangle trigonometry with just a short lesson and a few practice problems. Watch my video on Youtube!

**26. Answer: J. M207 Linear Functions:  $y=mx+b$**

$y = ax + b$  vs  $y = cx + b$

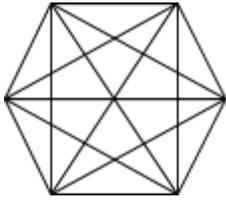
Slope of a is greater than c.  $a > c$

Note: YES, it is actually this easy! Don't overthink it. Pick the correct answer and move on!

**J.**  $a > c$

**27. Answer: A. M304 Polygon**

Draw!



6 on the outside (obviously; it's a hexagon) plus 9 on the inside is 15.

**A. 15**

**Tip:**  $\frac{n(n-3)}{2}$  is the formula for the distinct diagonals of a polygon. Do you need to know this? Not really, unless you want a 34+, in which case you should know it.

**28. Answer: H. M109 Rate & Proportion; M506 Tables**

$$\begin{aligned} \frac{60}{280} &= \frac{x}{112} && \text{cross multiply} \\ 6720 &= 280x \\ \div 280 & \quad \div 280 \\ 24 &= x \end{aligned}$$

**H. 24**

**29. Answer: C. M307 Solids**

$$\begin{aligned} \text{volume} &= \pi r^2 h \\ &= \pi(12)^2(5) \\ &= 2261.9 \end{aligned}$$

**C. 2262**

**30. Answer: G. M306 Sectors & Arcs**

Length of zipper = radius + arc length

$$\begin{aligned} \text{radius} &+ \frac{45^\circ}{360^\circ}(\text{circumference}) \\ 12 &+ \frac{45}{360}(24\pi) = 21.42 \end{aligned}$$

**G. 22**

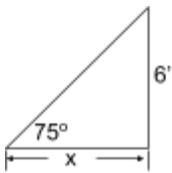
**31. Answer: E. M207 Linear Functions:  $y=mx+b$ ; M208 Coordinate Geometry & XY-plane**

A faster rate means a steeper slope! When the faster hose stops the slope becomes less.



**32. Answer: F. M401 SOHCAHTOA**

S  $\frac{O}{H}$  C  $\frac{A}{H}$  T  $\frac{O}{A}$



$$\tan(75^\circ) = \frac{6'}{x} \quad \text{solve for } x$$

$$x \tan 75 = 6$$

$$x = \frac{6}{\tan 75}$$

**F.**  $\frac{6}{\tan 75^\circ}$

**33. Answer: C. M110 Percent; M205 Exponents & Roots**

$$P(t) = p_o \left(1 + \frac{r}{100}\right)^t$$

$$P(10) = 782,000 \left(1 + \frac{5}{100}\right)^t$$

**C.**  $782,000(1.05)^{10}$

**34. Answer: J. M212 Linear Function: Rate; M506 Tables**

1. 11/22:  $(8)(.25) = 2.00$

2. 11/23:  $(10)(.25) = 2.50$

3. 11/24:  $(15)(.10) = 1.50$

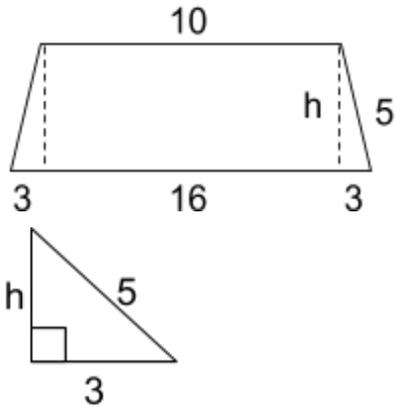
4. 11/26:  $(17)(.10) = 1.70$

5. 11/27:  $(22)(.05) = 1.10$

Total  $\$8.80$

**J.**  $\$8.80$

**35. Answer: B. M303 Quadrilaterals; M302 Triangles**



It's a 3-4-5- right triangle!

**B. 4**

**Tip:** The slant side of a trapezoid forms the hypotenuse of a right triangle with the height as a leg. Legs MUST be shorter than the hypotenuse! In the previous question, this allows you to immediately eliminate **C, D, and E.**

**36. Answer: K. M203 Inequalities**

$$3(x + 2) > 4(x - 3)$$

$$3x + 6 > 4x - 12$$

$$\begin{array}{r} -3x \quad -3x \\ 6 > x - 12 \end{array}$$

$$6 > x - 12$$

$$\begin{array}{r} +12 \quad +12 \\ 18 > x \end{array}$$

$$18 > x$$

**K.  $x < 18$**

**37. Answer: C. M208 Coordinate Geometry & XY-plane**

The midpoint is the average!

$$\text{midpoint of } \overline{AB} = (4, -3)$$

$$A = (1, -5)$$

$$x_B = \frac{1+x_B}{2} = 4$$

$$1 + x_B = 8$$

$$x_B = 7$$

$$y_B = \frac{-5+y_B}{2} = -3$$

$$-5 + y_B = -6$$

$$y_B = -1$$

$$x_B + y_B = 7 + (-1) = 6$$

C. 6

**38. Answer: J. M218 Rational Functions & PLD**

Two Solutions: 1) Algebra, 2) Plug-in

1) Algebra:

$$\frac{x+1}{x^3-x} = \frac{x+1}{x(x^2-1)} = \frac{x+1}{x(x-1)(x+1)} \text{ cancel out } x+1$$

$$= \frac{1}{x(x-1)} = \frac{1}{x^2-x}$$

2) Plug-in:

Let  $x=2$

$$\frac{x+1}{x^3-3} = \frac{2+1}{2^3-2} = \frac{3}{6} = \frac{1}{2}$$

F.  $\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$  No

G.  $\frac{1}{8} - \frac{1}{2} = \frac{-3}{8}$  No

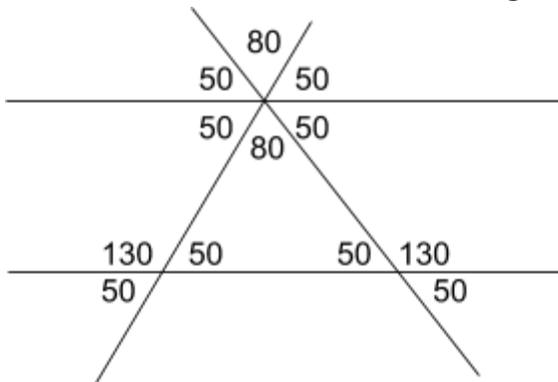
H.  $\frac{1}{4-1} = \frac{1}{3}$  No

J.  $\frac{1}{4-2} = \frac{1}{2}$  Yes!

K.  $\frac{1}{8}$  No

J.  $\frac{1}{x^2-x}$

**39. Answer: C. M301 Lines & Angles; M302 Triangles**



C. 8

**40. Answer: H. M207 Linear Functions:  $y=mx+b$ ; M203 Inequalities**

To solve, find \$600 worth of sales each for students

y-axis: student  $\frac{\$600}{\$2} = 300 \text{ tickets}$

x-axis: adults  $\frac{\$600}{\$3} = 200 \text{ tickets}$

Plot y-intercept (0, 300) and x-intercept (200, 0).

H.

**41. Answer: A. M502 Median, Mode**

Put in order:

21, 33, 33, 42, 67, 79, 89

Median = middle = 42

A. 42

**42. Answer: F. M204 Absolute Value**

$$|x|^2 + 2|x| - 3 = 0$$

Backsolve by putting answers in.

$$|1|^2 + 2|1| - 3 = 0$$

$$1 + 2 - 3 = 0$$

$$3 - 3 = 0$$

$$0 = 0$$

Yes

$$|-1|^2 + 2|-1| - 3 = 0$$

$$1 + 2 - 3 = 0$$

$$3 - 3 = 0$$

$$0 = 0$$

Yes

$$|3|^2 + 2|3| - 3 = 0$$

$$9 + 6 - 3 = 0$$

$$15 - 3 = 0$$

$$12 = 0$$

No

$$|-3|^2 + 2|-3| - 3 = 0$$

$$9 + 6 - 3 = 0$$

$$15 - 3 = 0$$

$$12 = 0$$

No

F.  $\pm 1$

**43. Answer: D. M208 Coordinate Geometry & XY-plane; M207 Linear Functions:  $y=mx+b$**

The point  $(2, 5)$  is still on a line with slope  $-\frac{2}{3}$ .

There are several solutions but the fastest is to know that  $slope = \frac{rise}{run}$ . A slope of  $-\frac{2}{3}$  means down 2 in  $y$  and over 3 in  $x$ , so the answer is  $(x + 3, y - 2)$ .  $(2 + 3, 5 - 2) = (5, 3)$ , point **D**.

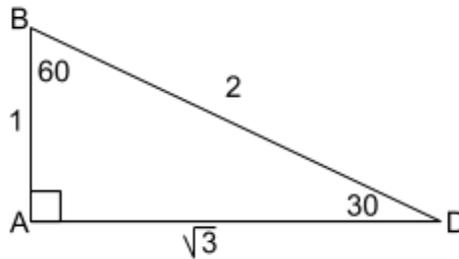
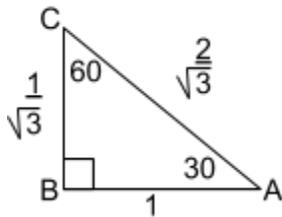
Go ahead and solve it the long way. I dare you.

**D.**  $(5, 3)$

**44. Answer: F. M108 Ratio; M302 Triangles**

Redraw.

$\overline{BA}$  is part of both, so make it equal to 1.



Good news! You don't have to add up the sides, you just have to compare the sides of a 30-60-90 right triangle:

$$BC : AB, AC : BD, AB : AD$$

**F.**  $AB : AD$

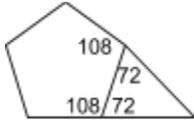
**Tip:** Know the sides of a 30-60-90 and 45-45-90 right triangle. You will see them on the ACT.

**45. Answer: C. M308 Multiple Figures**

The measure of an interior angle of a regular n-sided polygon is  $\frac{180(n-2)}{n}$ .

An interior angle of a pentagon is  $\frac{180(5-2)}{5} = 108$ .

The supplement to 108 is 72.



The triangle is therefore isosceles.

$$72 + 72 + x = 180$$

$$144 + x = 180$$

$$\begin{array}{r} -144 \qquad -144 \\ 144 + x = 180 \\ \hline x = 36 \end{array}$$

$$x = 36$$

**C. 36**

**Tip:** Know the angles of regular polygons, triangles to hexagons:

Sides	Total Angles	Regular Angle
3	180	60
4	360	90
5	540	108
5	720	120

**46. Answer: K. M307 Solids**

Surface area of a cube is  $6x^2$ .

$$6 \times 3^2 = 6 \times 9 = 54$$

**K. 54**

**47. Answer: C. M110 Percent**

When no number is given in a percentage problem, pick 100!

$$100 + 25\% = 125$$

$$125 - 20\% = 100$$

Know how to do this:

$$(100)(1.25)(.8) = 100$$

Trap: Answer **D** is a huge trap. Never add or subtract percents. ALWAYS multiply.

**C. 100%**

**48. Answer: J. M102 Operations - Order of Operations, Number Theory**

To solve, PLUG IN!

If  $x > 1$ , make  $x = 2$ .

The reciprocal of 2 is  $\frac{1}{2}$ .

**J.** *between 0 and 1.*

**49. Answer: D. M203 Inequalities; M105 Number Line**



$$x \leq -1$$

$$x \geq 3$$

or

or

$$-1 \geq x$$

$$3 \leq x$$

Trap: A number cannot be less than  $-1$  and greater than  $3$ . **A** & **B** are traps.

**D.**  $-1 \geq x$  or  $3 \leq x$

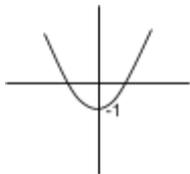
**Tip:** Know how to flip inequalities!

**Tip:** Know the difference between AND and OR. AND means both have to be true. OR means either one is true.

**50. Answer: J. M101 Word Problems - Translation & Vocabulary; M208 Coordinate Geometry & XY-plane**

$y$  is 1 less than the square of  $x$  translates to:

$$y = x^2 - 1$$

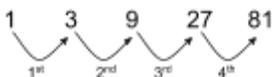


**J.**

**51. Answer: E. M104 Fractions; M103 Properties of Integers**

Why is this an integer problem? Because Ms. Chu does not break any disks, so it is whole numbers and multiples that are really being tested.

Minimum number remaining is ONE disk.



1)  $81 \times \frac{1}{3} = 27$  2)  $27 \times \frac{1}{3} = 9$  3)  $9 \times \frac{1}{3} = 3$  4)  $3 \times \frac{1}{3} = 1$

**E.** 81

**52. Answer: J. M103 Properties of Integers**

See two hard integer problems in the 50's. And you thought it would be AP Calc. NOT!

Plug-in: When asked about integers use numbers!

$$m = 2 < n = 3 \text{ or } m = 3 < n = 4$$

F.  $m = 2$  or  $3$  No

G.  $n = 2$  or  $4$  No

H.  $n - m = 4 - 3 = 1$  or  $3 - 2 = 1$  No

J.  $n^2 - m^2 = 4^2 - 3^2 = 16 - 9 = 7$  or  $3^2 - 2^2 = 9 - 4 = 5$  Yes!

K.  $n^2 + m^2 = 4^2 + 3^2 = 16 + 9 = 25$  No

**J.**  $n^2 - m^2$  is odd

**53. Answer: A. M214 Functions  $f(x)$** 

Note: This is the hardest *evaluate  $f(x)$  for some value of  $x$*  type of problem we have ever seen. Yes, it is ridiculously easy.

$$P(-1)$$

Look at  $x < 0$

$$P(x) = -(x)^5 + (x)^4 + 36(x) - 36 \text{ use parentheses!}$$

$$P(-1) = -(-1)^5 + (-1)^4 + 36(-1) - 36$$

This is a great time to be very good with your TI-84/83.

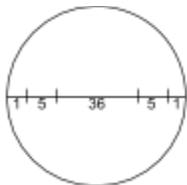
$$P(-1) = 1 + 1 - 36 - 36 = 2 - 72 = -70$$

**A.** - 70

**Tip:** Always use parentheses when evaluating a function. This is especially true for a negative number.

**54. Answer: K. M305 Circles; M111 Units**

$$3 \text{ feet} = 36 \text{ inches}$$



$$36 + 5 + 5 + 1 + 1 = 48$$



*both sides*

Trap: This is a #54, so it simply cannot be as easy as adding up the numbers in the problem.

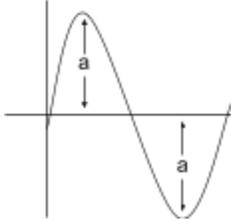
$36 + 5 + 1 = 42$  is **J** - huge trap! Diameter means both sides of the circle.

**K.** 48

**55. Answer: B. M403 Trig Function**

We love this problem. It is so easy...if you know how to graph  $f(x) = a\sin(x)$ . The question asks which has a bigger amplitude.

The amplitude of the graph of  $\sin(x)$  or  $\cos(x)$  is  $\frac{1}{2}$  the height/distance from the max to the min.



The sine wave  $y(t)$  is higher, therefore it has a greater amplitude. See our lessons on trig functions.

$$\mathbf{B.} 0 < a_2 < a_1$$

**56. Answer: H. M403 Trig Function**

$$\sin^2(x) + \cos^2(x) = 1$$

$$\sin^2(x) = 1 - \cos^2(x)$$

$$\cos^2(x) = 1 - \sin^2(x)$$

$$\frac{\sqrt{1-\cos^2 x}}{\sin x} + \frac{\sqrt{1-\sin^2 x}}{\cos x}$$

$$\frac{\sqrt{\sin^2 x}}{\sin x} + \frac{\sqrt{\cos^2 x}}{\cos x}$$

$$\frac{\sin x}{\sin x} + \frac{\cos x}{\cos x}$$

$$1 + 1 = 2$$

**H. 2**

**57. Answer: A. M214 Functions  $f(x)$** 

$$f(x) = \sqrt{x}$$

$$g(x) = 7x + b$$

$y = f(g(x))$  passes through (4, 6)

Substitute

$$6 = f(g(4))$$

Put the 4 into  $g(x)$  and the  $g(4)$  into  $f(x)$

$$6 = \sqrt{7(4) + b}$$

$$6 = \sqrt{28 + b} \quad \text{square both sides}$$

$$36 = 28 + b$$

$$\begin{array}{r} -28 \\ -28 \end{array}$$

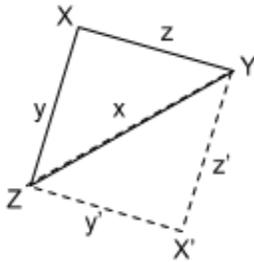
$$8 = b$$

**A. 8**

**58. Answer: K. M309 Rotate a Figure**

Reflect  $\triangle XYZ$  about side  $\overline{YZ}$ .

Draw!



The perimeter of the quadrilateral formed by the reflection is  $y + y + z + z$  or  $2(y + z)$ .

**K.**  $2(y + z)$

**Tip:** Know how to reflect!

**59. Answer: E. M214 Functions  $f(x)$**

Odd function means  $f(-x) = -f(x)$ .

For example,  $f(-2) = -f(2)$ .

Let's make  $f(x) = x^3$ , so  $f(2) = 8$  and  $f(-2) = -8$ .

It is an odd function because  $f(-2) = -f(2)$ .



**E.**

**Tip:** An *EVEN* function is where  $f(x) = f(-x)$ , such as  $f(x) = x^2$ . An *ODD* function is where  $f(-x) = -f(x)$ , such as  $f(x) = x^3$ .

**60. Answer: J. M206 Logarithm**

$$\log_2 24 - \log_2 3 = \log_5 x$$

Quotient Rule:  $\log(x) - \log(y) = \log\left(\frac{x}{y}\right)$

$$\log_2 24 - \log_2 3 = \log_2\left(\frac{24}{3}\right) = \log_2(8) = 3$$

$$3 = \log_5 x$$

$$5^3 = 125 \text{ so } x = 125$$

**J.** 125

## Reading Test

### **1. Answer: B. R104 Big Picture**

This question is particularly tricky because the passage deals with a lot of ideas. It may be helpful to glance at the passage and note that the passage begins with mention of Eugene, then discusses about the old neighbors for a paragraph, discusses meeting Eugene for the next several paragraphs, talks about her parents for one paragraph, and then talks about imagining sitting with Eugene. From this information, you can eliminate **C** and **D** because they do not mention Eugene as the primary focus. **B** is the best answer because the narrator discusses, in the last paragraph, how her thoughts change after meeting Eugene, and never discusses maintaining their friendship.

### **2. Answer: J. R201 Detail; R401 Least/Not/Except**

If you read carefully, you might be able to answer this question from memory, since it can be time-consuming to go back in the passage and find evidence to eliminate all three wrong answers. If you don't remember, try to skim quickly, and find the details that allow you to eliminate **F**, **G**, and **H**, in lines 81-82, 39-40, and 5-6, respectively.

### **3. Answer: C. R201 Detail**

You should be able to remember this detail, but if not, skim the passage to find where Eugene's parents are described. The answer is supported by lines 31-32, where the narrator mentions never seeing Eugene's family sit down at the table together.

### **4. Answer: F. R204 Main Idea/Function: Paragraph; R102 Paragraph Number**

For questions like these, always look back at the mentioned paragraphs. The second-to-last paragraph discusses details of the narrator's life before meeting Eugene, and the last paragraph discusses the narrator's thoughts after meeting Eugene. The answer choice that emphasizes this before-and-after is **F**.

### **5. Answer: C. R203 Inference/Assumption**

Although the answer is not explicitly stated, there is clear evidence that will help make an inference. The narrator mentions seeing the father mowing, *and when he finished*, the narrator didn't see the flowers anymore. This clearly implies the father mowed down the flowers, **C**. **B** might trick you, but it mentions that the narrator had stopped watering the plants, and the narrator specifically mentioned that the old lady had taken care of the flowers.

### **6. Answer: J. R203 Inference/Assumption**

You are not specifically asked to make an inference, but the answer can clearly be inferred from the text. By skimming the text to find where the narrator first speaks to Eugene, you can see the text mentions in lines 56-57 that Eugene was blushing and liked her when they first spoke. This clearly implies that he had taken notice of the narrator ahead of time.

**7. Answer: A. R201 Detail; R102 Paragraph Number**

Always refer back to the given line to see where it fits into the rest of the passage. The line separates the mention of the narrator's career plans and the mention of wanting to explore Eugene's house and spend time with him. The only answer choice that mentions getting to know Eugene is **A**.

**8. Answer: H. R201 Detail**

Reread the paragraph (lines 67-79) that mentions the narrator's parents' dreams, and you will see that her parents *talked constantly* about plans for *someday*, which describes something she has heard many times but that seem far off, **H**.

**9. Answer: D. R201 Detail**

Skim the passage to find mention of being close to the old couple. In lines 11-16, the narrator mentions becoming *part of their family* and then immediately mentions that she could see into their house, but not hear what they said, and learned about them by watching them at mealtimes.

**10. Answer: G. R201 Detail**

This question can be tricky since it refers to details that may have been overlooked on the first read-through. Skim the entire passage to see mention of the narrator's feelings about looking into Eugene's house. In line 63, the narrator mentions feeling dishonest, which only matches choice **G**.

**11. Answer: B. R104 Big Picture**

You should be able to answer this question without rereading the passage. There is nothing quiet (**A**), traditional (**C**), or calm (**D**) mentioned about ER. She is described as politically courageous in lines 20-25, among other places, and as socially concerned in lines 47-48.

**12. Answer: F. R203 Inference/Assumption**

The last paragraph sums up the passage well. It mentions that she *refused to withdraw from controversy* and *brought...agitators and activists into the White House*. From these details, you can infer that she was exceptional because she raised unpopular views to the forefront of politics.

**13. Answer: D. R201 Detail; R401 Least/Not/Except**

If you read carefully, you may find the word *theories* jumps out at you. If you find the word in the passage (lines 48-49), you see that ER was not interested in complex theories.

**14. Answer: J. R203 Inference/Assumption**

There is no specific place to find an answer like this, so rather than reread the entire passage, see if you can figure out the answer based on the answer choices. ER is definitely not theoretical (**F**), because she doesn't like theories. She is described frequently as controversial and impatient, so would not be patient (**G**) or simplistic (**H**). **J** is the only answer that has two accurate adjectives.

**15. Answer: D. R203 Inference/Assumption**

For questions that ask you to infer, you will likely find a specific line that will provide you with sufficient evidence. In lines 34-38, ER is described as battling *on the margins of national politics* when fighting for social justice, which implies that her social goals were not widely supported.

**16. Answer: G. R203 Inference/Assumption; R102 Paragraph Number**

When asked about the paragraph as a whole, always reread the given paragraph. The paragraph discusses ER's alliances, controversy, and determination. The only answer choice that matches this information is **G**.

**17. Answer: A. R204 Main Idea/Function: Paragraph; R102 Paragraph Number**

Always reread the given paragraph, which lists ER's accomplishments at the time she became First Lady. This paragraph leads into further discussion of her accomplishments, suggesting that these early accomplishments helped prepare her for later successes.

**18. Answer: F. R201 Detail**

The answer is explicitly stated in lines 48-49.

**19. Answer: C. R201 Detail**

The answer is explicitly stated in lines 58-59.

**20. Answer: H. R203 Inference/Assumption**

The author talks about ER's enjoyment of the game immediately following mention of her setbacks and obstacles, implying that she enjoyed the challenge of criticism and obstacles.

**21. Answer: A. R104 Big Picture**

Although the text is particularly tricky, read through the answer choices to see if any can easily be eliminated. **D** can be eliminated because the story is not about a recent event and **C** can be eliminated because the narrator doesn't mention the perspectives of her parents. Between **A** and **B**, **A** is more accurate because the passage does begin and end with assertions, and the story illustrates those assertions.

**Tip:** Often, the more obscure or challenging a text is, the easier the questions are. Don't get discouraged if the text seems too difficult on the first read.

**22. Answer: H. R104 Big Picture**

For questions like these, always look back at the lines given. In 9-44, the passage describes the narrator's experience with the *thing*, but the given lines end with the reveal that the *thing* was light reflected on a passing car. If you don't look at the exact lines in the question, it is easy to miss that detail. Thus, the mood is growing tension that is finally broken.

**23. Answer: C. R102 Paragraph Number**

By rereading the paragraph mentioned, you should notice a lot of fancy imagery and adjectives, including *transparent*, *luminous oblong*, *blue wall turn pale*, and *luminous glance*.

**24. Answer: J. R201 Detail; R203 Inference/Assumption**

Skim the passage for the part that mentions the narrator's sister, and you will find lines 30-31, which mentions that she couldn't *blink or breathe* or she would be found by the *thing*. From this, you can infer that she also couldn't warn her sister.

**25. Answer: D. R203 Inference/Assumption; R104 Big Picture**

You should be able to answer this *big picture* question without taking the time to refer back to the passage, if you remember that the purpose of the passage is to show the benefit of reason over imagination (lines 85-86). Thus, the narrator's discovery of the truth of the *thing* illustrates her finding a reasonable explanation, which would be significant (**D**). Although it could be described as satisfying, the rest of answer **C** is incorrect.

**26. Answer: G. R203 Inference/Assumption; R101 Line Number**

Although the question asks you to make an inference, you should have already realized that the author was happy with her discovery of what the *thing* was. Connecting this realization with the first paragraph, her thoughts about the monster were *interior* and her reasonable discovery was *outer*, so the bursting through the ocean was crossing the boundary separating these two spaces.

**27. Answer: D. R201 Detail**

Look back at the mentioned line. The author states that she can connect to the *outer world by reason*, OR the *show in light*, which suggests it is neither outer nor reasonable; it is a fantasy.

**28. Answer: F. R101 Line Number**

Look back at the mentioned line. By looking at the line right before it, you can see that the author is talking about the crazy things the ego/self imagines, which can be described as *deceptive self-absorption* (**A**).

**29. Answer: C. R101 Line Number**

Reread lines 5-8, and summarize it in your own head before reading the answer choices. These lines discuss the risk of ignorance and imagination compared to a much smaller prize, and the possibility of using imagination in limited quantity.

**30. Answer: G. R203 Inference/Assumption**

This question asks you to make an inference about what the author was thinking. She is talking about the world as a series of objects, of which she is one, implying that she is part of a larger world (**G**).

**31. Answer: B. R201 Detail; R203 Inference/Assumption**

Although this question appears to be about the *big picture*, if you skim through the answer choices, you can see that **B** is supported with the lines you *just* read at the end of the passage, 89-91. By suggesting that this theory *would have died long ago* if Frank had had lesser standing, the author is implying that new theories are more likely to be supported if they are suggested by well-respected scientists.

**32. Answer: J. R203 Inference/Assumption**

Skim the passage for the mention of Frank first presenting the small-comet theory. At the end of the second paragraph, the author mentions Frank's reputation as *a bit unstable, an otherwise estimable fellow*, suggesting that although this new idea is odd, his previous work is still respectable (**J**). Additionally, the author mentions in lines 73-75 that the scientific community continued to respect Frank's *mainstream work*.

**33. Answer: B. R201 Detail**

While it might be tricky to find the exact part of the passage that mentions this, since the chronology of the passage is not always in order, the answer is clearly supported in lines 20-21, when Frank *seemed relieved* this part of his career was over. By describing the ridicule immediately after, the author implies that Frank was specifically relieved that the ridicule was over (**B**).

**34. Answer: H. R204 Main Idea/Function: Paragraph; R102 Paragraph Number**

For questions like these, always go back and reread the given paragraph. You can eliminate **F** because there is no earlier criticism of scientists. **G** and **J** definitely untrue because there is no connection to the role of science in society or the difference between theoretical and practical research. **H** is the only reasonable answer.

**35. Answer: A. R201 Detail**

Quickly skim the passage to find the required detail. The answer is mentioned in lines 45-47, where they *analyzed photos of the electrical phenomena that accompany sunspots* and noticed dark specks that they decided to explore further.

**36. Answer: F. R102 Paragraph Number**

Always reread the given paragraph in a question like this. The last line of the paragraph mentions that, over time, the water entering Earth's atmosphere will add up, which makes the rest of the paragraph relevant to our own experiences.

**37. Answer: C. R203 Inference/Assumption**

Although the answer is not stated in the text, it can be easily inferred without spending the time to go back and read. Over the course of the passage, the scientists are ridiculed for a new theory, and then find new evidence that gives some credibility (or at least a reason to research further). It can be reasonably inferred that the science research did not change much between the newest evidence mentioned in the passage and the time the passage was written.

**38. Answer: G. R201 Detail; R101 Line Number**

Always look back in the passage at the line mentioned. The author mentions that it was clear that objects were bombarding Earth. *Something* is italicized to emphasize that it may or may not have been small comets.

**39. Answer: D. R101 Line Number**

Always look back in the passage at the line mentioned. After mentioning the *schizophrenic existence*, Zare goes on to describe how a scientist has to think contradictory thoughts in a proper balance to succeed in the profession. Choices **B** and **C** can be ruled out because they emphasize an either/or mindset rather than one that includes both sides.

**40. Answer: H. R201 Detail**

Skim the passage to find mention of the scientists first finding the dark specks. The answer is found in lines 51-52, which states their curiosity grew, eventually into an obsession.

## Science Test

### **1. Answer: B. S100 Text**

The text states that 1 gene is transferred every 15 minutes. After 30 minutes, 2 genes would have transferred, and after 45 minutes, 3 genes would have transferred. In the final 5 minutes, a part of the 4th gene would be transferred, but the process would not be complete; only 3 complete genes would have been transferred.

### **2. Answer: J. S108 Text to Data**

Student 3 states that replication can begin anywhere, but always proceeds clockwise (such as S, A, G, F, X, R). If the first gene replicated is G, the second is F and the third is X.

### **3. Answer: C. S100 Text**

Students 3 and 4 state that replication can begin anywhere.

### **4. Answer: F. S108 Text to Data**

Student 1 states that replication begins between Gene F and X, with Gene X being replicated first and Gene F being replicated last. The genes would replicate in this order: X, R, S, A, G, F. After 45 minutes, 3 genes would have transferred (15 min per gene, according to the text), so X, R, and S would've transferred and A, G, and F would not have been transferred.

### **5. Answer: A. S108 Text to Data**

Student 2 states that replication begins between Gene F and X, but the direction can vary. Genes can be transferred F, G, A, S, R, X or X, R, S, A, G, F. After 30 min, 2 genes would have transferred: either F, G or X, R. Thus, A and S would definitely not have transferred.

### **6. Answer: J. S108 Text to Data**

According to Students 1 and 2, only F or X could be the last gene transferred. Students 3 and 4 state that gene transfer can start anywhere, so it is possible that A could be the last transferred.

### **7. Answer: D. S108 Text to Data**

Student 1 states that gene transfer begins with X and goes X, R, S, A, G, F. If X, R, S, and A were transferred, and it takes 15 min per gene (according to the text), then 60 minutes would've passed.

### **8. Answer: G. S316 XY Graph: Increase/Decrease**

In Figure 1, as the wavelength of the different S colors increases, the reflectance increases, as shown by the upward-sloping lines. For SO<sub>2</sub>, the reflectance increases then decreases.

### **9. Answer: C. S314 XY Graph: Data Point; S319 XY Graph: Correlation**

In Figure 4, the small plume line (dotted) is always higher than the large plume line (solid) for each wavelength, so the large plume reflectance is always lower.

### **10. Answer: H. S314 XY Graph: Data Point**

In Figure 1, the white S line at 0.40 μm is around 0.2 reflectance.

**11. Answer: D. S319 XY Graph: Correlation**

The line for the Pele crater floor in Figure 3 is shallow, and is most similar to the brown S line in Figure 1.

**12. Answer: H. S317 XY Graph: Extrapolate**

In Figure 4, the large plume line (solid) is steadily increasing until it levels off around 0.60  $\mu\text{m}$  and 0.5 reflectance. The small plume line (dotted) is steadily increasing the entire time, so if it is around 0.85 reflectance at 0.60  $\mu\text{m}$ , it will be at a slightly higher reflectance at 0.61  $\mu\text{m}$ .

**13. Answer: B. S100 Text**

The text defines reflectance as the fraction of light that is reflected by a surface, so a reflectance of 0.98 at 0.60  $\mu\text{m}$  means that 98% of light is reflected, and that light is 0.60  $\mu\text{m}$ .

**14. Answer: F. S301 Table**

In Table 1, V starts at 0 and is 8.4 after 12 sec. Thus, V must be 7.6 some time between 0 and 12 sec.

**15. Answer: C. S305 Table: Extrapolate**

In Table 2, time increases as capacitance increases. At 0.6, the time is 4.2 sec and at 1.2, the time is 8.3 sec. From this, it can be inferred that at 1.8, the time would be around 12.5 sec, so at 1.5, the time would be between 8.3 and 12.5 sec.

**16. Answer: J. S101 Text: Experimental Design**

The text and table of Experiment 3 state that students used different resistors and measured the time to reach 6 V, so the purpose of the experiment was likely to see how resistance affected time.

**17. Answer: A. S108 Text to Data**

According to the text of Experiment 1 and Figure 1, the voltmeter measured voltage across the capacitor. In order to measure voltage across a resistor, the part of the circuit with the voltmeter (circled V) should connect to the circuit just before and after the resistor.

**18. Answer: F. S302 Table: Data Point**

In Table 2, the fastest time (lowest number of seconds) is at a capacitance of  $0.1 \times 10^{-6}$  F. In Table 3, the fastest time is at a resistance of  $0.25 \times 10^7 \Omega$ , which can be rounded to 0.3.

**19. Answer: B. S304 Table: Increase/Decrease; S107 Text: Explain**

In Table 2, which describes experiment 2, as capacitance increased, time increased.

**20. Answer: F. S306 Table: Infer**

In Table 1, the more heat was released, the more the water temperature changed. In Table 2, as amount of sucrose increased, heat released increased, so it can be inferred that the temperature change increased as well.

**21. Answer: B. S307 Table to XY Graph**

In Table 1, the more heat was released, the more the water temperature changed. The graph that shows this direct relationship is **B**, with a steady upward slope.

**22. Answer: G. S305 Table: Extrapolate**

When 1.0 g sucrose is burned, 16.0 kJ is released. When 0.5 g sucrose is burned, 8.0 kJ is released, which is a decrease of exactly half of 16.0.

**23. Answer: A. S302 Table: Data Point**

In Table 1, the least heat was released by 1.0 g of potato (3.2), then egg (6.7), then bread (10.0), and lastly cheese (17.0 kJ). The amount of heat released from 1.0 g of sucrose is 16.0 kJ, which is more than every food except cheese.

**24. Answer: H. S305 Table: Extrapolate**

In Table 2, as the amount of sucrose was multiplied by any factor (such as 1.0 being multiplied by 4 to get 4.0), the heat released was multiplied by the same factor (such as 16.0 being multiplied by 4 to get 64.0), which shows a linear relationship. Thus, as the amount of potato is multiplied by 5 from 1.0 g to 5.0 g, the heat released will also be multiplied by 5, from 3.2 to 16.0. 16 is closest to 15 kJ.

**25. Answer: D. S316 XY Graph: Increase/Decrease**

In Figure 1, the line curves to show that when temperature decreases from 10 to 0 (the right half of the graph), density increases then decreases.

**26. Answer: G. S306 Table: Infer**

In Table 1, all liquids have a lower density than the least dense solid (glucose; 1.56) EXCEPT for mercury, which has the highest density on the table. Thus, the student's claim would not be supported by the data.

**27. Answer: B. S316 XY Graph: Increase/Decrease**

According to Figure 2, as temperature increases, density decreases, which is shown by the steady downward slope of the line.

**28. Answer: F. S200 Science Knowledge; S306 Table: Infer**

Liquids form layers based on density, with the highest density at the bottom and the lowest density at the top. Ethyl ether is 0.71, mercury is 13.59, and water is 0.9971. Thus, the mercury would be on the bottom, water in the middle, and ethyl ether on top.

**29. Answer: C. S108 Text to Data**

According to Figure 1, water at 4°C has a density of 1. The text states that density = mass/volume. If we have 100 g water, the density equation could be rewritten as  $1 = 100/\text{volume}$ , and solved to find volume = 100.

**30. Answer: F. S316 XY Graph: Increase/Decrease**

In Study 4, which is represented by Figure 3, as time increases, the number of captures by frugivores (line with squares) decreases, as shown by the line's downward slope.

**31. Answer: D. S316 XY Graph: Increase/Decrease**

If more birds are captured, it is likely that more birds are present. Since the number of captures for insectivores (line with diamonds) decreased after fragmentation, fragmentation probably caused a decrease in insectivore populations. However, the hummingbirds (line with triangles) increased, so fragmentation probably caused an increase in hummingbird populations.

**32. Answer: G. S317 XY Graph: Extrapolate**

In Figure 1, the 70 m point is around -3 and the 80 m point is around -2, so a 75 m point would likely be around -2.6.

**33. Answer: C. S105 Text: Infer; S101 Text: Experimental Design**

In Study 2, there was an average change in AGTB of 0. It is possible that the AGTB of every plot was 0, or it is possible that the AGTB averaged out to 0, such that some plot increased and some plots decreased.

**34. Answer: J. S318 Graph: Infer**

The first paragraph of the text states the researchers predicted fragmentation would cause a decrease in AGTB and animal populations. Study 4 (Figure 3) shows an increase in hummingbird populations, which is least consistent with the researchers' prediction.

**35. Answer: C. S201 Science Math; S314 XY Graph: Data Point**

In Year 2, 80 insectivores (line with diamonds) were captured every 1,000 hr. Thus, in 10,000 hr (10 times 1,000), 800 insectivores were captured (10 times 80).

**36. Answer: H. S319 XY Graph: Correlation**

In Figure 1, the core soils that have close to 85 ohms of resistivity and 22 mL/g CO<sub>2</sub> are yellow till and gray till C. Yellow till has very different percentages of sand, silt, and clay. Gray till C has very similar percentages of sand, silt, and clay, so the sample is likely gray till C.

**37. Answer: D. S200 Science Knowledge**

Since soil is laid down over time, the deepest layers are the oldest. Of the four answer choices, gray till D is the deepest below the surface and therefore the oldest.

**38. Answer: G. S314 XY Graph: Data Point**

In Figure 1, the sand and gravel layer has the highest resistivity (almost 150), clearly higher than the resistivities of the till layers.

**39. Answer: C. S314 XY Graph: Data Point**

In Figure 1, the resistivity of bedrock is around 50, which is closest to the resistivity of olive green and gray till.

**40. Answer: J. S317 XY Graph: Extrapolate**

In Figure 1, the CO<sub>2</sub> is highest for gray till A around 35 mL/g, so for present day CO<sub>2</sub> levels to be higher than any measured, they would have to be higher than 35.