

# Ensuring Instructional Task Quality in Mathematics

Leadership II - Grades 6-12 - Day 3



# High-Quality Tasks?

## Why? Why Not?

[6.EE.C.9]

Stephanie is helping her band collect money to fund a field trip. The band decided to sell boxes of chocolate bars. Each bar sells for \$1.50 and each box contains 20 bars. Below is a partial table of monies collected for different numbers of boxes sold.

1. Complete the table for the values of  $m$ .
2. Write an equation for the amount of money,  $m$ , that will be collected if  $b$  boxes of chocolate bars are sold. Which is the independent variable and which is the dependent variable?
3. Graph the equation using the ordered pairs from the table above.
4. Calculate how much money will be collected if 100 boxes of chocolate bars are sold.
5. The band collected \$1530.00 from chocolate bar sales. How many boxes did they sell?

Boxes Sold $b$	Money Collected $m$
1	\$30.00
2	
3	
4	
5	\$150.00
6	
7	
8	

## Why? Why Not?

[A-REI.C.5]

Lisa is working with the system of equations  $x + 2y = 7$  and  $2x - 5y = 5$ . She multiplies the first equation by 2 and then subtracts the second equation to find  $9y = 9$ , telling her that  $y = 1$ . Lisa then finds that  $x = 5$ . Thinking about this procedure, Lisa wonders

*There are lots of ways I could go about solving this problem. I could add 5 times the first equation and twice the second or I could multiply the first equation by -2 and add the second. I seem to find that there is only one solution to the two equations but I wonder if I will get the same solution if I use a different method?*

- a. What is the answer to Lisa's question? Explain.
- b. Does the answer to (a) change if we have a system of two equations in two unknowns with no solutions? What if there are infinitely many solutions?

# 6–8 Tasks

## 6.RP.2

- c. A publishing company is looking for new employees to type novels that will soon be published. The publishing company wants to find someone who can type at least 45 words per minute. Dominique discovered she can type at a constant rate of 704 words in 16 minutes. Does Dominique type at a fast enough rate to qualify for the job? Explain why or why not.

From Engage NY: [https://www.engageny.org/file/39886/download/math-g6-m1-topic-c-lesson-16-student.pdf?token=ZOR\\_z4Zs](https://www.engageny.org/file/39886/download/math-g6-m1-topic-c-lesson-16-student.pdf?token=ZOR_z4Zs)

## 7.RP.3

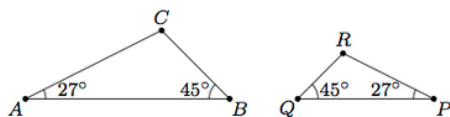
2. DeMarkus says that a store overcharged him on the price of the video game he bought. He thought that the price was marked  $\frac{1}{4}$  of the original price, but it was really  $\frac{1}{4}$  off the original price. He misread the advertisement. If the original price of the game was \$48, what is the difference between the price that DeMarkus thought he should pay and the price that the store charged him?

From EngageNY: <https://www.engageny.org/file/58916/download/math-g7-m1-topic-c-lesson-14-student.pdf?token=W29RYYvz>

## 8.G.5

### Task

Triangles  $ABC$  and  $PQR$  below share two pairs of congruent angles as marked:



- a. Explain, using dilations, translations, reflections, and/or rotations, why  $\triangle PQR$  is similar to  $\triangle ABC$ .
- b. Are angles  $C$  and  $R$  congruent?
- c. Can you show the similarity in part **a** *without* using a reflection? What about *without* using a dilation? Explain.
- d. Suppose  $DEF$  and  $KLM$  are two triangles with  $m(\angle D) = m(\angle K)$  and  $m(\angle E) = m(\angle L)$ . Are triangles  $DEF$  and  $KLM$  similar?

From Illustrative Mathematics: <https://www.illustrativemathematics.org/content-standards/8/G/A/5/tasks/2042>

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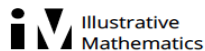
# 9–12 Tasks

## N-Q.A.1

You are considering driving an ice cream van during the summer vacation. Your friend, who “knows everything” tells you that “It’s easy money.” You make a few inquiries and find that the van costs \$600 per week to rent. Each ice cream cone costs 50 cents to make and sells for \$1.50.

For each of the questions below, show all work and include an explanation of your method of solution.

- a. How many ice cream cones would you have to sell each week just to cover the cost of renting the van?
- b. In order to sell the ice cream cones, you have a choice of driving the van through neighborhoods or parking the van in a public area. Typical selling data is that one can sell an average of 35 ice cream cones per hour at each of your planned stops if driving through neighborhoods, while you can sell an average of 30 ice cream cones per hour if one parks the van in a public area.
  - i. If you choose to drive the van, you will have to consider the time spent driving the van, which will depend on the average speed from stop to stop on your route, as well as the cost of gasoline, which will depend on the number of miles per gallon the van gets. Make reasonable estimates for these and any other costs you feel would be relevant. If you drive an average of 180 miles per week, how many ice cream cones would you have to sell just to cover the cost of driving the van for a week (not including rental costs)?
  - ii. If you choose to park the van, you will have to pay a one-time seasonal permit fee and weekly space rental. If the seasonal permit costs \$90.00 and space rental ranges from \$140 to \$150 per week, how many ice cream cones would you have



to sell just to cover the cost of parking the van for a week (again, not including rental costs)? Identify any assumptions you make.

- c. How many hours a week will you have to work in order to make this “easy money”? After how many hours would the amounts you earned under each of the two options be the same? How much money might you be able to make if you were willing to work really hard? Identify and take into account any additional expenses for the additional hours. Explain your reasoning clearly.

From Illustrative Mathematics:

<https://www.illustrativemathematics.org/content-standards/HSN/Q/A/1/tasks/85>

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**A-SSE.2**

3. Simplify the expression:  $4(x+3) + 5 =$