Mirrored Mappings

Antonio and his friend Brittany were at a summer math camp that had a large *coordinate plane* drawn on the gym floor. Antonio challenged Brittany to try and mirror him as he traveled around the first quadrant. Map Antonio's & Brittany's movements on this coordinate plane:

Antonio began at (2,1) and walked to (3,5); Brittany decided to begin at (-2, 1), then tried to mirror Antonio by walking to (-3, 5). Antonio jumped to (5,5) and side-stepped to (4,3); Brittany jumped to (-5, 5) then side-stepped to (-4,3). Antonio returned to (2,1) and Brittany returned to (-2,1).

1. Did Brittany mirror Antonio?

- If you answered **no**, identify the incorrect coordinates Brittany used and find the correct coordinates. Explain your decision and identify the line of symmetry she should have used as a mirror. **How did you know that this should have been the line of symmetry?**

- If you answered **yes**, identify the line of symmetry Brittany used as a mirror. **How did you know it was the line of symmetry?**

2. If Brittany had instead begun at (-2,1), walked to (-4,3), side-stepped to (-5,5), jumped to (-3,5) and then returned to (-2,1), could she claim that she created a mirror image of Antonio's path? **Justify your answer**.

Antonio and Brittany decided to change the game and use some lettered blocks to mark points they visited on the grid. Antonio placed blocks A, B and C as indicated by the points below, then drew a chalk line between them.

3. Label the coordinates Antonio used, and then construct the graph of where Brittany would place her blocks if she correctly reflected Antonio's figure across the x-axis.

4. Describe how you determined where to place Brittany's blocks.

5. Each block Brittany placed corresponds to one that Antonio placed. List each pair of coordinates that correspond.

6. What can you observe about the distances between each of Antonio's blocks and the corresponding block Brittany placed?

7. If Antonio walked 2 feet from his block A toward his block C, and Brittany mirrored his movement by walking 2 feet from the blocks corresponding to A and C, would Brittany and Antonio be the same distance from the reflection line? How can you be certain?

8. How would you define a reflection now that you have analyzed some of the properties of reflected images using the coordinate plane?

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