

**1. Answer: C. *Joining and Separating Sentences: Comma***

The start of a new independent clause (that is, an idea that contains both subject and predicate without need of another idea on which to “depend”) signals the need of a period. **D** includes the unnecessary “While,” which would imply another simultaneous action in the following sentence, and thus is not correct.

**2. Answer: H. *Is it Relevant: Inserting***

The answer must be a “no” because the idea presented is not consistent with the passage, which makes no reference to dancers’ careers. We can eliminate **J** because the information does not contradict the passage.

**3. Answer: B. *Additional Comma Uses and Misuses***

The clauses in this sentence are “Growing up in Mexico in the 1920s” and “Hernandez believed she was born to dance.” Identifying these without any commas makes clear where they are separated. Imagine a movie narrator saying the sentence and emphasizing the pause. Where do you hear it?

**4. Answer: G. *Non-Essential Transitions, Words, and Phrases***

The phrases “despite,” “in fact,” and “on the other hand” are all transitions which introduce a new thought which is by nature contrary to the preceding point. Her father’s acquiescence is not counterintuitive, however; it simply shows the natural result of her persistence.

**5. Answer: D. *Is it Relevant: Deleting & Shorter is Better: Redundancy and Wordiness***

The underlined portion and all other options are unnecessary and redundant. We are already told that he acquiesced, so to state that he gave in is already stated and need not be repeated. Omission is grammatically correct and concise.

**6. Answer: H. *Colons***

As in number 3, read the options with commas aloud. Where does a pause occur naturally? Or does it? In this case, the underlined portion does not include a change of clause at all. No punctuation is necessary, as it is simply continuing the explanation of Amalia’s tutelage.

**7. Answer: A. *Non-Essential Transitions, Words, and Phrases***

Similarly to question 4, some answers here use transition words which are not correct in this context. Answers **C** and **D** would serve to introduce new ideas; however, this is not the case at the end of this paragraph. Option **B** is simply not relevant to the passage, as one can determine from reading. **A**, however, both ties up this paragraph and hints at the start of the next. Reading ahead by a sentence or two is a great way to gain some context for these transition questions.

**8. Answer: H. *Apostrophes***

Possessive. There’s no trick to this; you just have to know where the apostrophes go. A singular possessive will always have an apostrophe between the word and the s (save the few irregular exceptions).

**9. Answer: A. *Word Pairs and Comparison***

These questions are a hybrid of vocab and inference. If one knows the meanings of all 5 (4 answers + underlined) words, there is only to determine which is different and why. In this case, **A** is the outlier because “grouping” does not imply the homogenization the other options do. In the other 4, the parts are changed to create a whole. In **A**, they are preserved.

**10. Answer: G. *Parallel Structure: Lists***

Lists can be tricky. It’s important to know that in lists all listed articles must be of the same part of speech. In this case, “life” and “death” are nouns. “To have a rebirth,” as well as options **H** and **J**, are actually verbs phrases using “To have” and “To be.” The option “Rebirth” is consistent with the other articles listed.

**11. Answer: D. Transitions**

Often, omissions are the correct choice. You should still check the other options, though, to confirm. In this case, “However,” “Nevertheless,” and “Instead,” all imply a contradiction. Reading the sentence, however, we see that in fact these transitions are not only unnecessary but incorrect.

**12. Answer: F. Is it Relevant: Inserting**

Options **G-J** are easily eliminated by their reasoning. **G** and **J** both mention description, however the paragraph was an informative one which did not describe the ballets. **H** can be eliminated because the paragraph did not focus on the MIFA in the first place. **F** is the only reasonable answer because it accurately classifies the addition in relation to the text.

**13. Answer: C. Dashes**

The biggest hint here is the em dash immediately following. Em dashes almost always come in pairs, especially when in the middle of a sentence. The other options would improperly separate the portion following the existing dash as a new clause, when it’s really being interrupted by an aside.

**14. Answer: G. Is it Relevant: Replacing**

The answer here is in the question. Only one answer shows a “valuable contribution.”

**15. Answer: B. Suppose the Writer’s Goal**

We can eliminate 3 answers easily in this question. **A** is incorrect because the passage does not focus on awards, and **C** & **D** try to make semantic distinctions but fail because they are not actual evidence, seeing as the question does not necessitate artists in general or specific dance forms.

**16. Answer: E. Apostrophes: Possessive vs Plural**

Be careful not to mistake a general pronoun for a plural one. “Someone” is singular, so the singular possessive “else’s” is already correct.

**17. Answer: C. Joining and Separating Sentences: Comma + FANBOYS**

Here are two independent clauses, which should be their own sentences more often than not. The underlined “which” is unnecessary, so simplifying this into 2 simple sentences is easy. This is another type of question which is good to read aloud or imagine being read by a narrator.

**18. Answer: F. Word Pairs and Comparisons**

This is a vocab question in disguise! What do all these words mean? What do they add to the tone of the text? If you don’t know all the words, use context to estimate what they mean. As they’re listed together, you can bet they are very similar!

**19. Answer: D. Verbs: Agreement**

A matter of redundancy once more. Reading these options aloud should quickly eliminate the unwieldy **B** & **C**, and **D** makes a clear verb-noun agreement.

**20. Answer: H. Word Pairs and Comparisons**

The clue here is in the word “of.” All answers make sense followed by the word “of” except **H**; he doesn’t carry “many of pens.”

**21. Answer: D. Verbs: Tense**

This is a trickier question, which can be determined by tense. “I feel” is present, so we can determine we need another present-tense verb. **A** & **B** are both infinitive, while **C** is not even the correct part of speech.

**22. Answer: G. Pronouns: Agreement and Tense**

**H** and **J** can be easily eliminated because they are, respectively, too vague and blatantly incorrect in numbering. The distinction between **F** and **G** is subtle but important: **G** reinforces the point the author is making. When the pen he is using is run dry he needs another. “They” would mean all of the pens he has with

him, in which case it wouldn't matter if he had another as it may also be dry.

**23. Answer: C. Sentence Order & Non-Essential Clause "...,"**

Try rearranging the sentence to get an idea of the clauses. It can be written instead as "Small piles of uncapped ballpoints gather on my night table as if of their own accord." Here we can see that "as if of their own accord" is a separate clause from the rest of the sentence, which is placed in the middle as a stylistic choice. As it is not dividing the clause in which it is placed, a comma on either side denotes it as a separate thought.

**24. Answer: F. Is it Relevant: Inserting**

These questions are almost always easier to solve by elimination. **G-J** can be eliminated because of their reasoning. It does not explain a statement or distract from the focus, nor is it vague. It is a specific, relevant detail, so **F** is correct.

**25. Answer: D. Apostrophes: It's/Its**

It's vs. Its. The way to remember the difference is to remember that "It's" is a contraction of "It is." In a contraction the apostrophe holds the place of the omitted letter(s). As one cannot ignore the missing i, instead the possessive drops the apostrophe as it serves only to denote that it is in fact possessive, which is redundant seeing as there is no preexisting word with which to confuse it (the plural of "it" is not "its").

**26. Answer: J. Transitions**

"Still," "consequently," and "instead" all suggest a contradiction or a concession. In this case there is neither; the ideas being connected are simply being tied together, so a simple "also" is correct and does not make irrelevant implications.

**27. Answer: D. Verbs: Agreement**

Subject-verb agreement! The clothes are the subject, and they aren't capable of decorating. They can only be decorated, and **B** is in the wrong tense. This only leaves **D**.

**28. Answer: F. Sentence Order**

Rearranging the sentence to find the clauses is very useful. In this case, by swapping the clauses presented we can see they are in fact already correct. The other options cannot be moved in the same way, and are grammatically incorrect.

**29. Answer: B. Paragraph Order**

Use clues in the sentences to connect the dots. Sentence 4 naturally leads into sentence 2, and in the same way 1 and 3 are connected. With these two parts we only have to find which goes in front. As sentence 2 does not lead into sentence 1, we can determine that 1, 3, 4, 2 is the correct order.

**30. Answer: F. Is it Relevant: Deleting**

**G** is obviously incorrect because the friend is not only irrelevant but also not even identified. Options **H** and **J** just don't matter; neither is a reason to not include the opening paragraph, as they reference no rules of writing. **F**, however, correctly identifies the purpose of the intro to establish subject and tone with an anecdote.

**31. Answer: D. Non-Essential and Essential Clauses**

Options **A** & **B**, despite punctuation, are in the wrong tense. The sentence should be in the past tense to match the text, as with **C** & **D**. **C**, however, is not punctuated correctly, so only **D** is correct, even though it omits the detail.

**32. Answer: H. Apostrophes: It's/Its**

Possessive, not a contraction. "It is" would not fit, and the other options are entirely incorrect.

**33. Answer: C. Is it Relevant: Inserting**

Because "work" and "live" are used specifically above, it should be an immediate indicator that answer **C** is redundant. Once you check that the others are indeed not better options, **C** can be determined as the answer.

- 34. Answer: F. Parallel Structure: Prepositions**  
The changes provided, while not glaringly wrong, are all unnecessary and only add confusion. As written, “outside” is specific and concise enough and should be left.
- 35. Answer: B. Adjectives and Adverbs**  
Read it out loud! Where does it make sense? “Greatly” is an adverb, and thus must modify a verb. The trickiness here is that they ask what it comes *after*, which is not actually being modified. The verb “extends” is being modified by “greatly,” and to come before “extends” it must be after “ability.”
- 36. Answer: H. Is it Relevant: Inserting**  
The reasoning in the first two options is not relevant; neither camaraderie nor comfort pertains to the passage. **J** is also incorrect because the lack of descriptions has nothing to do with whether it should be included in relation to the rest of the passage.
- 37. Answer: D. Non-Essential and Essential Clauses**  
The extra specification of depth should not influence the existing clauses, so by nesting it between commas it becomes an aside that does not change the structure of the sentence while still adding the detail in a correct and relevant place.
- 38. Answer: J. Joining and Separating Sentences: Comma + FANBOYS**  
This marks the start of a new idea in no way dependent on the prior sentence. Thus, a period and a start of a new sentence is appropriate. The semicolon in option **C** would only be necessary if the following independent clause needed to be tied to the preceding sentence.
- 39. Answer: B. Verbs: Agreement**  
Subject and verb. The verb at the start is “Bolted,” so what is bolted? The research outpost. **A, C & D** would all be saying the scientists are bolted to the sea floor.
- 40. Answer: F. Is it Relevant: Inserting**  
**G** does not offer a complete answer, **H** adds the “at odds” portion for no reason, and **J** is far too vague. **F** offers all the necessary specifications.
- 41. Answer: A. Word Pairs and Comparisons**  
One of these things is not like the other! A classification is not similar to the other answers which all describe a number of objects.
- 42. Answer: F. Sentences and Fragments**  
“A special air pocket that keeps the ocean outside,” is not a complete sentence. It is a dependent clause, so it must be attached to an independent clause by a comma as in the text.
- 43. Answer: C. Adjectives and Adverbs**  
We must have an adverb (ending in -ly) to describe the verb “returned,” because “gradual” must be describing some sort of change. Pressure cannot be gradual, but a return can. **C** is correct because the “and” is superfluous in option **B**.
- 44. Answer: H. Paragraph Order**  
An important clue is the word “this” in sentence 1. It must be referring to something before it, so which sentence has a decompression to which it may be referring? Sentence 2. Similarly, sentence 3 implies another object as the price to pay, so it must come after something. This gives us the final order of 2, 1, 3.
- 45. Answer: D. Suppose the Writer’s Goal**  
The key word here is “generally.” **A** and **B** reference description, which is not relevant. **C** incorrectly states that the essay focuses on the role of UNC. **D** correctly points out the generality of the essay.
- 46. Answer: F. Relative Pronouns: Who(se), Whom, Which, Where, and That**  
The word “in” makes no sense here. Grant was not inside his own accomplishments! The others are simply rewordings meant to confuse you.

**47. Answer: D. Shorter is Better: Redundancy and Wordiness**

The other options are exceedingly redundant. When discussing his invention, it is already implied that he created it.

**48. Answer: F. Apostrophes: Possessive vs. Plural**

**G** implies the golfers invented them. **H** is not even usable. **J** is a contraction and would not make sense. Attributing the invention to Grant, as is in the original text, is the most correct option.

**49. Answer: A. Verbs: Tense**

In this case the tense must be in its infinitive form, as it already is. The other options incorrectly conjugate it and add extraneous words to mix you up.

**50. Answer: J. Word Pairs and Comparisons**

The word being verb'd in this question is "problem," so which is most appropriate? Would he correct, alleviate, fix, or rescue a problem? Even if you don't know all the words used, if you know "rescue" you know it doesn't fit.

**51. Answer: B. Is it Relevant: Inserting**

Read the paragraph! This gives you the context to figure out what needs to introduce them. Once you identify the subject of the paragraph to be Grant's dental achievements, **B** is the clear choice.

**52. Answer: G. Apostrophes: It's/Its**

This question tests you on both apostrophes and commas. Because the design is possessed by Grant, we must have an apostrophe before the s. The comma is unnecessary because "Those constructed according to Grant's design," is only a subject with no predicate and thus may lead straight into the predicate.

**53. Answer: B. Verbs: Agreement**

Finding the subject for the verb is key here. What is the subject? "The general health of his patients," more specifically "health." This is singular, and the plural "patients" after may throw you off. As our

subject is singular and we are in the past tense, "was" is the correct option.

**54. Answer: F. Additional Comma Uses and Misuses**

In this case, the temptation to put a comma at the end comes from the mistake that 2 articles make a list; they do not. **J** is not correct, and the comma after "invention" in **G** & **H** is also unnecessary. Although it's a mouthful, the text is correct as is.

**55. Answer: A. Shorter is Better: Redundancy and Wordiness**

Answers **B-D** are redundant. Each is simply another, more confusing way of saying "a need." The need is of course out there, in existence, and by definition the lack of something. It can be left as is for conciseness and clarity.

**56. Answer: H. Parallel Structure: Prepositions**

The key here is to recognize the word "focus" a few words before. One does not focus at something, nor for something, nor to something. "On" is the correct preposition to accompany the word "focus."

**57. Answer: D. Non-Essential Transitions, Words, and Phrases**

Remember to always pay special attention to omissions. In this case, there is no need to include one of these transition words because none of them make sense following the conclusion of the paragraph prior.

**58. Answer: H. Non-Essential Transitions, Words, and Phrases**

"A brilliant professor of dentistry" is not an independent clause, and so cannot support much of the punctuation. A comma, however, simply makes it a statement describing the subject "he," with the antecedent "Dr. George Franklin Grant."

**59. Answer: D. Verbs: Tense**

In this case, an infinitive verb must follow the conjugated “making it possible.” This is necessary to prevent 2 separate predicates from forming out of one. “To concentrate” does just that.

**60. Answer: H. Suppose the Writer’s Goal**

This question is tricky. The first two options are tempting because the descriptions are true to the essay, however they do not address the question properly. The question refers to “key innovations,” plural. This means there must be multiple. **H** mentions this, and while **J** is the correct in its conclusion the reasoning is completely irrelevant.

**61. Answer: C. Non-Essential Clause “,...,”**

A period cannot be correct because the leading sentence would be a fragment. It must have a comma, however, to denote the phrase “the year our house was built” does not begin the predicate.

**62. Answer: J. Parallel Structure: Prepositions**

**G** and **H** can be readily eliminated because they do not fit with the surrounding sentence, however determining between **F** and **J** can be difficult because it’s less readily determinable. It can be deduced, however, because the “scheme” was one for the collection of garbage. Although it is about it as well, *for* is more specific.

**63. Answer: A. Relative Pronouns: Who(se), Whom, Which, Where, and That**

This is not suggesting a reasoning, so **B-D** are not correct. “Being that,” “so that,” and “since,” all imply an explanation, which is unnecessary and incorrect.

**64. Answer: H. Diction and Register**

It’s important to get some context before answering this question, so read ahead to understand how the sidewalks are being portrayed. As the author is trying to contrast with the image of unclean trash cans, option **H** is the most appropriate to showcase how the trash cans hurt the image.

**65. Answer: B. Parallel Structure: Prepositions**

None of the options here are fantastic, and indeed the correct one even sounds a little off. Try reading them aloud to eliminate the more obviously incorrect options like **A** and **D**.

**66. Answer: J. Shorter is Better: Redundancy and Wordiness**

The “were have” and “would have” in **F** and **G** are not correct because they *did* work that way. It is past tense and fact, so there is no catch. **H** is incorrect because the “that” is unnecessary, and **J** is both definite and concise.

**67. Answer: A. Word Pairs and Comparisons**

The question specifically references “the writer’s description,” so the first thing you should do is go and find it. The words “narrow” and “slender” are used to describe the alleys, so it makes sense that the large trucks had to “squeeze through.” The other options do not make reference to the scarce description provided, so are incorrect.

**68. Answer: H. Is it Relevant: Replacing**

There’s no trick to a question like this. **F**, **G**, & **J** simply don’t have anything to do with the text, whereas **H** is a natural inclusion with the descriptions of large trucks traversing narrow alleys.

**69. Answer: C. Joining and Separating Sentences: Periods, Semicolons & Comma + FANBOYS**

Be careful! The “NOT” in the question is easy to miss. Colons and semicolons can be confusing, so if you aren’t sure about them make sure you use all your comma knowledge first. If you do this, recognizing that **C** is definitely wrong (even if **B** and **D** are maybes) gets you the answer. As a new, independent thought is started, a comma is indeed incorrect.

**70. Answer: G. Verbs: Tense**

This is another tricky one. The subject is unclearly “what,” so we have to determine it by looking at the verbs. Since “what was,” in the past tense, it makes sense that in the present tense “what is.” The word “now” clues you into that change of tense, and if you’re careful with the subject you should find the answer readily.

**71. Answer: B. Word Pairs and Comparisons**

“Attraction” has a connotation unlike the other 4 words. While “display,” “exhibition,” “spectacle,” and “showing,” all merely denote the trash cans’ being put out for all to see, “attraction” has a connotation which would imply they are put out with the intention of drawing people to see them. This is a subtle difference; however, the others are so similar that even this small discretion is key.

**72. Answer: F. Relative Pronouns: Who(se), Whom, Which, Where, and That**

In this case, eliminating the answers provided is the best bet. “Whom” is used with prepositions, “which” would not be used for people, and “whose” is possessive. None of these apply to the children, who thus remain “who.”

**73. Answer: B. Apostrophes: It’s/Its**

Watch the “NOT” in the question! It should be clear that something is needed to join these ideas, and the scarcity of option **B** is as glaring as it appears. The others all provide some means of conjunction or transition (and, comma, that is) which allow the two ideas to remain together. Simply squishing them into one sentence is not allowed.

**74. Answer: G. Colons**

Colons are used most commonly to present an example or list. In this case, a list of features immediately follows, so a colon is appropriate to lead the list.

**75. Answer: C. Paragraph Order**

The clue for this question is the word “them” in sentence 4. To whom is it referring? As garbage trucks are also mentioned, “them” must be referring to the children mentioned in sentence 2, so it would best fit immediately following it.

**1. D. Substitution**

$$\left(4 - 2 \times \frac{1}{2}\right) \left(4 + 2 \times \frac{1}{2}\right)$$

$$(3)(5)$$

**D. 15**

**2. J. Percent**

80% of 40 points

$$(.8)(40) = 32$$

**J. 32**

**3. D. Factoring & FOIL**

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

FOIL

$$6x^2 - 8x - 9x + 12$$

**D.  $6x^2 - 8x - 9x + 12$**

**4. J. Probability**

Probability of NOT happening is  $1 - \frac{2}{9}$

$$\frac{9}{9} - \frac{2}{9} = \frac{7}{9}$$

**J.  $\frac{7}{9}$**

**5. B. Rate & Proportion**

$$\frac{4.5}{50} = \frac{x}{80}$$

$$x = 2.4$$

**B. 2.4**

**6. F. Linear Function: Rate**

$$36 - 0.48t$$

**F.  $36 - 0.48t$**

**7. C. Triangles**

$$70 + 2x = 180$$

$$2x = 110$$

$$x = 55$$

**C. 55**

**8. H. Quadrilaterals**

1.  $2 \times 8 = 16$
2.  $1 \times 4 = 4$
3.  $2 \times 20 = 40$
4.  $1 \times 5 = 5$

$$\frac{65 \text{ square feet}}{10 \text{ sq/bg}} = 6.5$$

**H. 7**

**9. D. Functions  $f(x)$**

Find the  $x$  values.

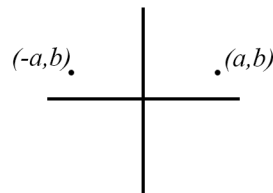
**D. {0,2,3}**

**10. F. Logic**

lights on  $\rightarrow$  store open  
converse

**F. store open  $\rightarrow$  lights on**

**11. A. Coordinate Geometry & XY-Plane**



**A.  $(-a, b)$**

**12. K. Algebraic Operations**

$$x^2 + 5x + 1$$

$$-(4x^2 + x - 5)$$

$$-3x^2 + 4x + 6$$

**K:  $-3x^2 + 4x + 6$**

**13. B. Rate & Proportion**

$$\frac{\$1.99}{5} = .398$$

$$\frac{\$2.19}{5} = .438$$

$$.438 - .398 = .04$$

**B. \$0.04**



**14. F. Solving Equations**

$$12x = -8(10 - x)$$

$$12x = -80 + 8x$$

$$4x = -80$$

$$x = -20$$

**F: -20**

**15. B. Percent**

$$414 = (1.15)x$$

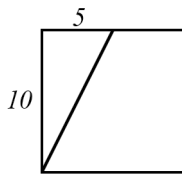
$$x = \frac{414}{(1.15)}$$

**B. \$360**

Note: Estimate and look at the answers.

- A. stupidly low
- C.  $414 - 15 = \text{not}$
- D/E too high

**16. J. Multiple Figures**



Big - Small

$$(10 \times 10) - \frac{1}{2}(10)(5)$$

$$100 - 25 = 75$$

**J: 75**

**17. D. Systems of Equations**

Use elimination

$$x + 2y = 12$$

$$x - y = 3$$

$$x + 2y = 12$$

$$-(x - y = 3)$$

$$3y = 9$$

$$y = 3$$

**D. 6,3**

**18. H. Functions  $f(x)$**

$$f(x) = 2x$$

$$g(x) = x^2$$

$$f(g(31))$$

$$g(3) = 3^2 = 9$$

$$f(9) = 2(9) = 18$$

**H: 18**

**19. E. Counting**

$$5 \times 4 \times 5 = 100$$

**E. 100**

**20. H. Inequalities**

$$-5 + m \leq -4 + 2m$$

$$-m \quad -m$$

$$-5 \leq -4 + m$$

$$+4 \quad +4$$

$$-1 \leq m \text{ or}$$

**H.  $m \geq 1$**

**21. B. Fractions**

Use your calculator and turn them all into decimals.

$$\frac{1}{3} = .333\bar{3}$$

$$.28$$

$$\frac{2}{5} = .4$$

$$\frac{3}{8} = .375$$

$$.37$$

$$\frac{3}{10} = .3$$

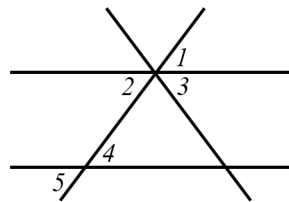
**B. .28, .3, .33, .37, .375, .4**

**22. F. Exponents & Roots**

$$(3x^3)^{-2}$$

**F:  $\frac{1}{9x^6}$**

**23. C. Geometry Lines**



**Congruent: 1, 2, 4, 5**

**C.  $< 2$  and  $< 3$**

**24. G. Logarithms**

$$A = 10^{B+C}$$

$$\log_{10} A = B + C$$

**G. B+C**

**25. B. Solving Equations**

$$4x^2 - 9 = 0$$

$$(2x - 3)(2x + 3) = 0$$

$$2x - 3 = 0$$

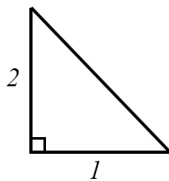
$$x = \frac{3}{2}$$

$$2x + 3 = 0$$

$$x = -\frac{3}{2}$$

**B.**  $\left\{-\frac{3}{2}, \frac{3}{2}\right\}$

**26. G. Triangles**



$$c^2 = 1^2 + 2^2$$

$$c^2 = 5$$

$$c = \sqrt{5}$$

**G.**  $\sqrt{5}$

**27. B. System Word Problems**

Lehman:  $\$30 + \$22(h)$   
 A - 1:  $\$35 + \$20(h)$   
 $30 + 22(h) = 35 + 20(h)$   
 $2h = 5$   
 $h = \frac{5}{2}$

**B.**  $\$2\frac{1}{2}$  hours

**28. H. Linear Functions:  $y = mx + b$**

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(5-3)}{(-3-7)} = \frac{2}{-10} = -\frac{1}{5}$$

**H.**  $-\frac{1}{5}$

**29. C. Sequence**

$$4 \quad 4n \quad 4n^2 \quad 256$$

$$256 = 4n^3$$

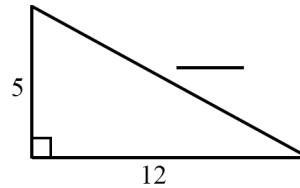
$$64 = n^3$$

$n = 4$ , second term is  $4n$  or  $4(4) = 16$

**C.** 16

**30. H. Triangles**

Double Sides



This is a standard right triangle 5-12-13

**H.** 13

Note\*: if you have to do Pythagorean theorem for standard right triangles, you are wasting time.

**31. D. Algebraic Operations**

$$3x + a = 9$$

$$3x = 9 - a$$

$$x = \frac{9-a}{3}$$

**D.**  $\frac{9-a}{3}$

**32. J. DRT Time/Rate/Distance, Fractions**

To solve, convert all fractions to decimals. The longest distance in the same time ran the fastest speed.

**J.**  $\frac{7}{9}$

**33. C. Linear Functions:  $y = mx + b$**

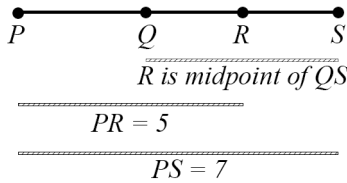
The answers are in standard form. Simply plug-in the given points in the answers. Easiest number to plug in is always zero!

$$3(0) - 4(0) = 0$$

Only C. works

**C.**  $3x - 4y = 0$

**34. H. Geometry Lines**



$$PS - PR = SR$$

$$7 - 5 = 2$$

$$QS = 4$$

H. 4

**35. E. Factoring & FOIL**

$$3x^4 + 6x^2 - 45$$

$$3(x^4 + 2x^2 - 15)$$

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

E.  $3(x^2 + 5)(x^2 - 3)$

**36. G. Rate and Proportion**

$$1 \text{ cm} = 4 \text{ miles}$$

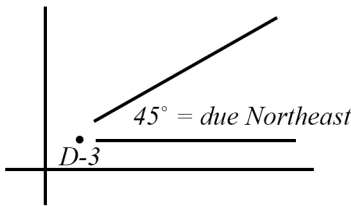
$$2\frac{1}{2} \text{ cm} = ?$$

$$\frac{2.5 \text{ cm}}{1 \text{ cm}} = \frac{(x \text{ miles})}{4 \text{ miles}}$$

$$x = (2.5)(4)$$

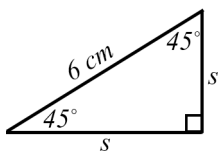
G. 10 miles

**37. D. Planes**



$$\frac{24 \text{ miles}}{4 \frac{\text{miles}}{\text{cm}}} = 6 \text{ cm}$$

This is a 45 – 45 – 90 triangle.



$$6 \text{ cm} = s\sqrt{2}$$

$$\frac{6}{\sqrt{2}} = s$$

$$4.24 = s$$

Go 4.24 from D to H and from 3 to 7

D. H – 7

**38. F. Rate & Proportion**

$$\frac{1 \text{ cm}}{4 \text{ mi}} = \frac{x \text{ cm}}{\frac{1}{2} \text{ mi}}$$

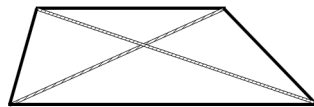
$$x = \frac{1}{8} \text{ cm per side}$$

$$\text{Area} = \frac{1}{8} \text{ cm} * \frac{1}{8} \text{ cm} = \frac{1}{64}$$

F.  $\frac{1}{64}$

**39. E. Quadrilaterals**

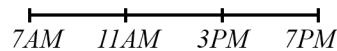
Note\*: A rectangle, rhombus, and a square are all parallelograms which by definition have diagonals that bisect each other. A trapezoid may not have diagonals that bisect each other.



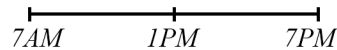
E. trapezoid

**40. J. Properties of Integers**

Every four hours



Every six hours



Note\*: The LCM of 4 and 6 is 12.

$$7 \text{ AM} + 12 \text{ hours} = 7 \text{ PM}$$

J. 12

**41. B. Table**

Most games AWAY from home

To solve take the "Wins" and subtract the home wins.

92	88	85	74	53
-49	-43	-47	-35	-29
43	(45)	38	39	26

B. Baltimore

**42. F. Solving Equations**

Substitute

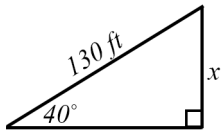
$$(1)^2 + h(1) + 10 = 0$$

$$h + 11 = 0$$

$$h = -11$$

F. -11

**43. A. Trigonometry**



$$\sin 40 = \frac{x}{130}$$

$$130 * \sin 40 = x$$

$$(130)(.643) = 78$$

A. 80

**44. H. Exponents & Roots**

$y = a^t$   
 Since the exponent  $t$  is a positive real number, the only way for  $y$  to decrease is for  $a$  to be a decimal or fraction.  
 $0 < a < 1$

Ex:  $\frac{1}{2} \left(\frac{1}{2}\right)^2 = \frac{1}{4}$      $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$

H.  $0 < a < 1$

**45. F. Multiple Figures**

small:  $\pi r^2 = 4$   
 $r = 2$   
 big: radius =  $5 * 2 = 10$   
 area of large  $\pi r^2 = \pi(10)^2 = 100\pi$

F.  $100\pi$

**46. K. Sequence**

TIP: Ellipsis “...” (three period or dots) means “every counting number between the two numbers on either side.”  
 (1, 2, 3, ..., 10) is the same as (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)  
 The sum of the cubes of the counting numbers is equal to the square of the sum of the counting numbers.

K.  $(1 + 2 + \dots + c)^2$

**47. B. Solids**

radius of Uranus  $r_u$   
 radius of Earth  $r_e$   
 $r_u = 4r_e$   
 volume of  $r_u = \frac{4}{3}\pi(4r_e)^3$   
 $= \frac{4}{3}\pi(64r_e^3)$

Volume of Uranus is 64 times that of Earth.

B. 64

**48. H. Mean, Average**

$$\frac{(a+a+a+b+c)}{5} = a$$

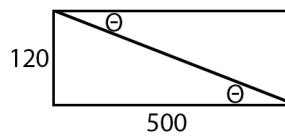
$$3a + b + c = 5a$$

$$b + c = 2a$$

$$\frac{b+c}{2} = a$$

H.  $a$

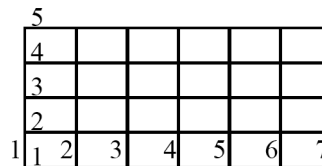
**49. E. Trigonometry**



E.  $\tan \theta = \frac{120}{500}$

**50. H. Multiple Figures**

Draw:  
 4 cm requires 5 horizontal lines  
 6 cm requires 7 vertical lines

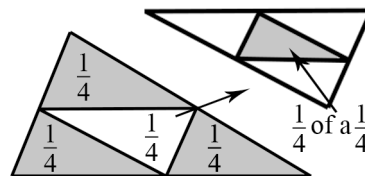


5 lines x 6 spaces = 30 line segments  
 7 lines x 4 spaces = 28 line segments  
 Total = 58 line segments

H. 58

**51. E. Multiple Figures**

TIP: Midpoints of the three sides of a triangle, when connected, form four sections of equal area.



$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} \text{ of } a \frac{1}{4} = \frac{13}{16}$$

E. 13/16

**52. K. Coordinate Geometry & XY-Plane**

- Midpoint of  $x$  and  $y$ .  
 $\left(\frac{20+120}{2}\right), \left(\frac{100+40}{2}\right)$   
 $(70,70)$
- Distance from booth to  $y$ .  
 $\sqrt{(100 - 70)^2 + (110 - 70)^2}$

**K. 50**

**53. A. Quadratics & Parabolas**

$$h = -t^2 + 3t$$

Tip: Vertex of any parabola  $ax^2 + bx + c = 0$  is  $\frac{-b}{2a}$

$$\frac{-b}{2a} = \frac{-3}{2(-1)} = \frac{3}{2}$$

**A. 3/2**

**54. K. Algebraic Operations**

Find LCD =  $(x + 1)(x)$

$$\frac{(x)}{(x)} * \frac{1}{(x+1)} + \frac{(x+1)}{(x+1)} * \frac{1}{x} = \frac{2x+1}{(x)(x+1)}$$

**G.**  $\frac{(2x+1)}{(x)(x+1)}$

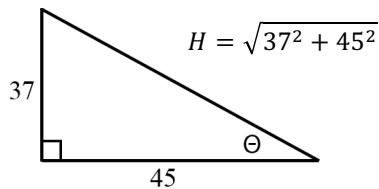
**55. D. Quadrilaterals, Ratio**

$$1 : 2 : 3 : 4 = 10 \text{ total parts}$$

$$\begin{matrix} \times 36 & \times 36 \\ 144 & 360 \text{ total degrees} \end{matrix}$$

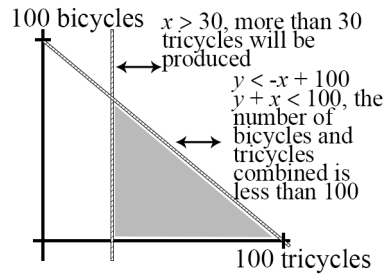
**D. 144°**

**56. K. Trigonometry**



**K.**  $\cos \theta = \frac{45}{\sqrt{37^2 + 45^2}}$

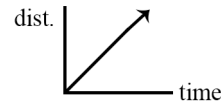
**57. E. Systems of Equations**



**E. The number of tricycles and bicycles together is less than 100, and the number of tricycles exceeds 30.**

**58. K. Linear Functions:  $y=mx+b$ ; Coordinate Geometry & XY-Plane**

- Moving in a circle keeps the same distance, radius, from one point over time.
- Moving in a straight line away is a linear function with a positive slope.

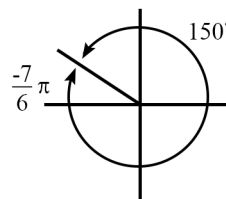


- Standing still is a horizontal line over time

**K. I & III only**

**59. D. Trigonometry**

Tip: negative radians or degrees means the angle moves clockwise



**D. 150°**

**60. G. Equation of a Circle**

$$(x - (-2))^2 + (y - 3)^2 = 5^2$$

$$(x + 2)^2 + (y - 3)^2 = 25$$

$$x^2 + 4x + 4 + y^2 - 6y + 9 = 25$$

combine constants and rewrite

**G.**  $x^2 + y^2 + 4x - 6y = 12$