Smarter Balanced Assessment Essentials: K-12 Math
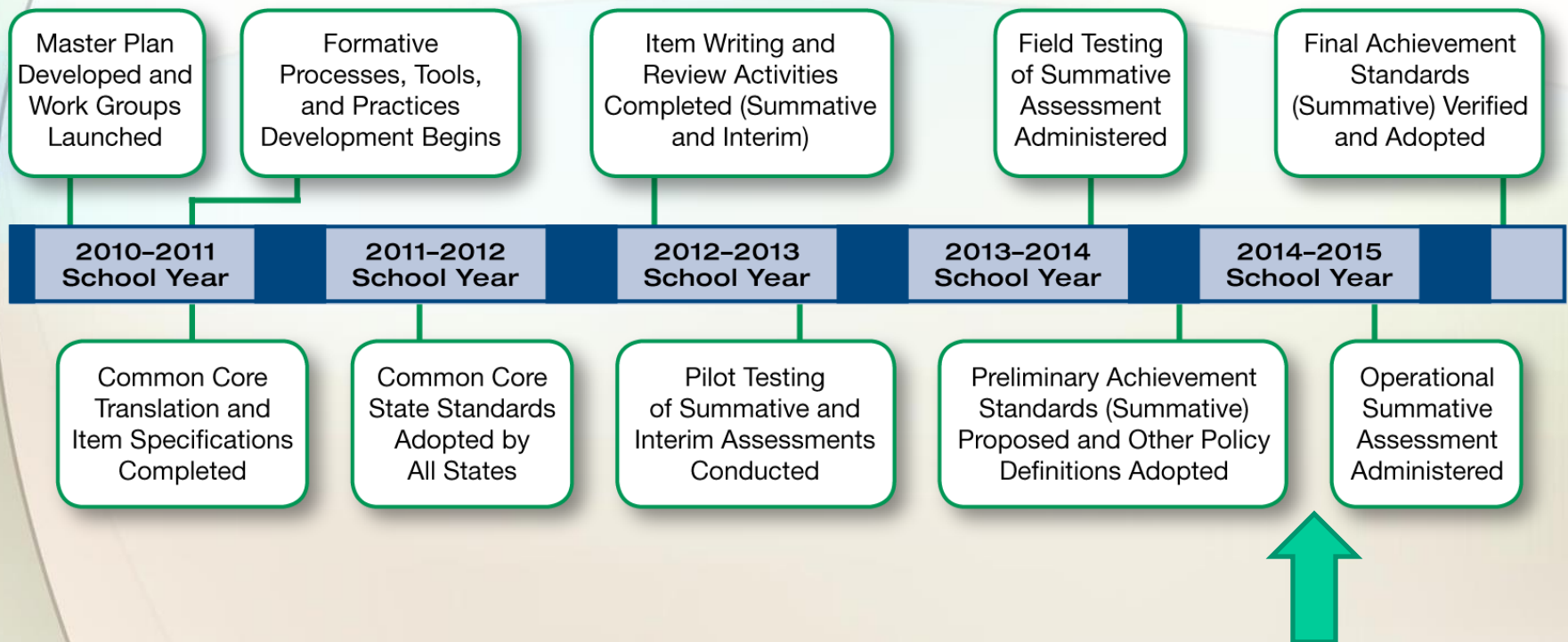
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K-12 Mathematics Specialist

Multnomah ESD

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Mathematics Assessment Specialist

Oregon Department of Education

DEVELOPMENT TIMELINE

Above timeline:

- Master Plan Developed and Work Groups Launched
- Formative Processes, Tools, and Practices Development Begins
- Item Writing and Review Activities Completed (Summative and Interim)
- Field Testing of Summative Assessment Administered
- Final Achievement Standards (Summative) Verified and Adopted

Timeline bar:

2010–2011 School Year	2011–2012 School Year	2012–2013 School Year	2013–2014 School Year	2014–2015 School Year

Below timeline:

- Common Core Translation and Item Specifications Completed
- Common Core State Standards Adopted by All States
- Pilot Testing of Summative and Interim Assessments Conducted
- Preliminary Achievement Standards (Summative) Proposed and Other Policy Definitions Adopted
- Operational Summative Assessment Administered

Smarter Balanced
Assessment Consortium

"…the best preparation for the CCSS assessments, with their commitment to assessing all the standards, including the Standards for Mathematical Practice, is high-quality instruction…"

NCTM President Diane J. Briars

Student Achievement Before and After Intervention
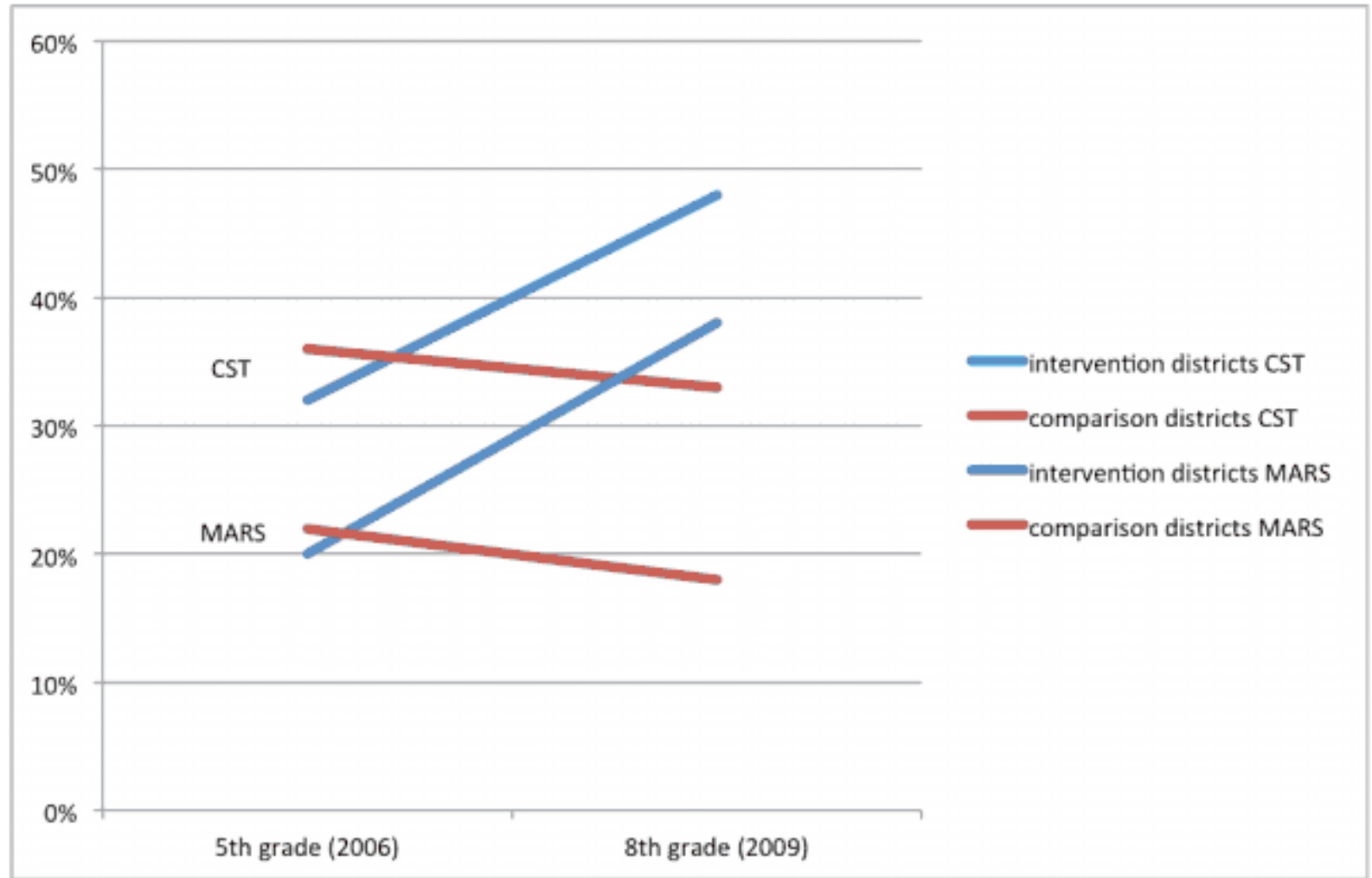
(Boaler & Foster, 2014)

MARS TASK

Baseball Jerseys

This problem gives you the chance to:
• work with equations that represent real life situations

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks two local companies to give him a price.

1. 'Print It' will charge $21.50 each for the jerseys.

   Using n for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

   _____

2. 'Top Print' has a one-time setting up cost of $70 and then charges $18 for each jersey.

   Using n to stand for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

   _____

3. Bill decides to order 30 jerseys from 'Top Print'.
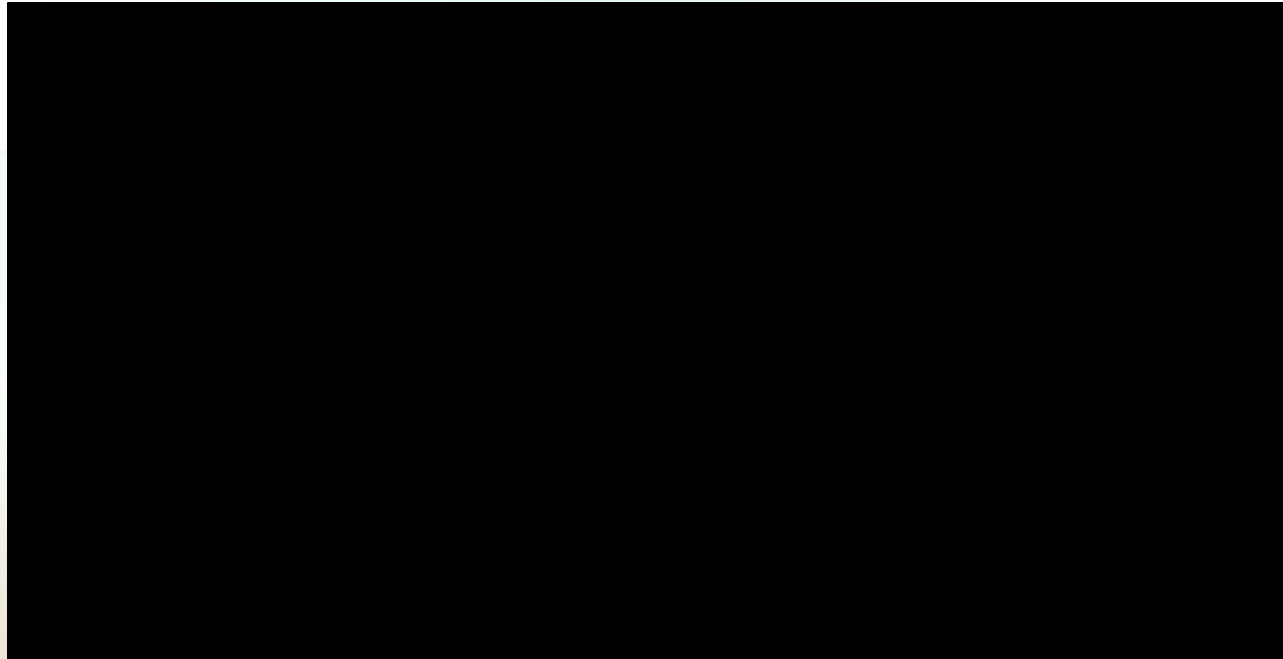   How much more would the jerseys cost if he buys them from 'Print It'?
   Show all your calculations.   _____

4. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to buy for the price from 'Top Print' to be less than from 'Print It'.
   Explain how you figured it out.   _____

PERFORMANCE ASSESSMENT TASKS

Video: How to Learn Math: Teaching for a Growth Mindset

SIX ITEM TYPES

1. Selected Response
2. Constructed Response
3. Extended Response
4. Technology Enabled
5. Technology Enhanced
6. Performance Tasks

SELECTED RESPONSE

SINGLE RESPONSE— MULTIPLE CHOICE

2

Select the statement that explains how the values of the numbers 420 and 4200 are different.

Ⓐ 4200 is 1000 times as large as 420

Ⓑ 4200 is 100 times as large as 420

Ⓒ 4200 is 10 times as large as 420

Ⓓ 4200 is 1 time as large as 420

SELECTED RESPONSE

MULTIPLE CORRECT OPTIONS

20

Select **all** equations that are true.

☐ $\dfrac{4}{10} = 0.04$

☐ $\dfrac{17}{100} = 0.17$

☐ $\dfrac{9}{100} = 0.09$

☐ $\dfrac{6}{100} = 0.60$

CONSTRUCTED RESPONSE

11

A cone with radius 4 feet is shown. Its approximate volume is 165 cubic feet.
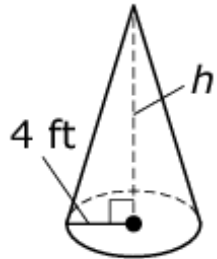
Enter the height of the cone, in feet. Round your answer to the nearest hundredth.

1	2	3
4	5	6
7	8	9
0	.	-

CONSTRUCTED RESPONSE

2

Multiply and combine like terms to determine the product of these polynomials.

$$(2x - 3)(5x + 6)$$

1	2	3	x
4	5	6	+	-	*	÷
7	8	9	<	≤	=	≥	>
0	.	-	□/□	□^□	□_□	( )				√□	□√□	π	i
				sin	cos	tan	arcsin	arccos	arctan

21

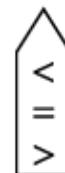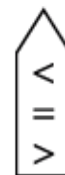The base of triangle *ABC* and the base of triangle *DEF* lie on line *m,* as shown in the diagram.
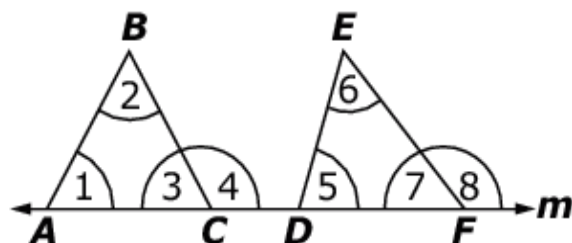
not drawn to scale

The measure of ∠4 is less than the measure of ∠8.

For each comparison, select the symbol (<, >, =) that makes the relationship between the first quantity and the second quantity true.

First Quantity	Comparison	Second Quantity
$m\angle 3$	< = >	$m\angle 7$
$m\angle 1 + m\angle 2$	< = >	$m\angle 5 + m\angle 6$

TECHNOLOGY ENHANCED
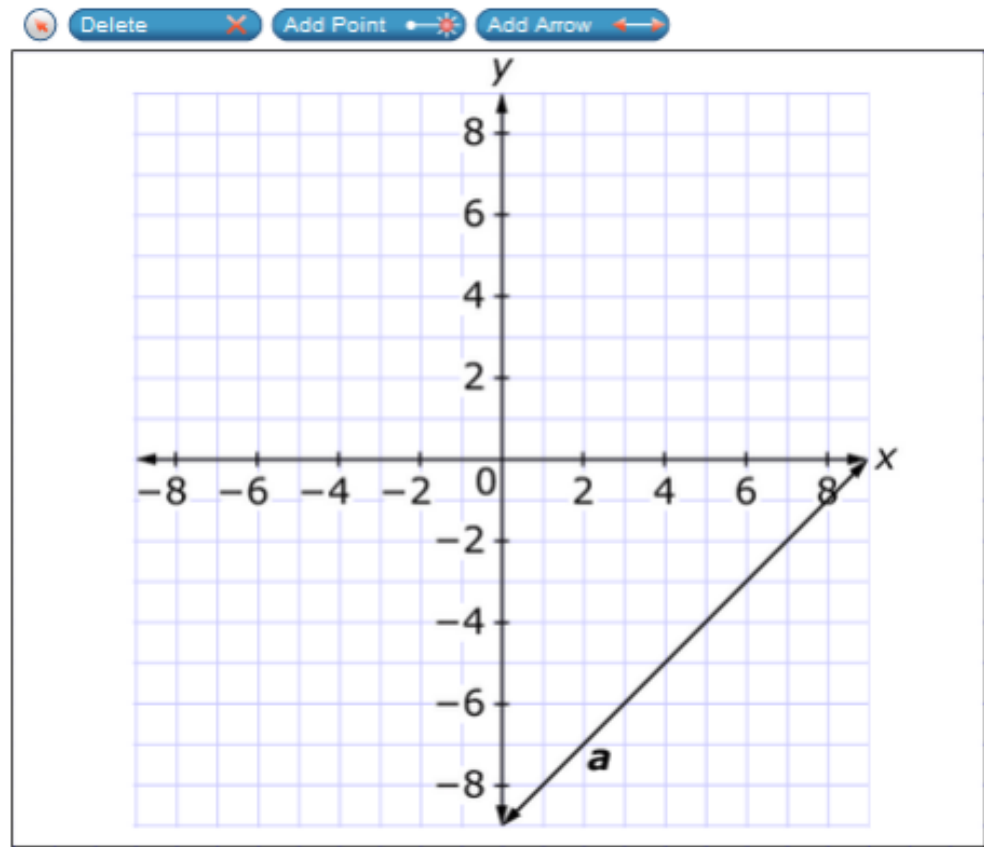
EXTENDED RESPONSE

Two figures are shown on the coordinate grid.
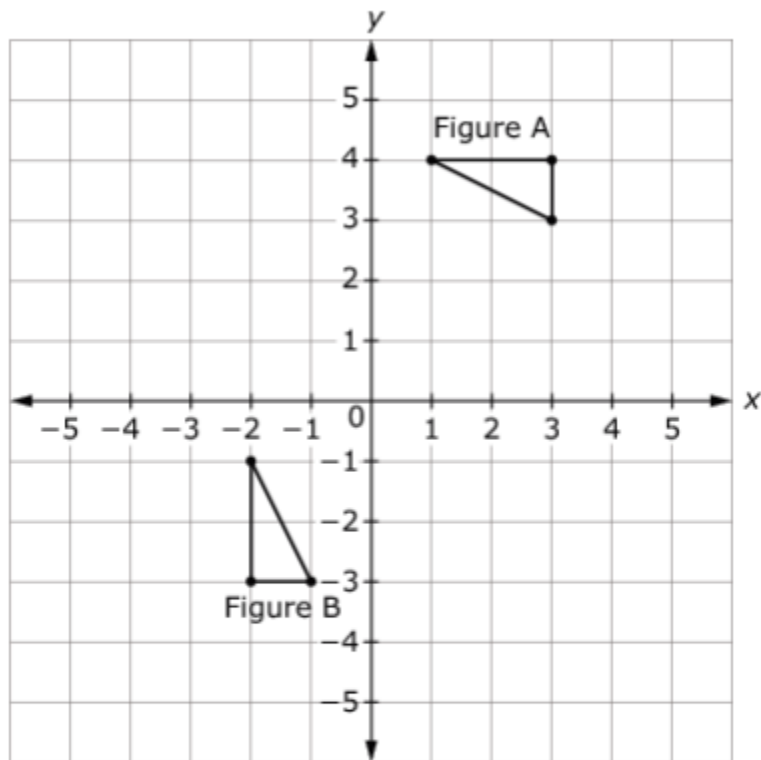
Show that Figure A and Figure B are congruent by describing a sequence of basic transformations that maps Figure A onto Figure B. In your response, be sure to identify the transformations in the order they are performed.

EQUATION RESPONSE EDITOR

Smarter Balanced Assessment Consortium

Question: Practice I ▼

← Back   → Next

Practice creatin

Score Result

Description	Status
Did I create the expression correctly?	Sorry, not this time. But try again!
Did I create the equation correctly?	Yes, good job! Move on to the next problem.

1. $5(3 + 2) - 4$

2. $2\frac{1}{2} - \frac{2}{3} = 1\frac{5}{6}$

Press here to se

Close

| 7 | 8 | 9 | < | = | > |

| 0 | . | - | □/□ | □□ | ( ) | | | |

https://tds2.airws.org/EQTutorial/?c=SBAC_PT

Coming soon to Oaksportal.org

PERFORMANCE TASK

A TRIP TO THE ZOO

Anna and her family go to the zoo. The zoo ticket prices, snack shop menu, and gift store prices are shown in the tables.

Snack Shop Menu

Food	Price
Hamburger	$5
Cheeseburger	$6
Salad	$3
Pizza	$3

Drinks	Price
Water	$1
Milk	$2
Juice	$3
Soda	$3

Zoo Ticket Prices

Type of Ticket	Price
Adult (ages 12-64)	$16
Senior (ages 65+)	$13
Child (ages 2-11)	$11
Under 2	Free

Gift Store Prices

Gift	Price
Stuffed panda bear	$ 9
Zoo magnet	$4
Pack of 4 pens	$6
Photo frame	$8

The family has $100 to spend at the zoo…

SMARTER BALANCED 2-POINT RUBRIC

| Score	Description
2	The Student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this task. The student has addressed the task in a mathematically sound manner. The response may, however, contain minor flaws that do not detract from a demonstration of full understanding.
1	The student has demonstrated a **partial** understanding of the mathematical content and practices essential to this task. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task.
0	The student has demonstrated **merely an acquaintance** with the topic, or provided a completely incorrect or uninterpretable response. There are significant omissions or irregularities that indicate a lack of comprehension. No evidence is present that demonstrates the student's competence in problem solving, reasoning, and/or modeling related to the specific task.

LEMON JUICE

Claim	Domain	Target	DOK	CONTENT	MP
3	NF	B	3	4.NF.A, 4.NF.B.4	1

Liam is making lemonade. He needs 16 ounces of lemon juice. He has 10 lemons.
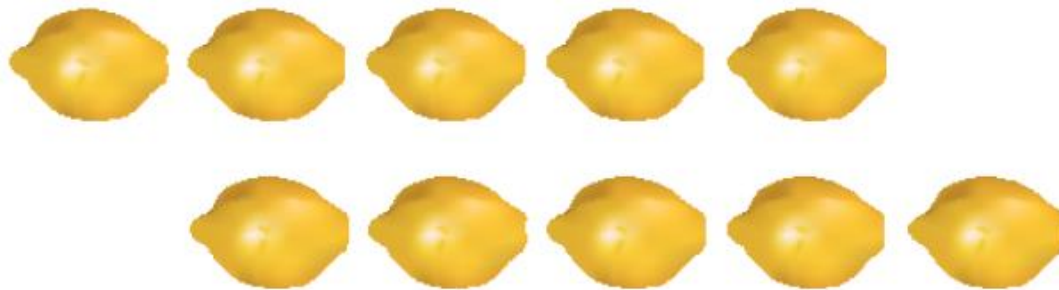
Each lemon makes about $1\frac{1}{2}$ ounces of lemon juice.

Will he have enough lemon juice? Explain how you know.

Scoring Lemon Juice

Full credit response 2 points:

    Liam does not have enough juice, supported by the juice in ten lemons (15 oz.) -or-

    Liam has close to the amount and supports this by describing the 15 oz. is close to 16 oz.

Partial credit response   1 point:

    Correctly determines 15 oz., but provides incorrect or no decision about whether this is enough. -or-

    Student performs an incorrect computation using a correct process, and reaches a correct conclusion

No credit response 0 points:

    Includes none of the features of a full credit response

2 POINT EXAMPLES

Sample Top-Score Responses:

<u>Sample 1</u>

Liam does not have enough lemon juice. Ten lemons makes about 15 ounces since 10 x 1 1/2 = 15. This is less than the 16 ounces he needs.

<u>Sample 2</u>

Liam might have enough lemon juice. Since each lemon makes about 1 1/2 ounces of lemon juice, 10 lemons is about 15 ounces (10 x 1 1/2 = 15). If the 10 lemons are a little bit bigger than normal, it is possible that he can get the 16 ounces that he needs.

LEMON JUICE STUDENT RESPONSE

I know that Liam will not have enough lemon juice. I know this because one and one-half times ten equals fifteen ounces. Liam needed sixteen ounces. He will not have enough lemon juice.

LEMON JUICE STUDENT RESPONSE

No because every two lemoens is three ounces 3 times 5=15 and thats one ounce short.

LEMON JUICE STUDENT RESPONSE

No because 10 * 1 1/2 = 15 ounces.

LEMON JUICE STUDENT RESPONSE

Liam has 10 lemons and they each make 1 1/2 ounces of juice. So 10 times 1 1/2 means he has 10 ounces plus 1/2 ounce. That is not enough juice because he needs 16 ounces.

LEMON JUICE STUDENT RESPONSE

no he will not becaue when i added 1 pair of 1/2 i got 15 ounses witch will not be enough.

LEMON JUICE STUDENT RESPONSE

15 if you add all of them up you get 15

LEMON JUICE STUDENT RESPONSE

He will need 1/2 more.
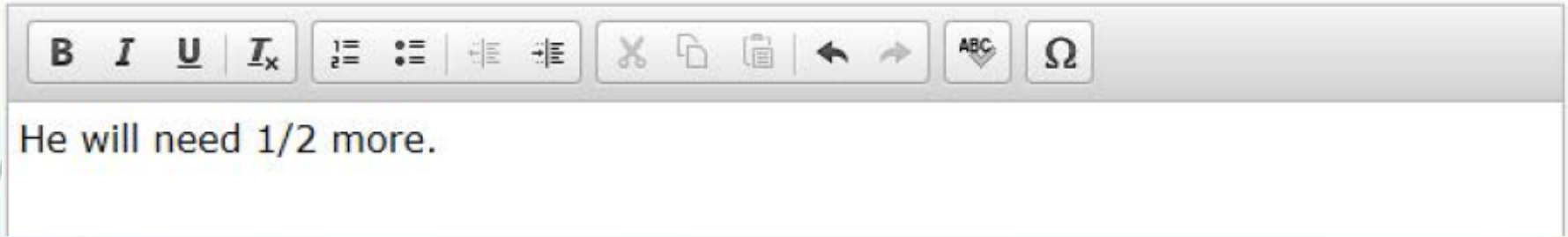
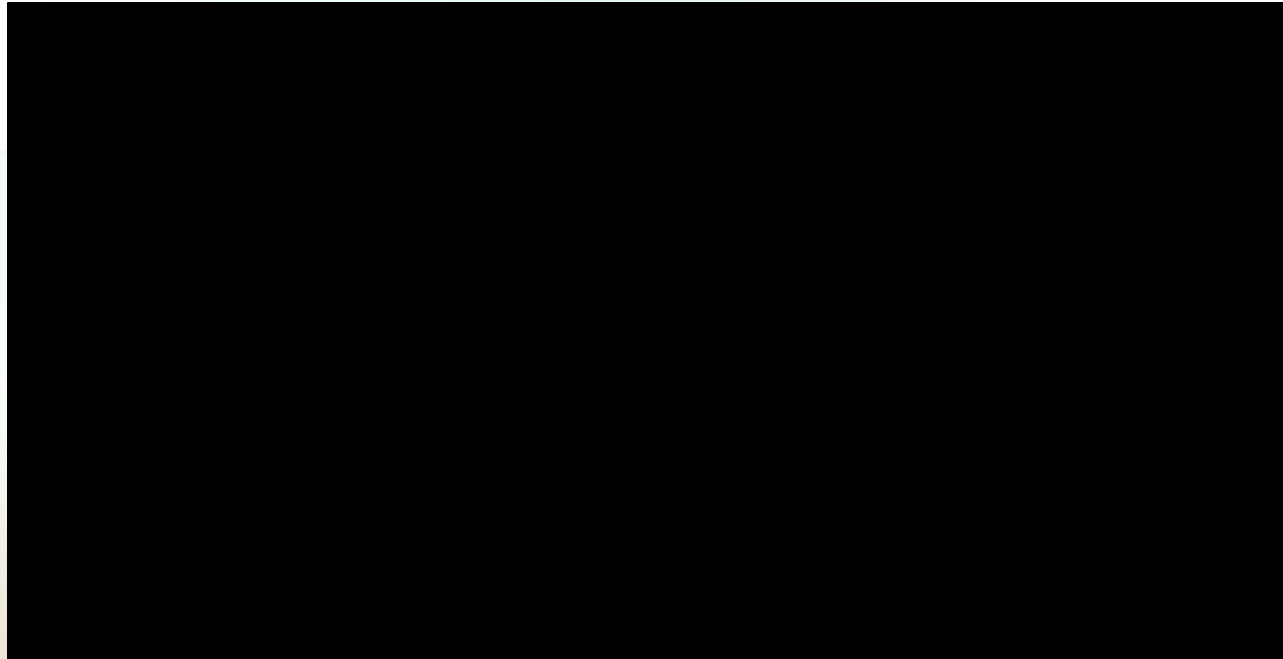# LEMON JUICE STUDENT RESPONSE

He will have enough for his lemonade.

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NCTM President Diane J. Briars

MAKE WRITING A PART OF THE LEARNING

Video: Steve McKinney: Keeping It Real
http://www.Americaachieves.org
http://bcove.me/eqw8vuyz

BLOG

WESLEY'S BLOG

MONDAY, JANUARY 10, 2005

Derived Measurement Extended Response

Mark's heart beats 16 times in 15 seconds. At that rate, how many times will it beat in one minute? Be sure to include the appropriate unit.

I know that Mark's heart beats 16 times in 15 seconds. I also know that 15 seconds is a quarter of a minute. So I multiplied 16 by 4, and the product was 64 BPM. The reason I multiplied 16 by 4 is because I know that 15 seconds divides into 1 minute 4 times. That is how I got my solution.

POSTED BY PERIOD5WB AT 10:34 AM

1 COMMENTS:

misterteacher said...

Wesley,
Here is how I scored your response:

I Power
Blogger

GOOGLE FORMS

The Box Factory

* Required

The portion of the graph with domain x > 10 shows positive volume. What does this mean in the context of the problem? *

[text box]

Explain the meaning of the parts of the graph showing a negative volume. *

[text box]

Name and Password

GOOGLE DOC MATH JOURNAL

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The family has $100 to spend at the zoo…

4ᵀᴴ Grade Question 1

Full-credit response (1 point) includes

- 51

No-credit response (0 points) includes none of the features of a full-credit response.

4ᵀᴴ Grade Question 2

Full-credit response (1point) includes

	Food Choice	Drink Choice	Total Food and Drink Cost for Each Person
Betsy	Hamburger	Juice	8
Grandma	Pizza	Soda	6
Ray	Salad	Soda	6
Anna	Pizza	Water	4

OR

Any four partial sums that are correct based on the food and drink choices in the table.

A no-credit response (0 points) includes none of the features of a full-credit response

4ᵀᴴ Grade Question 3

A full-credit response (1 point) includes

- 24

OR

Any total sum that is correct based on the student's response to question 2

A no-credit response (0 points) includes none of the features of a full-credit response

4ᴛʜ Grade Question 4

A full-credit response (1 point) includes

- 25

OR

Any difference that is correct based on the student's responses to question 1 and 3

A no-credit response (0 points) includes none of the features of a full-credit response

4ᵀᴴ GRADE QUESTION 5

A full-credit (2 points) response includes

- stating correct gifts that Anna and Ray can buy based on question 4 and the restrictions in the stem

AND

- Explaining why there is enough money for the gifts based on the student's response to question 4

"Anna and Ray can buy a zoo magnet and a photo frame. There is enough money for these gifts because they cost 10 dollars and there is 25 dollars left to buy gifts. 10 dollars is less than 25 dollars."

Question 5 Cont.

A partial credit (1 point) includes

- Stating the correct gifts that Anna and ray can buy based on question 4 and the restrictions in the stem

"They can buy a stuffed panda bear and a zoo magnet."

OR

"Anna and Ray can buy a pack of 4 pens and a photo frame that cost 14 dollars total."

Question 5 Cont.

A no-credit (0 points) response includes non of the features of a full or partial credit response.

"They can buy 4 stuffed panda bears."

OR

"Anna and Ray can buy 2 stuffed bears and 2 photo frames."

This item is not graded on spelling or grammar

4ᵀᴴ Grade Question 1

Full-credit response (1 point) includes

- 51

No-credit response (0 points) includes none of the features of a full-credit response.

4ᵀᴴ Grade Question 2

Full-credit response (1point) includes

	Food Choice	Drink Choice	Total Food and Drink Cost for Each Person
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Ray	Salad	Soda	6
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- 24

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RESOURCES

Study: Boaler, J., Foster, D. (2014) Raising Expectations and
            Achievement

            http://youcubed.org/teachers/wp-content/uploads/2014/
            07/Raising-Expectations.pdf

Tasks: SBAC Grade 4 Math Performance Task

            http://sbac.portal.airast.org/practice-test/resources/

            Mathematics Assessment Project: Baseball Jerseys

            http://map.mathshell.org/materials/tasks.php?taskid=362
            &subpage=apprentice

Editor: https://tds2.airws.org/EQTutorial/?c=SBAC_PT

Videos: Steve McKinney: Keeping It Real Americaachieves.org

             http://bcove.me/eqw8vuyz

            How to Learn Math: Teaching for a Growth Mindset
            http://youtu.be/EbhJk62N05I

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