Grade 7 / Case Study 1
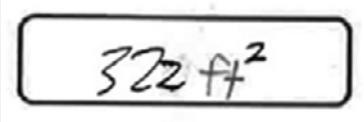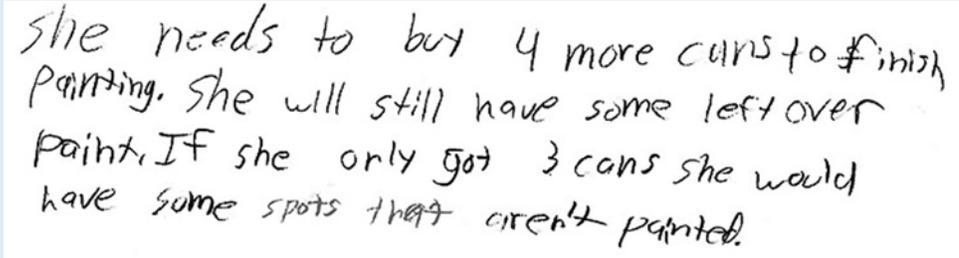
➡ **MATH** ✳ **SMARTER BALANCED PERFORMANCE TASK**

Item 1	What is the area, in square feet, of the ceiling?
Student Response to Item 1	$120 ft^2$
Analysis of Response to Item 1	This response receives a full score of 1 point. The student demonstrated an understanding of the properties of rectangles by inferring the lengths of the adjacent side. The student also successfully applied the formula ($A = l \times w$) to calculate the area of the ceiling.
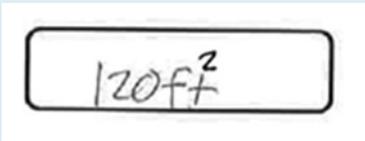
Item 2	Sam needs to figure out how much purple paint to buy.
	Calculate for her the total area, in square feet, of the four **walls**.
	She will **not** paint the door or windows.

| Student Response to Item 2 | $322\ ft^2$ |

| Analysis of Response to Item 2 | This response receives a full score of 1 point. The response suggests that the student successfully calculated the area of the four walls, and deducted the area for the two windows and door to arrive at the correct answer. |

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Item 3	Part way through painting her room, Sam runs out of paint.

- She estimates that there are about 125 square feet left to paint.
- The purple paint that Sam is using is **only** available in 1-quart cans. (Assume she must buy whole cans of paint.)
- Each can of paint covers 40 square feet.

How many cans of paint does Sam **need** to buy to finish painting her room? Explain to Sam why she needs this many cans of paint.

Student Response to Item 3	

She needs to buy 4 more cans to finish painting. She will still have some left over paint. If she only got 3 cans she would have some spots that aren't painted.

Analysis of Response to Item 3	This response receives a full score of 2 points. The student correctly stated the number of cans of paint needed. From the explanation, it is clear that the student understood that using three cans of paint would "have some spots left that aren't painted." This demonstrates the student's understanding that three cans not being enough means four cans are necessary.

Item 4	You decide to paint your room, too.
	Your room has 300 square feet of wall space to paint.
	Sam says it took her 10 minutes to paint 25 square feet.
	At this rate, how many **hours** would it take Sam to paint your room?

Student Response to Item 4	2 hours
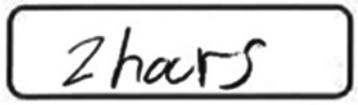
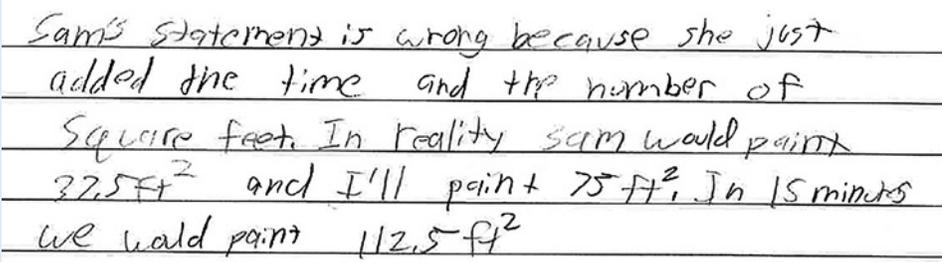| Analysis of Response to Item 4	This response receives a full score of 1 point. The response suggests that the student was able to coordinate the quantities of area, time, and rate to arrive at a quantity that had to be converted into hours.

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Item 5	Sam and you are going to paint your room together.
	Sam takes 10 minutes to paint 25 square feet.
	It takes you 5 minutes to paint 25 square feet.
	Sam says, "If we paint together, then it will take 15 minutes for us to cover 50 square feet." Give an explanation to convince Sam that she is **incorrect**.
Student Response to Item 5	Sam's statement is wrong because she just added the time and the number of square feet. In reality sam would paint 37.5ft² and I'll paint 75 ft². In 15 minutes we would paint 112.5 ft²
Analysis of Response to Item 5	This response receives a full score of 2 points. The student clearly has an understanding of rates. The first indication of this is when the student states, "…she just added the time and the number of square feet." The student does not clearly show his/her process, but it can be inferred that he/she used Sam's rate of 25 square feet per 10 minutes to arrive at 37.5 square feet, and 25 square feet per 5 minutes to arrive at 75 square feet. The student's explanation to Sam could be stronger by providing clearer evidence of the progression of ideas in his/her mathematical thinking.

Overview of Student's Performance

This student is in a regular 7th grade math class that is about 30% English Learners. Overall, this student consistently performs at a high level on class assignments and assessments, usually within the A to B range. The student's work on this task reflects a lot of what he/she does in the class. The student rarely shows his/her work or uses it to defend his/her responses. So, although all of the answers on the task are correct, the student shows minimal use of Math Practice 3. The student is able to logically justify his/her answers when prompted, but his/her written work tends to have minimal logical mathematical progression. Like many 7th grade students, the student makes assumptions that a reader can follow his/her thought process well enough, as demonstrated in Item 5. In addition, in Item 3, the student does not share how he/she knows that 4 cans of paint are needed.

Next Steps

This student would benefit from opportunities to engage in Mathematical Practice 3, with specific support for strengthening his/her written argumentation skills. This student does spend a significant amount of time using an online math program, which may assist in his/her ability to calculate proficiently, and does keep him/her engaged in building mathematical abilities. Because of the student's use of the online program, however, he/she may need more guidance in selecting a wider variety of means for expressing his/her thinking. It may also be beneficial for this student to present some of his/her work done on the online math program so that he/she becomes accustomed to answering questions verbally from peers and teachers. This would help the student to learn how to incorporate his/her mathematical reasoning into justifications.

Even with these identified areas of growth, the student demonstrates the flexibility of working with and coordinating across several variables (Item 4). The student shows that he/she does attend to computational precision (MP 6), and reasons abstractly and quantitatively (MP 2). This student is starting on strong ground for additional support directed at deepening her/his proportional reasoning, and making justifications more complete, more explicit, and more precise.