

# TCAP/CRA 2012-2013



## Task 2: Lemonade Stand Task Full Scoring Guide



## 2. Lemonade Stand Task Scoring Guide

### The CCSS for Mathematical Content (3 points)

- 7.RP.1 The student computes the unit rate of sugar to water. The student may write the ratio of sugar to water or water to sugar; however, the student uses techniques described in 7.RP.2b to scale to 1 cup of water. Interprets the work done appropriately as  $\frac{2}{13}$  cup of sugar for 1 (or per) cup of water, 0.153846 (or  $\approx 0.2$ ) cup of sugar for 1 (or per) cup of water. \_\_\_\_\_
- 7.RP.2b The student explains the use of the unit rate  $\frac{2}{13}$ , its decimal equivalent or its approximate decimal equivalent in the constructed equation. The student explains this in either of the following ways: \_\_\_\_\_
- by citing the fact that, since the relationship is proportional,  $y = kx$  (or any of its variants, where  $k =$  unit rate; see 7.RP.2c below) is the equation describing the relationship.
  - by explaining that the number of cups of sugar is equal to the number of cups of water multiplied by  $\frac{2}{13}$  (or 0.153846) because there are  $\frac{2}{13}$  cup of sugar per 1 cup of water.
- 7.RP.2c The student represents the proportional relationship using the equation  $s = \frac{2}{13}w$ , \_\_\_\_\_  
 $\frac{s}{w} = \frac{2}{13}$  or  $\frac{w}{s} = \frac{13}{2}$  or any equation equivalent to these. The student may use the decimal equivalent or its approximate decimal equivalent.

**Total Content Points** \_\_\_\_\_

**The CCSS for Mathematical Practice (3 points)**

MP1 The student recognizes that the recipe represents a relationship whose quantities can be scaled up or down. Responds to both parts of the task. \_\_\_\_\_

(MP1: Make sense of problems and persevere in solving them.)

MP2 The student correctly notes the meaning of the results in the context of the problem. \_\_\_\_\_

(MP2: Reason abstractly and quantitatively.)

MP4 The student uses mathematical models to reason about ratios and proportional relationships. The student may do this in one of the following ways: \_\_\_\_\_

- by writing number sentences illustrating the reasoning used to determine unit rate such as  $\frac{1}{2} \div 3\frac{1}{4} = \frac{2}{13}$  and  $0.5 \div 3.25 = 0.153846$ .
- by plotting the points (0,0) and (3.25, 0.5) and determining the slope of the line to identify the unit rate.
- by using diagrams to illustrate the ratio of sugar to water in the lemonade recipe.
- by modeling the proportional relationship.

(MP4: Model with mathematics.)

**Total Practice Points** \_\_\_\_\_

**Total Awarded Points** \_\_\_\_\_

## The CCSS for Mathematical Content Addressed in This Task

### Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. *For example, if a person walks  $\frac{1}{2}$  mile in each  $\frac{1}{4}$  hour, compute the unit rate as the complex fraction  $\frac{1/2}{1/4}$  miles per hour, equivalently 2 miles per hour.*
- 7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.2c Represent proportional relationships by equations.

### The CCSS for Mathematical Practice\*

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

\*Gray text indicates Mathematical Practices that are not addressed in this task.

Students' responses to a mathematical task provide evidence of what they understand and are able to do in relation to the standards and practices. Across tasks, this cumulative evidence shows students' understanding and abilities within a domain. When students do not respond completely to all parts of a task, they provide insufficient evidence of their mathematical understanding and abilities and therefore do not fully demonstrate the expectations of the standards and practices aligned with that task.



Guide 1

Litho 7229

Total Content Points: 3 (7.RP.1, 7.RP.2b, 7.RP.2c)

Total Practice Points: 3 (MP1, MP2, MP4)


The student correctly computes the unit rate of sugar to water ( $\frac{2}{13}$ ) and correctly interprets the amount of sugar as per one cup of water (7.RP.1), using an equation to model ratios and proportional relationships (MP4). The student provides the equation  $s/w = r$ , with  $r$  identified as the rate  $\frac{2}{13}$ , to show how the unit rate can be used (7.RP.2b) and substitutes values from the table into the equation (7.RP.2c). The student indicates the meaning of the unit rate in the context of the problem (MP2) and correctly completes both parts of the task (MP1).

Total Awarded Points: 6 out of 6

## Task 2. Lemonade Stand Task


Lemonade	
For 4 servings:	
$3\frac{1}{4}$	cups water
$\frac{1}{2}$	cup lemon juice
$\frac{1}{2}$	cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.


 $\frac{13}{16} = 1 \text{ serving of water}$ 
 $\frac{1}{8} = 1 \text{ serving of sugar}$

$\frac{1}{8} \div \frac{13}{16} = \frac{2}{13}$ 
 the unit rate is  $\frac{2}{13}$  Sugar to water in every serving.

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.


 $\frac{2}{13}w = s$ 
 if you multiply  $\frac{2}{13}$  by  $3\frac{1}{4}$  cups of water you get  $\frac{1}{2}$ .



Guide 2

Litho 7135

Total Content Points: 2 (7.RP.2b, 7.RP.2c)

Total Practice Points: 3 (MP1, MP2, MP4)

The student computes a rate of sugar to water ( $\frac{2}{13}$ ), but incorrectly states that the rate is of sugar per serving of lemonade instead of per cup of water (no credit for 7.RP.1). The student uses an equation to model ratios and proportional relationships (MP4). The student shows evidence of how the rate can be used (7.RP.2b) in the constructed equation ( $\frac{2}{13} w = s$ ) (7.RP.2c), indicating the meaning of the rate in the context of the problem (MP2). The student has formed a ratio to determine the rate and used it in the constructed equation, completing all parts of the task (MP1).

Total Awarded Points: 5 out of 6



Guide 3

Litho 7163

Total Content Points: 2 (7.RP.1, 7.RP.2b)

Total Practice Points: 1 (MP4)

The student correctly computes the unit rate of sugar to water ( $\frac{2}{13}$ ) and correctly interprets this rate as per one cup of water (7.RP.1). The student uses equations to find the unit rate and model the proportional relationship in the context of the problem (MP4).

The student shows that the ratio ( $\frac{1}{2} \div 3\frac{1}{4} = \frac{2}{13}$ ) is sugar to water (7.RP.2b), but does not construct an equation to indicate that the amount of water can be multiplied by the rate to determine the amount of sugar needed or use the unit rate in an equation (no credit for 7.RP.2c, no credit for MP2). The student does not fully make sense of the problem, as there is no correct equation to determine the amount of sugar needed for any number of cups of water (no credit for MP1).

Total Awarded Points: 3 out of 6

## Task 2. Lemonade Stand Task

## Lemonade

For 4 servings:

 $3\frac{1}{4}$  cups water $\frac{1}{2}$  cup lemon juice $\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.



$$\frac{\frac{1}{2} \text{ cup sugar}}{3\frac{1}{4} \text{ cups water}} = \frac{2}{13}$$

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.



$$s = \frac{1}{2}s \div 3\frac{1}{4}w$$

you would divided the amount of sugar you use for the number of cups of water.

Guide 4

Litho 11943

Total Content Points: 1 (7.RP.2b)

Total Practice Points: 1 (MP4)

The student correctly computes the rate of sugar to water ( $\frac{2}{13}$ ), but does not indicate that the rate means sugar per cup of water (no credit for 7.RP.1). The student uses an equation in Part A to model the ratio and shows that the ratio ( $\frac{1}{2} \div 3\frac{1}{4} = \frac{2}{13}$ ) compares sugar to water (7.RP.2b, MP4). The student does not write an equation to determine the amount of sugar needed for any number of cups of water or use the rate in an equation to show the meaning of the unit rate in the context of the problem (no credit for 7.RP.2c, no credit for MP2). The lack of a correct equation in Part B indicates that the student has not fully made sense of the problem (no credit for MP1).

Total Awarded Points: 2 out of 6

## Task 2. Lemonade Stand Task

**Lemonade**


*For 4 servings:*

$3\frac{1}{4}$  cups water


$\frac{1}{2}$  cup lemon juice

$\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.

 There is six and a half more cups of water than sugar. So for every  $\frac{1}{8}$  cup of sugar there are  $\frac{13}{8}$  cups of water.

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.

  $S:6\frac{1}{2} = w$  multiplying the amount of sugar times six and a half will give you the amount of water you will need.

Guide 5

Litho 7191

Total Content Points: 1 (7.RP.2c)

Total Practice Points: 1 (MP4)

The student computes the ratio of water to one cup of sugar, rather than the rate of sugar to water (no credit for 7.RP.1). The student has not identified the correct constant of proportionality from the recipe (no credit for 7.RP.2b). The student does use an acceptable mathematical model in a viable equation ( $s \times 6.5 = w$ ) to indicate the ratio of water to sugar (7.RP.2c, MP4). The student does not find the correct ratio given the context of the task (no credit for MP2). The student does not fully make sense of the problem and persevere in solving it (no credit for MP1).

Total Awarded Points: 2 out of 6

Task 2. Lemonade Stand Task

**Lemonade**

For 4 servings:

$3\frac{1}{4}$  cups water

$\frac{1}{2}$  cup lemon juice

$\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.

$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
$3\frac{1}{4}$	$6\frac{1}{2}$	$9\frac{3}{4}$	13	$16\frac{1}{4}$	$19\frac{1}{2}$

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.

$$s = 3\frac{1}{4}(w) + \frac{1}{2}$$

$$\frac{1}{2}s = 3\frac{1}{4}w$$



Guide 6

Litho 7217

Total Content Points: 0

Total Practice Points: 1 (MP4)

The student does not compute the rate of sugar to water (no credit for 7.RP.1, no credit for 7.RP.2b). The student provides a diagram indicating a mathematical model of ratios and proportional relationships (MP4), but does not appropriately relate the meaning of the diagram to the context of the problem (no credit for MP2). The student provides two equations in Part B that do not indicate a unit rate, and the work shown indicates a lack of understanding of rates and ratios, as the two equations are not equivalent (no credit for 7.RP.2c). The student has not correctly completed all parts of the task (no credit for MP1).

Total Awarded Points: 1 out of 6

## Task 2. Lemonade Stand Task

**Lemonade**


*For 4 servings:*

$3\frac{1}{4}$  cups water

$\frac{1}{2}$  cup lemon juice

$\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.




$\frac{2}{31}$

$$\frac{1}{2} \div 3\frac{1}{4} =$$

$$\frac{2}{31}$$

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.



$3w + 6s = 9 \text{ cups of}$

Lemon-aid

Total Content Points: 0

Total Practice Points: 1 (MP4)

The student does not correctly compute the rate of sugar to water (no credit for 7.RP.1, no credit for 7.RP.2b). However, the student uses a mathematical model to reason about ratios and proportional relationships ( $\frac{1}{2} \div 3\frac{1}{4} = \frac{2}{31}$ ), constructing a correct expression that is inaccurately computed (MP4). The student does not provide a correct equation for the problem or label the ratio ( $\frac{1}{2} \div 3\frac{1}{4}$ ) as sugar to water (no credit for 7.RP.2c, no credit for MP2). The student has not fully made sense of the task (no credit for MP1).

Total Awarded Points: 1 out of 6

Task 2. Lemonade Stand Task

**Lemonade**


For 4 servings:

$3\frac{1}{4}$  cups water

$\frac{1}{2}$  cup lemon juice

$\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.

  $3\frac{1}{4}$  cup water

$-\frac{1}{2}$  cup sugar


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$2\frac{3}{4}$

$2\frac{3}{4}$  unit rate of sugar to water

• subtract  $3\frac{1}{4}$  and  $\frac{1}{2}$   
Cup Sugar

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.

  $s = \text{sugar}$  variables

$w = \text{water}$

$(w) = (s) + 1$

$6\frac{1}{2} = (1) + 1$

I doubled the recipe  
you will need  $6\frac{1}{2}$  cup  
water, 1 cup lemon juice,  
and 1 cup sugar.

work

Total Content Points: 0

Total Practice Points: 0

The student does not correctly compute the rate of sugar to water (no credit for 7.RP.1, no credit for 7.RP.2b). In Part A, the student uses a mathematical model that is incorrect for the context of the problem, subtracting instead of dividing (no credit for MP4). The student does not provide the correct equation for the context or provide a ratio comparing the amount of sugar to water (no credit for 7.RP.2c, no credit MP2). The student does not correctly complete all parts of the task (no credit for MP1).

Total Awarded Points: 0 out of 6


## Task 2. Lemonade Stand Task

## Lemonade


For 4 servings:

 $3\frac{1}{4}$  cups water $\frac{1}{2}$  cup lemon juice $\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.

  $3\frac{1}{4} \div \frac{1}{2} = 6\frac{1}{2}$  it will take  
 $\frac{1}{2}$  cup of sugar  
 and  $3\frac{1}{4}$  cups of  
 water to make 4 servings

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.

 if she is going to make  
 8 servings she would need 1 cup  
 of sugar and  $6\frac{1}{2}$  cups of  
 water.

Total Content Points: 0

Total Practice Points: 0

The student does not correctly compute the rate of sugar to water, and only identifies the rate of water to sugar as given in the recipe instead of as a unit rate (no credit for 7.RP.1, no credit for 7.RP.2b). The student uses a mathematical model ( $3\frac{1}{4} \div \frac{1}{2}$ ) that is incorrect for the context of the problem (no credit for MP4). The student does not construct an equation that could be used to find the amount of sugar needed for any number of cups of water or provide a correctly labeled ratio relating to the context of the problem (no credit for 7.RP.2c, no credit for MP2). The student has not appropriately responded to all parts of the task (no credit for MP1).

Total Awarded Points: 0 out of 6

Task 2. Lemonade Stand Task

**Lemonade**

For 4 servings:

$3\frac{1}{4}$  cups water

$\frac{1}{2}$  cup lemon juice

$\frac{1}{2}$  cup sugar

- a. AJ and Riletta use the recipe above to make lemonade for their lemonade stand. Use the recipe to find the unit rate of sugar to water. Show your work.

*Handwritten solution for part a:*

You times 3 by 4 and subtract this from  $\frac{1}{2}$  time 4 and get 11.

$$\begin{array}{r} 3\frac{1}{4} \times 4 = 13 \\ \frac{1}{2} \times 4 = 2 \\ \hline 11 \end{array}$$

- b. Write an equation that AJ and Riletta can use to determine the amount of sugar,  $s$ , needed for any number of cups of water,  $w$ . Explain how you can identify the unit rate in your equation.

*Handwritten solution for part b:*

$s = \frac{11}{13}w$ . You have to find the amount you find by 11. If you times it the amount of sugar should equal.



Total Content Points: 0

Total Practice Points: 0

The student does not correctly compute the rate of sugar to water (no credit for 7.RP.1, no credit for 7.RP.2b). The student uses a mathematical model that is incorrect for the context of the problem (“you times  $3\frac{1}{4}$  by 4 and subtract this from  $\frac{1}{2}$  time 4 and get 11”)

to reason about ratios and proportional relationships (no credit for MP4). The student does not provide a correct equation for the problem in Part B or correctly label the ratio (sugar to water) relating to the context of the problem (no credit for 7.RP.2c, no credit for MP2). The student has not appropriately responded to all parts of the task (no credit for MP1).

Total Awarded Points: 0 out of 6