

## Math Wrangle

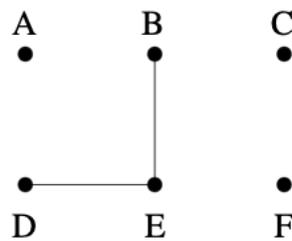
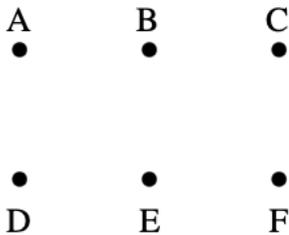
### MathAmigos & SFPS Teacher Workshop

Milagro Community School, 12 November 2022

Session Leaders: James Taylor, MathAmigos [jtaylor505@gmail.com](mailto:jtaylor505@gmail.com) & Geoffrey Moon [gmoon@sfps.k12.nm.us](mailto:gmoon@sfps.k12.nm.us)

No algebra!

- Using the dots below as endpoints, find as many ways as possible to draw two line segments that form a right angle. The vertex of the angle should be located on one of the lettered points. You may assume that the dots are equally spaced and aligned horizontally and vertically.



One way to draw a right angle is shown on the right. How many more ways can you find?

- Kiera is painting two equal squares measuring  $\frac{1}{2}$  of a foot by  $\frac{1}{2}$  of a foot. She paints one edge of the square red. Kiera says that this means she used  $\frac{1}{2}$  of a foot of red paint. She paints the entire second square blue. Kiera says that this means that she used  $\frac{1}{4}$  of a foot of blue paint. Kiera says, "Clearly I used more blue paint than red paint, so  $\frac{1}{2}$  must be less than  $\frac{1}{4}$ ." Are any of Kiera's statements correct? Are any of them incorrect?
- Six floats are in a parade along a straight road, with the starting line at one end and the finish line at the other. At 10:00 a.m., the sum of their distances from the starting line of the parade is 7.5 miles, and the sum of their distances from the finish line of the parade is 4.5 miles. How many miles long is the parade?
- The students at Meadow's Edge Elementary School have been learning to make nutritious lunch choices. The students learned that canned corn is a starch and does not really count as a serving of vegetables. Today, students could choose either canned corn or a fresh spinach salad as their vegetable.  $\frac{7}{10}$  of the students chose the healthier option, but the other 90 students opted for the corn anyway because they do not like the taste of spinach. How many students are at Meadow's Edge Elementary School?

## Math Wrangle Team Guide

In a Math Wrangle, the judges are looking for solutions, NOT answers. A solution includes an answer, but also includes an explanation of how you found the solution, patterns you noticed along the way, and why you think that your answer is correct.

When rebutting the other team (critiquing the other team's solution), you might explain something they forgot to explain, or show how you approached the problem differently. You might also explain why they are wrong, show another solution, or prove that you have a better solution.

### Things to Discuss While Preparing for the Wrangle

- Are you certain your answers are right?
- Can you explain why and prove your answers?
- Prepare things you might say to critique the other team.
- Does your team have a way to go above and beyond with any problems? This might be to:
  - Solve something not asked
  - Find a general rule or pattern
  - Demonstrate a way to solve the problem more easily
  - Extend the problem

### Some suggestions

- Remember that this is a team effort. Read through each problem carefully and solve them in team discussion.
- Keep track of time. We will remind you halfway through and when 5 minutes remain.
- Leave enough time to discuss your team's presentations of the problems.
- Think about what presenting your solutions at the wrangle will look like, how you will use the board, etc. All of you should have some understanding of all of the problems.
- Think about which problems your team would like to challenge the other team to solve.

### 15 Problem Solving Strategies

1. Engage in Successful Flailing
2. Do Something
3. Engage in Wishful Thinking
4. Draw a Picture
5. Make it small! (a smaller version of prob.)
6. Enumerate cases or make a table
7. Work backwards
8. Eliminate Incorrect Choices
9. Perseverance
10. Second-Guess the Author
11. Avoid Hard Work
12. Go to Extremes
13. Name and conquer (let  $n=...$ )
14. Use manipulatives or relevant physical objects
15. Test cases with your own numbers