

1. Answer: A. Additional Comma Uses and Misuses

The only necessary comma in the underlined portion is the one already there, which serves to separate the leading independent clause from the rest of the sentence.

2. Answer: J. Non-Essential Transition Words and Phrases

The word “similarly” is incorrect here because the usual six-sided snowflakes are understood well, while the triangular ones are not. We need a transition word to show the contrariness of these ideas. The best option is “however.”

3. Answer: D. Verbs: Agreement

The opening clause of this sentence is telling us that something “suggests.” We need to determine how to accurately say *what* they suggest, while also agreeing with the non-underlined portion that follows. **C** does agree with the rest; however, it does not agree with “suggests.” **B** has the opposite problem. Only **D** agrees with both sides of the sentence.

4. Answer: H. Verbs: Agreement

The opening clause offers us a verb in need of a subject. So, what or who re-created the snowflake formation? Not the discovery itself, but the scientists. The only answer with them as the subject is **H**.

5. Answer: B. Joining and Separating Sentences: Comma + FANBOYS

Answers **C** & **D** both offer a second independent clause after the comma, while **A** does this without even a comma. As there is no conjunction, we must have a dependent clause following the comma. Only **B** provides one.

6. Answer: J. Verbs: Agreement and Tense

We must have a plural verb to match the plural “molecules,” as well as a present-tense verb to match the rest of the passage. Answer **J** provides a plural, present form of “bump.”

7. Answer: B. Is it Relevant: Deleting

Hopefully answers **C** & **D** immediately stand out as irrelevant to the text, as they clearly do not have to do with the underlined portion. **A** is incorrect because it is not actually an explanation, but merely the mention of a step, as in **B**.

8. Answer: J. Verbs: Agreement

The subject for the underlined verb is “snowflakes,” so we need a plural conjugation. It also must retain the present tense. There is no need for the wordiness in options **G** & **H**, so **J** is correct.

9. Answer: C. Colons

A colon is correct here because it the sentence, an independent clause until the last word, is leading to present an example. A semicolon is incorrect because “dust” is not an independent clause. “Is” would incorrectly create a new clause by creating a predicate.

10. Answer: J. Sentences and Fragments

The underlined portion should only be continuing the subject of the sentence here, not creating a dependent clause. The subject should be “The greater pressure from the wind,” and doesn’t need a comma because the predicate immediately follows.

11. Answer: B. Adjectives and Adverbs

Because “form” is a verb, it must be described by an adverb. The word “than” following soon after indicates comparison while also ruling out “most.” Thus, “more quickly” is correct.

12. Answer: G. Non-Essential Transition Words and Phrases

Here we need only include a comma. The “although” at the start creates a dependent clause, ruling out all options other than the comma, which can combine a dependent to an independent clause.

13. Answer: A. Is it Relevant: Replacing

Note that the question asks for the most effective way to *conclude* the sentence

and the essay. It is best left as-is, because the other options are either too specific, too vague, or irrelevant.

14. Answer: H. Sentence Order

The word “this” in our sentence is our clue. We must find out which option has the “growth” referred to by “this.” The only option which makes sense here is **H**.

15. Answer: D. Suppose the Writer’s Goal

Recall that what is important here is not the yes/no answer, but the reasoning. The only answer with supporting evidence that is both *relevant* to the text and *true* is **D**.

16. Answer: H. Sentences and Fragments

Because the beginning of this sentence is a dependent clause, it does not need a conjunction with the comma. If it was rearranged so the clause before the comma came at the end, it would make sense. Thus, no conjunction is needed: only a comma.

17. Answer: B. Verbs: Agreement and Tense

It’s necessary to have the appropriate form of the verb “need” in this sentence. “Will need,” is improperly future tense. “Would have needed” implies that they did not in fact need them. “Need” is present tense. The only past-tense and appropriate option is “would need,” which shows that it was in the past, but came after the currently-narrated portion.

18. Answer: J. Shorter is Better:

Redundancy and Wordiness

It is redundant to restate the information given at the start of this sentence: “We tried to steady ourselves with our walking sticks.”

19. Answer: C. Verbs: Agreement and Tense

The past tense of the story immediately eliminates options **B** & **D** for their present-tense verbs. The difference between **A** and **C** is the preposition. “With” is appropriate, because “on” would imply the roof was literally atop the fallen rocks.

20. Answer: H. Additional Comma Uses and Misuses

G is quickly ruled out because it creates a new independent clause without conjunction. While **J** is dependent, it does not have a comma. Only **H** provides a dependent clause properly punctuated with a comma.

21. Answer: A. Modification

“Most of” is the correct modifier for “the route.” **B** is improper because “most” is comparative, and “part” is not in this case. **C** lacks a “the” to make it correct, because “majority” needs to be specified as “the majority” vs “the minority,” as there is only one possible majority. **D** is incorrect because “more” is directly comparative, but there is no other option to which it is compared.

22. Answer: F. Verbs: Agreement and Tense

Don’t be thrown off by the clause between the em dashes; it does not impact the rest of the sentence. Because we have a comma and no conjunction, we know we need a dependent clause to match the independent clause before. Only “forming,” which does not add a pronoun to create a new subject, is correct.

23. Answer: B. Diction and Register

The use of “only” and “able” gives a sense of the author being prevented from doing more. The other options merely state his progress, without answering the question’s request to emphasize “the slowness of the ascent” and how they “did not set their own pace.”

24. Answer: H. Additional Comma Uses and Misuses

Again here we have an inverted sentence structure with a dependent clause leading into an independent. As always in these situations, a simple comma is the best and correct way to punctuate. The other options provided all require beginning with an independent clause, regardless of what follows.

25. Answer: C. Apostrophes: Possessive vs Plural

Although we don't know from the context whether there are one or more craters, we can determine our answer from just the first word. "Cliffs" should be plural and not possessive, so there is no need for an apostrophe. Between **C** and **D**, only **C** has a possessive form of "crater," so it is the only correct option.

26. Answer: F. Is it Relevant: Deleting

We can rule out a number of answers. **G** because the idea of waiting was introduced just before. **H** because, necessary or not, it does not contradict anything. **J** because it is not an image at all.

27. Answer: D. Word Pairs and Comparisons

The word which is most appropriate here is "finally," because the author has just described their waiting. The other options do not relate to this statement of time.

28. Answer: G. Word Pairs and Comparisons

We can easily disqualify "went over," because it doesn't really describe anything. "Smothered" and "squelched" are not very "rugged" words, as the question requests. Only "shattered" bears this violent connotation.

29. Answer: A. Paragraph Order

The first paragraph mentions "the other hikers" just as the proposed addition does. It also fits into the chronology of the narrative, as they use flashlights once it is dark.

30. Answer: F. Suppose the Author's Goal

If you read the passage (which hopefully you have by now), should not be difficult to determine which option accurately describes the story. It does not focus on their tools, the rewarding nature, or the beauty—it just mentions them. They are all part of the story which, overall, describes the challenges involved in their journey.

31. Answer: B. Additional Comma Uses and Misuses

There is no need for a comma here. The underlined portion does not separate clauses, list articles, or anything else. The modifier "named Juan Quezada" can immediately follow the modified "boy," and similarly lead directly into the predicate.

32. Answer: H. Non-Essential and Essential Clauses

The fact that two answers use parentheses should be an immediate signal that one of them is using them incorrectly. In this case, the extra comma after "pots" makes it incorrect because it is redundant.

33. Answer: B. Sentences and Fragments

The active verb here is "wondered." Because the root of the sentence, "Quezada wondered," is not a question, we cannot end the sentence in a question mark. The comma in **C** is also incorrect because, again, nothing is being separated; it is merely stating what is being wondered.

34. Answer: H. Transitions

To form a good transition, we want a sentence which includes an idea from the last paragraph and the upcoming paragraph. To combine Quezada's desire to emulate the pots with his experimenting with the clay, option **H** is the only possibility.

35. Answer: A. Verbs: Agreement and Tense

Options **B** & **C** imply Quezada was selling a dedication to teaching and a teacher. As he was not, in fact, selling these, we need a new verb in the underlined sentence, not a subject. "Has taught" is incorrectly present tense, so the past-tense "had taught" is correct.

36. Answer: F. Is it Relevant: Deleting

Treat this like a deletion question. What would be lost without this detail? Well, it shows that his pots were so authentic they even fooled an anthropologist. This

is an important supporting detail, and is only reflected in answer **F**.

37. Answer: A. Verbs: Agreement and Tense & 9, Pronouns: Agreement and Case

The verb for this sentence must match the subject, "his search." "Himself" is a reflexive pronoun, which means something acted upon itself. As "his search" did the acting, it should not be reflexive. "Led him" agrees with the subject and the antecedent.

38. Answer: F. Word Pairs and Comparisons

The only option which implies delay is "eventual." The others have different meanings, none of which respond to the question accurately.

39. Answer: C. Relative Pronouns: Who(se), Whom, Which, Where, and That

Although omission is often correct, here it is not. The fact that **C** is much shorter and simpler, though, is a good hint that it's a better option. "Where" is necessary to create a dependent clause, as there is no conjunction.

40. Answer: J. Shorter is Better: Redundancy and Wordiness

The shortest answer is often correct. Also note that "more then" is never correct, as it should be "more than." The strange pronoun in option **H** makes this a confusing mess. What is the antecedent? Village, money, pottery? **J** is simple and correct.

41. Answer: C. Is it Relevant: Inserting, Deleting, and Replacing

We need a specific answer here. Of course there are more than 400 potters; there are thousands, millions. It is only relevant to the text if it is telling how many potters are in Mata Ortiz.

42. Answer: G. Relative Pronouns: Who(se), Whom, Which, Where, and That

"Which" is not used for people. "Them" would create an independent clause, which is incorrect as there is no

conjunction. "Who" does not follow "of." The correct pronoun here is "whom."

43. Answer: D. Pronouns: Agreement and Case

"They're" is very wrong; it is the contraction of "they are." **B** incorrectly uses a reflexive pronoun, when the people described are acting upon a separate entity. The word "each" means "her" is correct, not "hers," because it refers to multiple singular people instead of a group. Thus, "his or her" is the correct way to use possessive pronouns in this sentence.

44. Answer: J. Sentence Order

The reference to "each artist" should point us in the direction of a sentence discussing the artists. The only option which does this is **J**.

45. Answer: C. Suppose the Author's Goal

This piece is not one of historical information, but a biographical story of one artist in particular. Although it does mention things in the other options, none of them are the focus of the essay.

46. Answer: J. Apostrophes: It's/Its

This is an important thing to learn for the test. The apostrophe stands in for the missing letter "I" in "It is." This sentence needs a possessive, so there should not be an apostrophe.

47. Answer: D. Additional Comma Uses and Misuses & 8, Verbs: Agreement and Tense

There should not be a comma here! Nothing needs to be separated in the underlined portion. The correct verb is "fill," because "filling" would create a modification instead of a predicate, leaving the sentence as a fragment.

48. Answer: H. Non-Essential Transition Words and Phrases

Because the information being presented after the transition word is contrasting from that before it, "however" is the correct word. The others do not imply

this contrast, but instead causation or reinforcement.

49. Answer: B. *Modification*

We cannot create a new clause here. We instead must modify the “architecture buffs” by describing them as “there to admire.” The pronouns offered are all incorrect, and the closest, **D**, creates a new independent clause without conjunction.

50. Answer: F. *Separating Sentences: Semicolon*

Would a period work here? Yes! On the ACT a semicolon is just a period. If it is ever an option, substitute a period and see if it is correct. Here we have two independent clauses, separated correctly by a semicolon.

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

Options **A** & **C** are easily eliminated because they have such weak reasoning, but **B** is a tempting choice. The evidence is true, because it does provide this context. This answer is incorrect because this detail is not relevant to the focus of the essay, as option **D** points out. By reading through all the answers, you will realize this once you reach **D**.

52. Answer: J. *Is it Relevant: Deleting*

Omission is very often correct, and the fact that the other answers here are so similar should clue you in. The color and material composition of the building are irrelevant details which do not serve any purpose to this text.

53. Answer: A. *Sentences and Fragments*

Although this is an odd way to punctuate this sentence, it is more correct than the options presented. **B** & **C** create dependent clauses separated by a period, which is incorrect. **D** creates an independent clause with a comma and no conjunction, which is just as wrong.

54. Answer: F. *Verbs: Agreement & Adjectives and Adverbs*

As “chandeliers” are being described by “elegant,” it should remain an adjective, not an adverb. As “chandeliers” is plural, we must have the plural “illuminates.”

55. Answer: B. *Diction and Register*

A & **D** are dull and without any implications, while **C** is a very negative portrayal. **B** is positive and accurately mimics the style of the architecture.

56. Answer: G. *Is it Relevant: Deleting*

The other options do not sufficiently justify their claims. **F** is outright false, **H** misidentifies the essay's claim, and **J** incorrectly assumes the purpose of the sentence.

57. Answer: C. *Paragraph Order*

At point **C** the paragraph shifts from exterior to interior focus, which is exactly what is sought by the question.

58. Answer: F. *Transitions*

None of these transitions are appropriate in this location, so they are better off foregone.

59. Answer: D. *Shorter is Better:*

Redundancy and Wordiness

All options here are redundant, as the "adding" implication is already present in the word "enhancing."

60. Answer: G. *Suppose the Author's Goal*

F & **J** incorrectly claim the passage focuses on a number of buildings and styles, despite the clear focus on the Lyceum Theatre's Beaux Arts influence. **H** is easily ruled out if you've read the passage, as it does not focus on the sets.

61. Answer: C. *Sentences and Fragments*

The preposition "with" signals that we need a noun here. "Inaccuracies" is the noun option, and as such it must be modified by the adjective form "factual," not the adverb "factually."

62. Answer: G. *Colons*

The colon here is used properly, in that it follows an independent clause and leads into an example or extrapolation.

63. Answer: D. *Verbs: Agreement*

Because the subject here is "untruths," despite the clause between dashes, the verb must be plural to match. "Matter" is the correct plural, present option.

64. Answer: F. *Joining and Separating*

Sentences: Comma + FANBOYS

"For" is a conjunction which, with a comma, allows us to combine two independent clauses. This is correct as-is. Do not be tempted to pick the period or semicolon; the conjunction makes the clause dependent! Also note that if two options use a period and semicolon in the same way, they must both be wrong because they are functionally the same on the ACT.

65. Answer: C. *Transitions*

The words "rather" and "instead" are signal transition words which should immediately catch your eye. Between **C** & **D**, only one leads into the thesis of the essay as a whole. Consider reading ahead and coming back to this to determine just what that topic is.

66. Answer: H. *Apostrophes: Possessive vs. Plural*

This sentence contains a singular-possessive and a plural ("movement's" and "advocates" respectively). Although it can be confusing to see both, this is a straightforward question if you don't rush through it.

67. Answer: D. *Additional Comma Uses and Misuses*

There is no need for a comma here, as "She herself" is not a clause, but only the subject of this sentence.

68. Answer: G. *Is it Relevant: Inserting*

Remember, the only important part of the answer is the evidence. In this case, the incorrect answers disregard the importance of this detail in creating character, while **G** supports why the detail is important.

69. Answer: D. *Joining and Separating Sentences: Semicolon*

Don't know how to use a semicolon? Use a period! Both separate independent clauses, and are functionally the same on this test.

70. Answer: J. *Is it Relevant: Deleting*

The only answer which is relevant to the text is J. It is important to read the passage well, and if necessary go back into the text. Without the context, questions like this are very difficult.

71. Answer: A. *Is it Relevant: Inserting*

It's important to read the answers carefully, because some will try and trick you. Obviously the comparison is not unrelated, nor is it repeated, but **B** may tempt you because she may well have cared for her workers in that way. **A** is the best answer, though, because this metaphor is central to the text.

72. Answer: F. *Colons*

Note that colons must follow an independent clause. The following clause is an example, so a colon is appropriate. The other options are convoluted and incorrect. It is important to learn how, where, and when colons are acceptable; or, at the very least, when nothing else is.

73. Answer: B. *Transitions*

The only transition word here which implies causation, as the text would imply, is "because." The others would imply she was contrary to the workers, or a similarly incorrect relationship.

74. Answer: H. *Apostrophes: They're, Their, There*

"Their" is the form which refers to possession by a plural. "Behalf" does not need to be transformed in any way, and the strange apostrophe in J should be reason enough to ignore t.

75. Answer: D. *Suppose the Author's Goal*

D is correct because it supports its claim with evidence true to the text, which does focus on Mother Jones. The other answer choices reference either her or the labor movement, but not both, as required by the prompt.

1. D. Probability

Type A or AB
 $67 + 6 = 73$

D. $\frac{73}{150}$

2. H. Mean, Average

$$\frac{370+310+380+340+310}{5}$$

H. 342

3. E. Rate & Proportion

$$\frac{1}{2} \text{ hr} = 18 \text{ miles}$$

$$\frac{.5}{18} = \frac{2.5}{x}$$

Solve for x.

$$x = \frac{(18)(2.5)}{.5}$$

E. 90

4. F. Solving Equations

$$450 = c(10)^3$$

$$c = \frac{450}{1000}$$

F. 0.45

5. E. Functions $f(x)$

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

$$f(1) = (3 * 1 + 7)^2$$

$$f(1) = 100$$

E. 100

6. H. Percent

6% increase

$$(12)(1.06) = 12.72$$

H. \$12.72

7. E. Sequence

1, -3, 9, -27, ___ ___ ___

Geometric means multiple.

Here it is multiply by -3.

$$-27 * -3 = 81 \quad 5^{\text{th}}$$

$$8 * -3 = -243 \quad 6^{\text{th}}$$

$$-243 * -3 = 729 \quad 7^{\text{th}} \text{ term}$$

E. 729

Note: These are the powers of 3 which you should be familiar.

8. H. Rate & Proportion

1 box 15 lbs

Fee + Price per pound

$$\$10 + (.65)(15) = \$19.75$$

H. \$19.75

9. A. Solids

$$\frac{.32 - 2(.03)}{.02} = 13$$

H. 13

10. K. Median

13,15,16,19,19,22|25, 25, 26, 27, 28, 29

$$\frac{22+25}{2} = 23.5$$

K. 23.5

11. C. Linear Functions: $y=mx+b$

1. Plug in $t = 10, d = 14$

A. $14 = 0 + 14$

C. $14 = 6 * 0 + 14$

Eliminate B, D, E

2. Plug in $t = 1, d = 20$

A. $20 = 1 + 14$ NO

C. $20 = 6 + 14$ YES

C. $d = 6t + 14$

12. K. Quadrilaterals

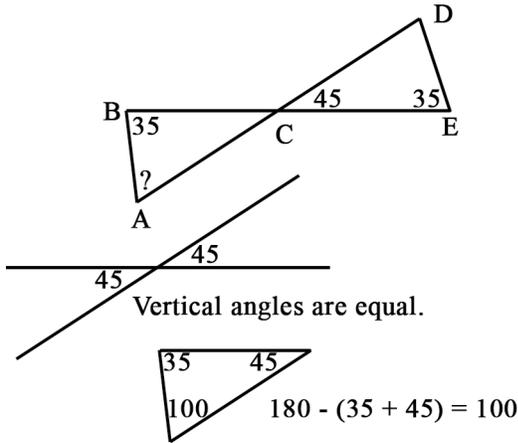
$$l * w = 54$$

$$9 * w = 54$$

$$w = 6$$

$$2(9) + 2(6) = 30$$

K. 30
13. B. Angles, Triangles



B. 100

14. H. Sectors & Arcs, Charts & Graphs

$$\frac{4 \text{ core}}{9 \text{ total}} = \frac{\theta(\text{angle})}{360^\circ}$$

Solve for θ .

$$\theta = \frac{4 * 360}{90}$$

$$\theta = 160^\circ$$

H: 160°

Note: Know how to do this. ACT loves this problem.

15. B. Systems Word Problems

$$S + L = 70$$

$$\$12L = \$8S$$

How many large

$$S = 70 - L$$

$$12L = 8(70 - L) \text{ distribute}$$

$$12L = 560 - 8L$$

$$20L = 560$$

$$L = \frac{560}{20}$$

$$L = 28$$

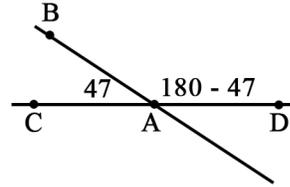
B. 28

16. H. Linear Functions: $y = mx + b$

$$\frac{220 - 88}{3} = 44$$

H: 44

17. D. Angles



$$\angle BAD = 133$$

B. 133°

18. F. Fractions

$$\frac{1}{2} \frac{5}{6} \frac{5}{8}$$

$$\text{LCD} = 24$$

$$\frac{12}{24} \frac{20}{24} \frac{15}{24}$$

“ascending”

$$\frac{12}{24} < \frac{15}{24} < \frac{20}{24}$$

$$\mathbf{F:} \frac{1}{2} < \frac{5}{8} < \frac{5}{6}$$

19. D. Exponents & Roots

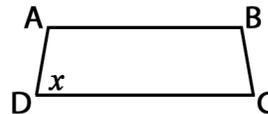
$$\frac{670,000,000}{6.7 \times 10^8}$$

$$\frac{700,000,000}{7.0 \times 10^8}$$

Add 13.7×10^8

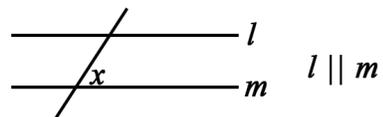
D. 1.37×10^9

20. F. Quadrilaterals



F. $(180 - x)$

- a lot like 304; Angles



21. B. Percent

$$(1,000)\left(\frac{80}{100}\right)\left(\frac{60}{100}\right)$$

$$(1,000)(.8)(.6) = 480$$

B. 480

22. H. Exponents & Roots

$$a^b = x \quad c^b = y$$

$x \times y = ?$ substitute

$$a^b \times c^b = (ac)^b$$

H: $(ac)^b$

23. A. Algebraic Operations

$$\frac{1}{2}y^2(6x + 2y + 12x - 2y)$$

combine like terms

$$\frac{1}{2}y^2(18x) = 9xy^2$$

A. $9xy^2$

24. H. Factoring & FOIL

$$500p - p^2 = 60,000$$

$$p^2 - 500p + 60,000$$

$$(p - 200)(p - 300) = 0$$

H. 200

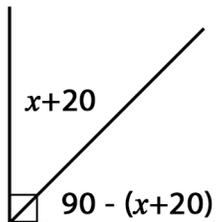
Tip: When there is a factoring problem, let the answers give you a clue.

25. B. Charts & Graphs

$$\frac{254}{900} = 0.28\bar{2}$$

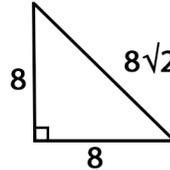
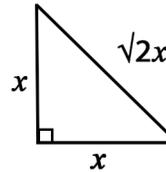
B. 28%

26. G. Angles



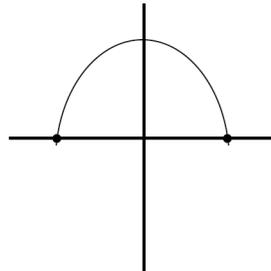
G. $(70 - x)^\circ$

27. E. Triangles



E. $16 + 8\sqrt{2}$

28. H. Quadratics & Parabolas



solution is where $y=0$ or x intercept

H. 1 positive, 1 negative real solutions

“real solution” means parabola crosses x-axis. If the solution is not real it is imaginary.

29. C. Complex Numbers

$$(-3i + 4)(3i + 4) \text{ FOIL}$$

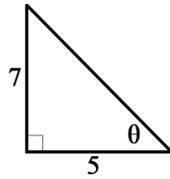
$$-3 * 3i - 4 * 3i + 4 * 3i + 16$$

$$-9(-1) + 16 = 25$$

C. 25

30. G. Trigonometry

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



G. $\frac{5}{755}$

31. D. Probability

$$750 + 5 \text{ extra} = 755$$

$$\frac{5 \text{ extra}}{755 \text{ total}} = \frac{5}{755}$$

Don't you think the ACT should reduce to $\frac{1}{155}$?

D. $\frac{5}{755}$

32. K. Fractions

The midpoint is simply the average.

$$\left(\frac{2}{3} + \frac{3}{4}\right)/2$$

math > frac

K. $\frac{17}{24}$

Note: 33 - 35 are three of the most missed questions!

33. B. Rate & Proportion

$$.25 \text{ inch} = 2 \text{ ft}$$

$$\frac{x}{.25} = \frac{15}{2}$$

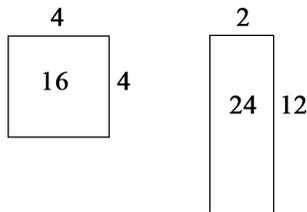
$$x = 1.875$$

B. 1.875

34. H. Multiple Figures

Not covered = whole - cabinet

$$\text{Whole} = 12 \times 15 = 180$$



$$180 - (16 + 24) = 140$$

H. 140

35. D. Linear Functions $y = mx + b$

$$2,150 = 650 + (10)(x)$$

There are 10 cabinets.

$$\text{Price per cabinet} = \frac{2150 - 650}{10} = 150$$

$$\text{Twice as many}$$

$$650 + 20 * 150$$

D. 3650

36. J. Systems of Equations, 203; Inequalities

$$1 < x + y < 2$$

break a compound into two inequalities

$$1 < x + y$$

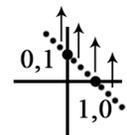
$$x + y < 2$$

graph line in standard form, use intercepts

$$1 < 0 + y \quad (0,1)$$

$$1 < x + 0 \quad (1,0)$$

Plot

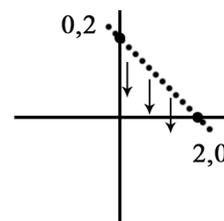


$$x + y < 2$$

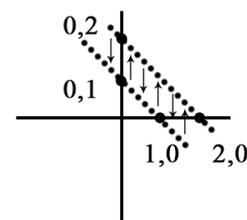
$$0 + y < 2 \quad (0,2)$$

$$x + 0 < 2 \quad (2,0)$$

Plot



combined:



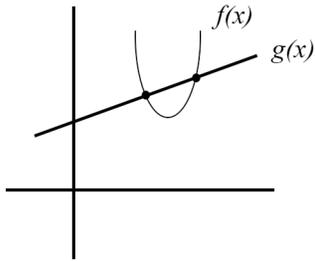
90% of students miss this one!

37. A. Mean, Median

$\frac{3+8+10+15}{4} = 9$
 3, 8, , 10, 15; median = 9
 Difference
 $9 - 9 = 0$

A. 0

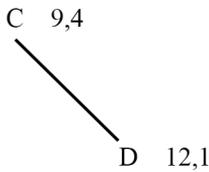
38. F. 2 Quadratics & Parabolas, Linear Functions $y=mx+b$, Systems of Equations



Where do they intersect?
 That is where the functions are equal.

F. $f(x) = g(x)$ for exactly 2 values of x

39. B. Slope

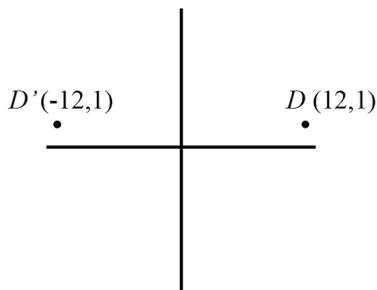


$m = \frac{4-1}{9-12} = \frac{3}{-3}$

B. -1

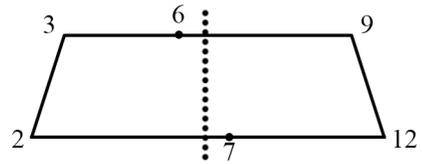
40. F. Coordinate Geometry & XY-Plane

Reflected over y-axis



F. -12, 1

41. E. Quadrilaterals



$\frac{(3+9)}{2} = 6$ $\frac{(2+12)}{2} = 7$

$\frac{(6+7)}{2} = 6.5$

MIDPOINT! means average
 Cut into equal area is midpoints of b_1 and b_2 .

E. 6.5

42. K. Functions $f(x)$

$f(x) = x - \frac{1}{x}$

$g(x) = 1/x$

$f(g(1/2)) = (1/(1/2)) - (1/(1/2))$ hulo?

$g(1/2) = 1/(1/2) = 2$

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

F. $\frac{3}{2}$

43. D. Algebraic Operations

$P = \frac{\frac{1}{2}ay+a}{12y}$

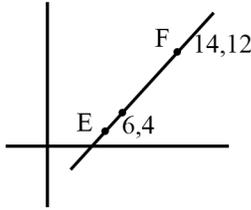
Factor out "a"

$P = \left(\frac{\frac{1}{2}ry+1}{12y}\right)a$

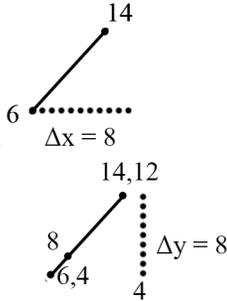
Multiply a by 2, means balance equation by $P \times 2$.

D. $P \times 2$

44. G. Coordinate Geometry and XY-Plane



$EF = 4 \times (ED)$



8 is 4×2
 $4 + 2 = 6$

G. 8.6

45. D. Matrix

A matrix can have a coefficient.
 Distribute the "a"

$$\begin{bmatrix} 2a & 6a \\ a & 4a \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$$

$6a = 27$
 $a = \frac{9}{2}$ or 4.5

$2a = x$
 $2(4.5) = x$
 $9 = x$

$4a = z$
 $4(4.5) = z$
 $18 = z$

$9 + 18 = 27$

D. 27

46. J. Fractions

$\frac{1}{8}$ of the whole
 $\frac{1}{8}x + 10 = 34x$
 Solve for x.
 $x = 16$

J. 16

47. B. Solids

"Most likely"
 $86 : 255$
 $18 : 51$
 These are the same "whole"

$51x = 255$
 $x = 5$

$18 \times 5 = 90$

10th	11th	12th
86	90	79

Most likely = $11^{\text{th}} \frac{9}{255}$

B. 11th

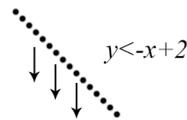
48. G. Fractions, Exponents & Roots

$\frac{4}{\sqrt{2}} + \frac{2}{\sqrt{3}} = ?$
 Find LCM
 $\frac{4\sqrt{3}}{\sqrt{2}\sqrt{3}} + \frac{2\sqrt{2}}{\sqrt{3}\sqrt{2}}$

G. $\frac{4\sqrt{3}+2\sqrt{2}}{\sqrt{6}}$

49. A. Systems of Equations, 215; Equations of a Circle, 207; Linear Functions $y=mx+b$

First find the linear inequality.

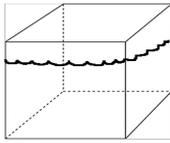


Second, the circle is shaded inside.
 Solutions must be less than radius.

$(x - 1)^2 + (y - 2)^2 < 9$

A. $\begin{cases} y < -x + 2 \\ (x - 1)^2 + (y - 2)^2 < 9 \end{cases}$

50. F. Solids



Volume of water

$$40 \times 30 \times 20 = 24,000$$

It increases by .25

$$40 \times 30 \times 20.25 = 24,300$$

Displacement = Difference

$$24,300 - 24,000$$

F. 300

51. E. Ratio

$$x : y = 5 : 2$$

$$y : z = 3 : 2$$

$$(5:2)3 = 15:16$$

$$(3:2)(2) = 6:4$$

$$x : z = 15 : 4$$

E. 15:4

52. H. Inequalities

$$-5 < 1 - 3x < 10$$

break into parts

$$-5 < 1 - 3x$$

$$-1 \quad -1$$

$$-6 < -3x$$

$$\frac{-6}{-3} < \frac{-3x}{-3} \text{ switch sign}$$

$$2 > x$$

$$1 - 3x < 10$$

$$-1 \quad -1$$

$$-3x < 9$$

$$\frac{-3x}{-3} < \frac{9}{-3} \text{ switch sign}$$

$$x > -3$$

H. $-3 < x < 2$

53. B. Solids

$$A = 2lw + 2lh + 2wh$$

Double each

$$2(21)(2w) + 2(21)(2h) + 2(2w)2h$$

$$81w + 81h + 8wh$$

increase by factor of 4

B. 4

54. K. Linear Function: Rate

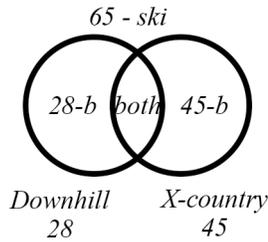
$\frac{7 \text{ cans}}{3 \text{ days}}$

$$3 + d = ?$$

$$3 \left(\frac{7}{3} \right) + d \left(\frac{7}{3} \right)$$

$$\mathbf{K. 7 + \frac{7d}{3}}$$

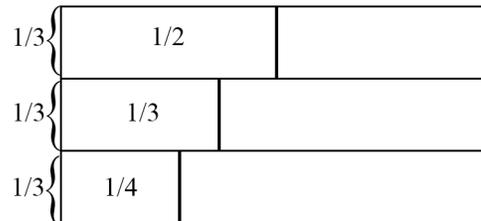
55. E. Counting, Permutations, & Combinations



$$28 + 45 - 65 = 8$$

E. 8

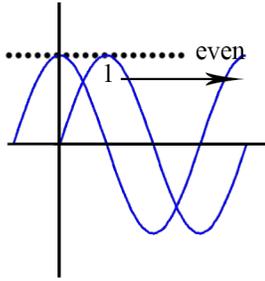
56. K. Multiple Figures, Fractions



$$\frac{1}{3} \times \frac{1}{2} + \frac{1}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{4} = \frac{13}{36}$$

$$\mathbf{K. \frac{13}{36}}$$

57. A. Trigonometry



1. function translation
 $f(x) + b$ moves function \uparrow
 since these two are EVEN
 $b = 0$

2. This function moves left
 $f(x-a)$ $a < 0$

$a < 0$ and $b = 0$

A. $a < 0$ and $b = 0$

58. K. ABS Absolute Value

$$|x - 5| < -1$$

The smallest value for $|x|$ is 0!
 There CANNOT be a negative ABS.

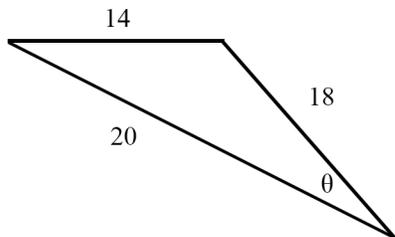
K. Empty Set

59. E. Probability

$$\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{81}$$

E. $\frac{1}{81}$

60. J. Trigonometry



Note: The smallest angle is opposite the smallest side.

$$\mathbf{J. 14^2 = 18^2 + 20^2 - 2(18)(20)\cos\theta}$$