Examining Student Work

Example:

Which properties justify the statement $\frac{3}{4}(1 - 5m) \times \frac{4}{3} = 1 - 5m$?

    I. Multiplicative Inverse Property
    II. Multiplicative Identity Property
    III. Commutative Property of Multiplication
    IV. Distributive Property

    A. I only   B. III only   C. I, II, and III   D. I, II, III, and IV

Student Answer: D

Looking at this student's answer, respond to the following questions:

What do we <u>know</u> about what the student knows?

What can we <u>infer</u> about what the student knows?

Student Explanations:

You have to distribute the ▢ *as you first step and the only choice with IV in it was D.*

How does the explanation give us more information about what the student understands?

Additional Student Explanations:

A. I know it has the distributive property and the only answer with that was D.

B. There was a bit of all of the above.

C. If you multiply ▢ by its reciprocal ▢, you will get 1. One times the quantity one minus 5 times *m* equals $1 - 5m$. This problem distributes the 1 so it is the distributive property, multiplies the one and five m by one. So it contains the Identity property, multiplies by reciprocal for Inverse property and reorders problem for commutative.

D. You need to distribute the ▢, you need to move the ▢ next to the ▢ so you can multiply them. When you multiply them it's the multiplicative inverse property. When you distribute the ▢ to the 1 it's ▢ which is the multiplicative identity.

E. Multiplicative inverse is used by saying ▢ x ▢ =1. Multiplicative identity is used when ▢ · 1 · ▢ =1. Commutative is used ▢ and ▢ were not included, changing the order. Distributive is used when ▢ $(1 - 5m)$ came into play. ▢ $- 3.75m \cdot$ ▢

F. Inverse is used when ▢ is multiplied by ▢ to equal 1. It is now $1(1 - 5m)$. Then you use the distributive to multiply to both and the inverse so they equal the same. Then you change the order (commutative).

G. When ▢ is multiplied by ▢ it equals one. Which is the mult. Inverse property. When you multiply $1 - 5m$ by the one that is mult. Identity property. And when you rearranged the numbers to multiply ▢ and ▢ you used the commutative property.

Critera For Good Responses

| Student work demonstrates appropriate and efficient strategies for developing the correct reasoning and answers of a task.	Students' work did not include any strategies and/or response to the task.	Students' work included strategies to solve the task (not necessarily the appropriate strategies).	Student's work demonstrated an appropriate strategy to solve the task.	Students' work demonstrated appropriate and efficient strategies to solve the task.
Students provide explanations of their reasoning of a task.	Students provided no explanation of their reasoning.	Students provided explanations to the task, but the explanations were generally not accurate.	Students' explanations were generally accurate but not well developed or the explanations were difficult to follow.	Students' explanations were accurate and well developed.
Students demonstrate appropriate level of thinking to explain their reasoning of a task.	Students provided no explanation of their thinking.	Students demonstrated only procedural thinking in their explanations.	Students' explanations went beyond procedural reasoning but did not accurately address the task.	Students' explanations were accurate and demonstrated higher levels of thinking.

Adapted from CABS Assessment Overview

Understanding the problem	0 – Complete misunderstanding of the problem 1 – Part of the problem misunderstood or misinterpreted 2 – Complete understanding of the problem
Planning a solution	0 – No attempt to show work or totally inappropriate plan 1 – Partially correct work/plan based on correct interpretation of part of the problem 2 – Work/plan could lead to correct solution if implemented properly 3 – Work/ plan is appropriate and accurate
Getting an answer	0 – No answer or wrong answer based on incorrect work or inappropriate plan 1 – Copying error, computational error, or partial answer for a problem with multiple answers 2 – Incorrect answer although it follows logically from an incorrect plan 3 – Correct answer and correct label for the answer

Adapted from Rubrics at Play by Maggie B. McGatha and Peg Darcy, Mathematics Teaching in the Middle School, February 2010

DIAGONALS TASK:

On a coordinate plane:

Draw a geometric figure with the two diagonals of slopes ½ and -2. Now draw a second figure using the same slopes for the diagonals, that is different from the first. Compare the two figures.
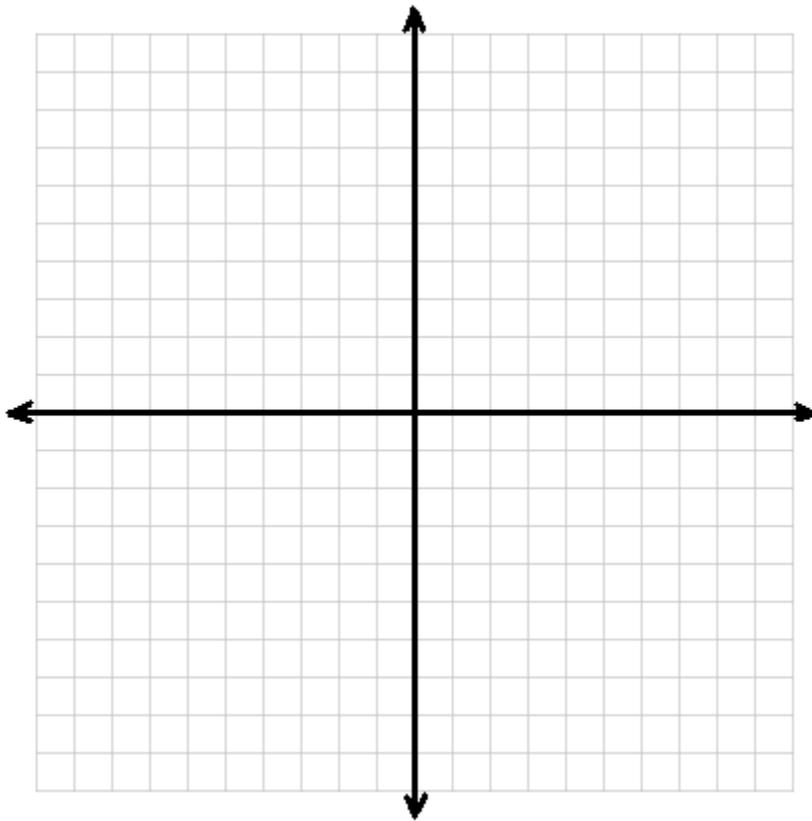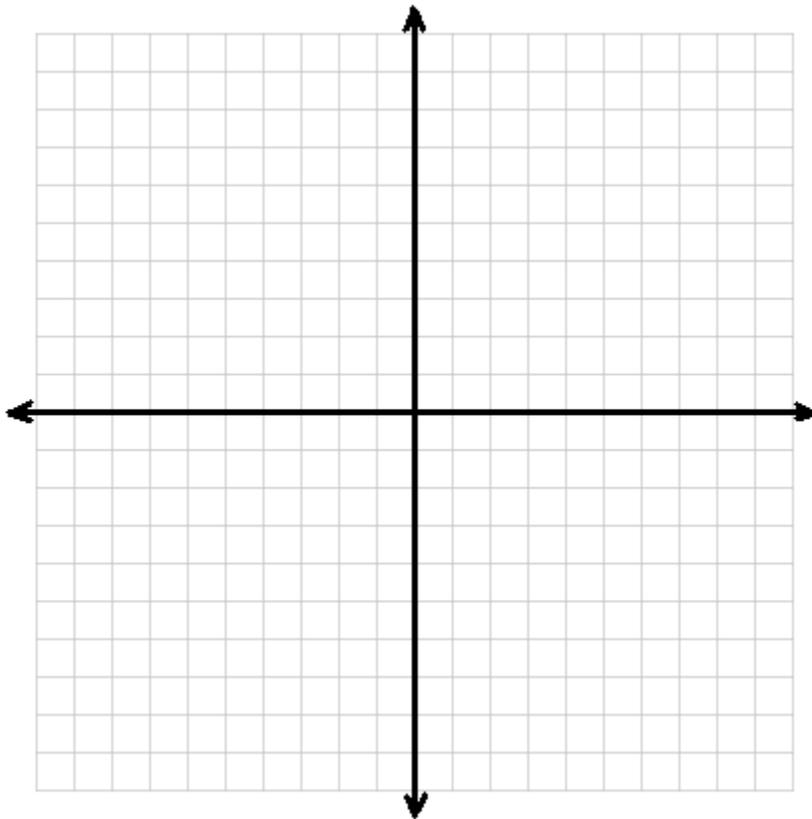
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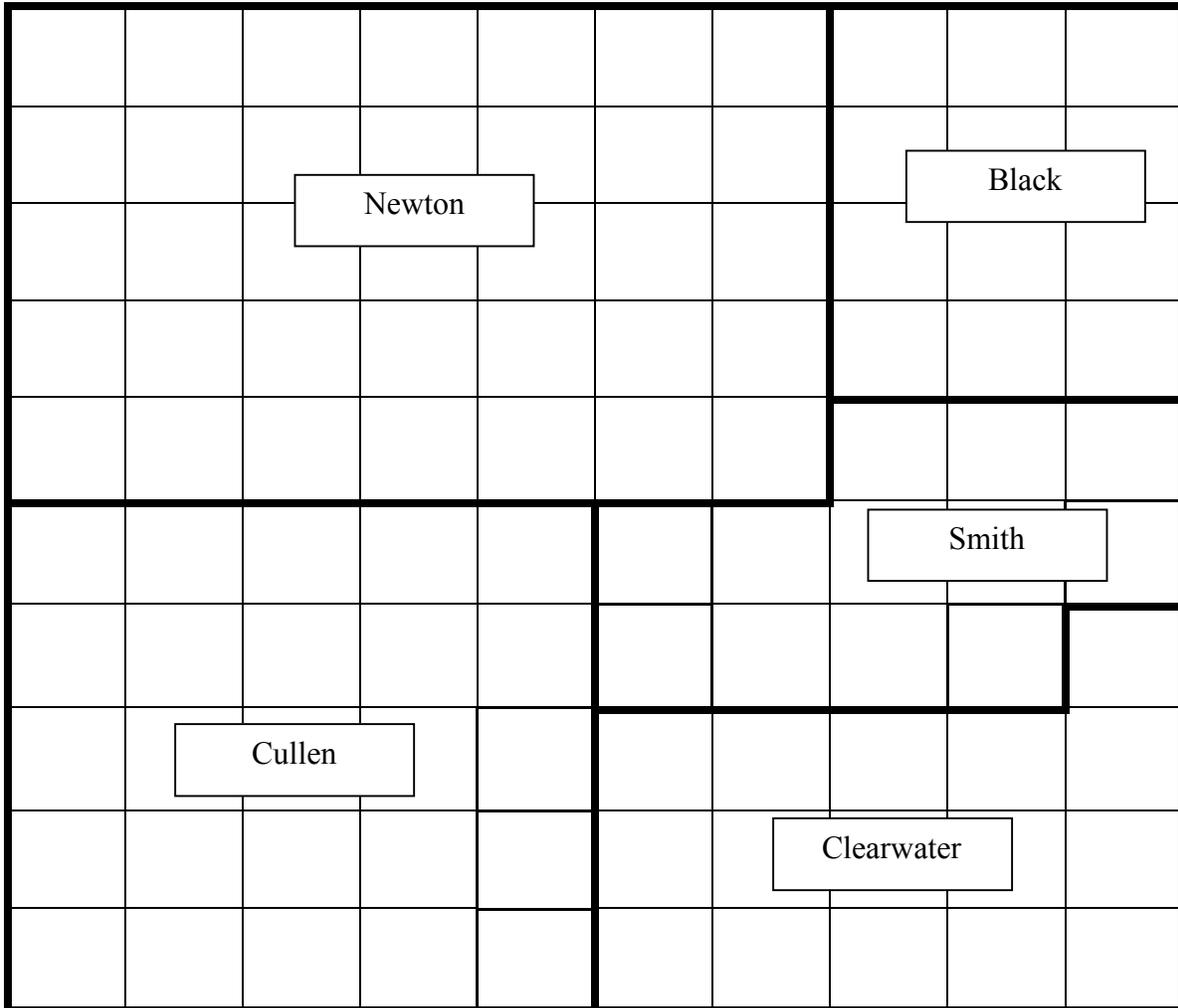A. Identify the learning targets that might be assessed using this task

B. Examine the student responses

C. Identify what we know about what each student was thinking/doing

D. Decide which papers demonstrate a good response

E. Decide the elements of a good response to this problem

Taxing Task

The map above shows some plots of land that belong to different families. The county charges a tax based on the size of each piece of land, not on the quality of the land. The Newtons pay $5,250 per year in taxes. After the map was drawn, the Smiths purchased some property from the Clearwaters and increased the size of their property to 125% of its size on the map. By approximately what percent will the Clearwaters tax bill decrease? Please make sure your solution strategy and explanations are clear.

Adapted from *Grades 6 – 8 Mathematics Assessment Sampler NCTM*

Providing Actionable Feedback

Student	Feedback	1. Can the feedback be used by the student to re-do their work or expand upon their thinking (remediation/enrichment)? 2. Does the feedback identify student's strengths and/or weaknesses? 3. Does the feedback provide the student direction and guidance for improvement?
A		
B		
C		
D		
E		
F		
G		
H		