Memo on CLT Math Rigor: Comparison to SAT and ACT

Introduction: The CLT covers the full range of standard mathematics coursework measured in college readiness assessments, including topics covered in Algebra I/Algebra II and Geometry, and more advanced topics such as Trigonometry. It is clear that the CLT tests mathematics at a higher level of rigor than the SAT and at a very similar level of rigor to the ACT if not slightly more rigorous given impending cuts to the math segment of the ACT in 2025.

Quantity: **CLT tests an equal number of math items as SAT and nearly equal number compared to the impending new version of the ACT**.

> The Quantitative Reasoning (QR) section of the CLT has 40 questions. The SAT Math Section is divided into two modules of 20 scored questions each, meaning the SAT also has 40 math questions. The ACT currently has 60 math items out of 215 total items. While this raw sum is more, it accounts for 28% of the test, short of the CLT's 33%. However, the new ACT format to be rolled out in 2025 will comprise 45 of the 131 required multiple-choice items, resulting in both a similar count and proportion of math items to that of the CLT. (Notably, the new ACT will also have four-choice multiple choice responses in the math section, down from 5 choices, aligning with CLT.)

High Difficulty Items: **The CLT includes double the number of items as the SAT and 40-50% more items as the impending new ACT in the most difficult mathematical subdomains of Geometry and Trigonometry.**

> While the SAT contains just 5-7 questions per test in the Geometry and Trigonometry Content Domain altogether, each CLT test form has 14 total questions in the Geometry Domain – at least twice as many as the SAT – including 4 questions *in the Trigonometry Subdomain alone.* The current and new ACT forms will contain 7-9 items in the Geometry subcategory (which includes trigonometry) within the Preparing for Higher Mathematics reporting category, still less than the CLT. (See Appendix A for an example of a CLT question in the Trigonometry Subdomain.)

The New ACT: **In 2025, the ACT will cut its math section substantially.**

> The math items that will be cut from the ACT in 2025 to make the section shorter are entirely from the Integrating "Essential Skills" category. This reporting category consists of "problems of moderate to high complexity," requiring students to "combine skills in longer chains of steps, apply skills in more varied contexts, understand more connections, and increase fluency." This suggests that ACT is placing less emphasis on complex problems that require creative problem solving.
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> Such problems have been and remain a core component of the CLT construct of numeracy. In addition to covering skills-based content, the CLT blueprint also includes

opportunities for students to demonstrate an aptitude for higher-order thinking by solving logic-based problems. CLT's Mathematical Reasoning - Logic Domain includes 8 questions on each test form that reward creative problem-solving and overall numeracy. While these questions often rely on only rudimentary math terms and concepts (such as even/odd, factorization, perfect squares, sums and products, etc.), the most effective solutions require a well-developed intuition about the underlying principles of number theory, set theory, and abstract algebra. (See Appendix B for an example and explanation of a CLT question in the Mathematical Reasoning - Logic Domain.)

Administration: **The CLT is the only test that retains a no-calculator policy.**

The ACT and SAT both allow scientific and graphing calculators to be used throughout the entirety of the math sections, whereas students must perform all calculations on their own when taking the CLT. (In the interest of test accessibility, students taking the CLT may apply for a testing accommodation to use a 4-function calculator only.)

Sources:

CLT Technical Report (CLI, 2024)

Assessment Framework for the Digital SAT Suite (College Board, 2024)

ACT Technical Manual (ACT, Inc., 2024)

ACT website (www.act.org, accessed 2/13/2025)

Appendix A: Example of a CLT question in the Trigonometry Subdomain, from a CLT practice test. The correct answer is (D).

116. Which transformation of the function $y = \sin\theta$ yields a function with an amplitude of 3 and a period of π radians?

- A) $y = 2\sin\theta + 3$
- B) $y = \frac{1}{2}\sin 3\theta$
- C) $y = 3\sin\frac{1}{2}\theta$
- D) $y = 3\sin 2\theta$

Appendix B: Example of a Mathematical Reasoning - Logic question, from a CLT practice test. The question type is "Conditions Logic Problems," of which 1-3 questions appear on each CLT test form.

83. How many numbers between 1 and 100 (inclusive) meet both of the conditions given in the statements below?

Statement 1: The number has factors of 5 and 10.
Statement 2: The number is divisible by 4.

- A) 5
- B) 10
- C) 20
- D) 25

As long as students understand the concept of *factors* and *divisibility*, they have all the tools they need to answer the question. However, in a timed testing environment, what will delineate performance is the ability to reason toward an increasingly abstracted solution as opposed to a rote "list, test, and count" method. Below is a table summarizing potential solutions, ordered from least to most sophisticated:

Method	Approach	Number of Items to List & Check
Method of Exhaustion	List all integers 1-100. Evaluate each item in the list by both conditions (has 5 and 10 as factors; is divisible by 4.) Count the items that meet both conditions.	100 items (integers 1-100 in the specified range)
Basic Restriction	List the multiples of 5, the multiples of 10, and the multiples of 4. Identify the intersection of these sets, and count the number of items.	About 55 items (20 multiples of 5, 10 multiples of 10, 25 multiples of 4 in the specified range)

Advanced Restriction	Since 5 is a factor of 10, the first condition is logically equivalent to "The number has a factor of 10." Since 10 is greater than 4, its multiples are less dense in the integers and there are fewer of them in the given range. List the multiples of 10 from 1-100 and identify, then count, those that are also multiples of 4.	10 items (multiples of 10 in the specified range)
Fully Abstracted	Since 5, 10 and 4 have 20 as their least common multiple (LCM), and 100 is evenly divisible by 20 five times, there are **5** numbers in the given range that meet both conditions.	0

Thus, as the proposed solution tends toward abstraction, it also becomes more efficient as there are progressively fewer items to individually investigate. In the most abstracted iteration, there are no items to list or test, and the set of items that meet both conditions (20, 40, 60, 80, 100) is never explicitly identified. In this way, the question can be answered with a single fluid line of reasoning that demonstrates aptitude for higher-level college math courses such as Abstract Algebra, Number Theory, and Real Analysis.