



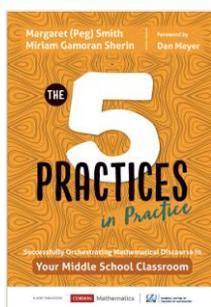
NATIONAL COUNCIL OF  
TEACHERS OF MATHEMATICS  
CELEBRATING 100 YEARS

## Orchestrating Productive Discussions: Overcoming the Challenges

Peg Smith  
100 Days of Professional Learning  
Webinar

April 8, 2020

Handouts



The materials in this packet are drawn from Smith, M. S., & Sherin, M. G. (2019). *The 5 Practices in practice: Successfully orchestrating mathematics discussions*. Thousand Oakes, CA: Corwin Mathematics. (Co-published by NCTM). **Please do not copy without permission from the publisher.**

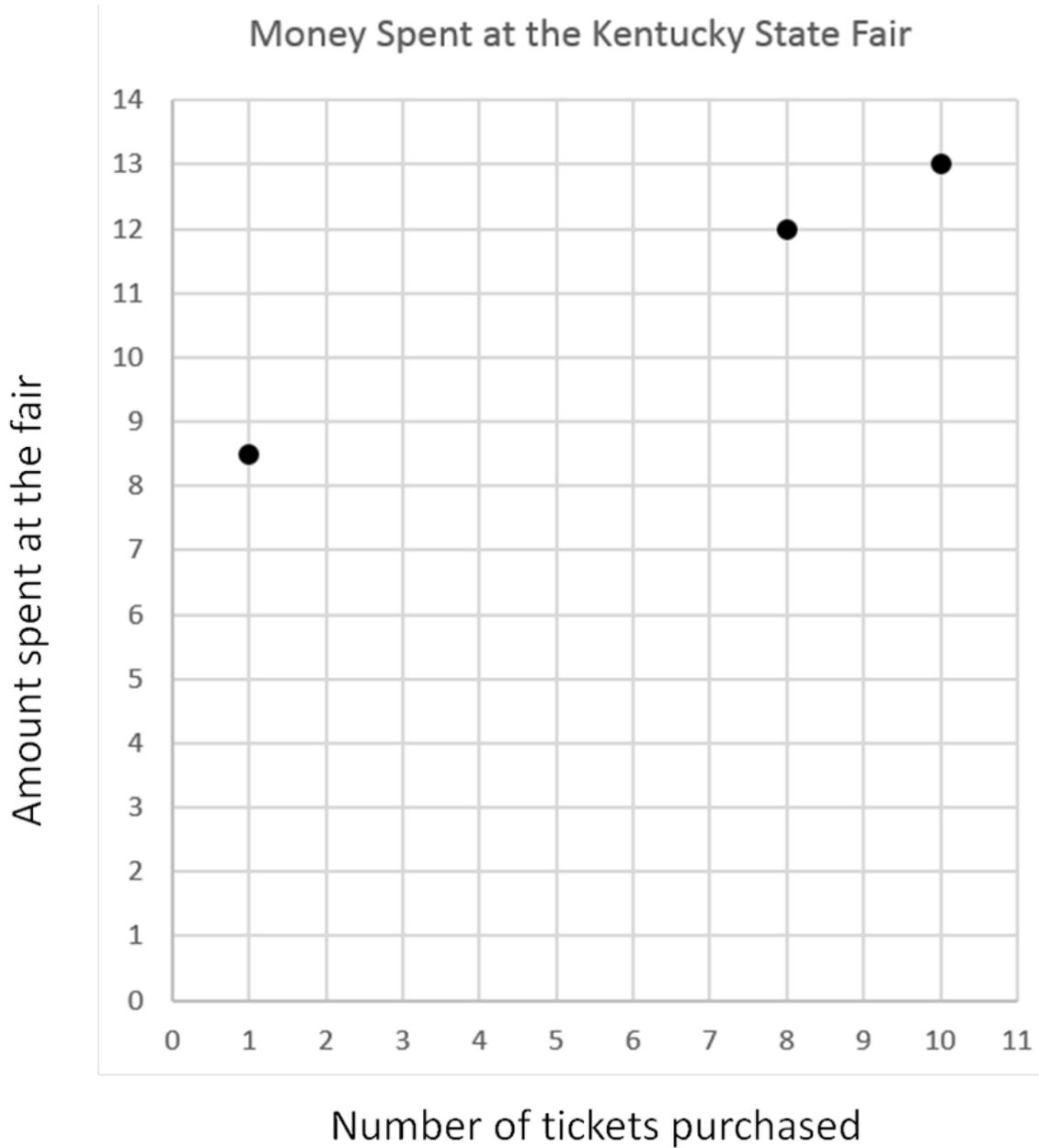
## **Mrs. Mossotti's Learning Goals**

As a result of engaging in the lesson Mrs. Mossotti wanted her students to understand that:

1. The rate of change can be seen as the ratio of the change in the  $y$ -variable compared to the change in the  $x$ -variable, as the rate expressed with the words 'for each, per, for every' in a verbal description, or as the coefficient of  $x$  in the equation  $y=mx + b$ .
2. Some functions do not "start" at zero. That is, the point  $(0,0)$  is not a solution for all linear functions.
3. The  $y$ -intercept can be understood as the initial value of a linear function in a real-world context.

## Mrs. Mossotti's Task Going to the State Fair

You are going to Kentucky State Fair in August. You are trying to figure out how much you should plan to spend. The graph below shows how much three different people spent after going through the main gate and then buying their ride tickets. Every ride ticket is the same price.



1. After entering the fair, you decide to buy 4 ride tickets. What will be your total cost for attending the fair? How do you know?

2. Describe how the cost increases as you buy more tickets. Be specific

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3. After entering the fair, you decide you want to go on a lot of rides. What will be the total cost for attending the fair and then purchasing 15 ride tickets?

4. Write a description, in words or numbers and symbols that can be used to find the total cost after entering the fair and purchasing any number of tickets.

5. How does the ticket price appear in your description or expression?

6. How does the ticket price appear in the graph?

**Extension:**

1. If you went to the Kentucky State fair, how many ride tickets could you buy with \$25?

2. If you could enter the Kentucky state fair for free, how would the graph look different?

## Daejhor, Razaria, and Mya's Solutions

Daejhor, Razaria, and Mya – first solution

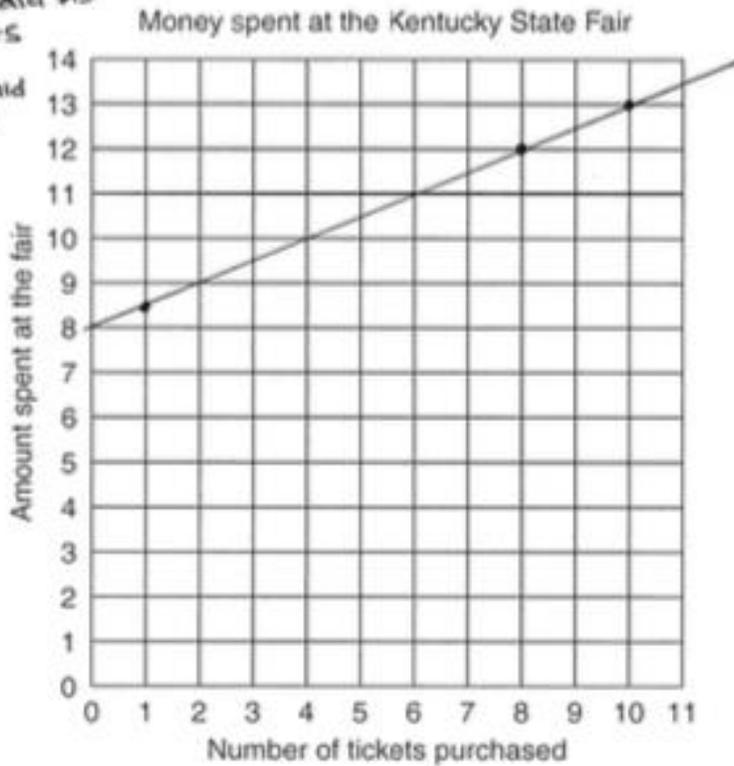
$$\boxed{1 \text{ ticket} = \$8.50}$$

8.50

~~$\$34.0$~~

Daejhor, Razaria, and Mya – second solution

1. someone paid \$13 for 10 tickets
2. someone paid \$12 for 8 tickets



## Daejhor, Razaria, and Mya Present

- Mrs. Mossotti: So what did you think at first, and then what did you do?
- Daejhor: What I thought at first was I had looked at the price of just one ticket. And then we timesed that by four. But we got like \$34, which was a lot of money and it wasn't even on the graph. So, what I did was I took my ruler. I drew a line on, and I made sure I lined it up with the points, and I saw that every time it went up it either was in-between or on point. [points to the board to show in between or on the point]
- Mrs. Mossotti: Okay so I'm going to go back for a second. Somebody in the audience, what did he first get?
- Students: 34.
- Mrs. Mossotti: Serenity?
- Serenity: 34.
- Mrs. Mossotti: And why did he change his answer and think, oh, it's not 34 anymore?
- Binti: It's not on the graph.
- Mrs. Mossotti: What do you mean it's not on the graph?
- Binti: He said 34 is too big. So he said it wasn't on the graph.
- Mrs. Mossotti: What do you mean it's too big? (5 second pause) Keep going. There's lots of numbers on this graph. Why is 34 too big? Somebody can-- Nietzsche go ahead.
- Nietzche: 34 is too big because the highest the graph goes up to is 14.
- Mrs. Mossotti: Okay so the graph goes up to 14. We're getting something like 34. So you didn't immediately draw that, Daejhor. You estimated. How did you estimate before you drew that line? Somebody besides you explain what Daejhor did.
- Mya: All we did was start from-- what's this? Because one tickets equals like \$8.50. So we just drew the line, and then we saw that each ticket was going up by fifty