Subways - Lesson 2 - Coordinate Translations - SD

Introduction
Describing train travel with coordinate notation helps show connections between horizontal and vertical motion (for example, from point A to B one traveled a mile east and 2 miles north.) You will learn how every diagonal line can be thought of as a hypotenuse of a right triangle with horizontal and vertical legs, and this will also connect to learning about the Distance Formula in Lesson 3.

This is the starter map. You will find this map picture in Choreo Graph and use it to create a subway map as the background. (You can also use the subway map that you already designed from Lesson 1.)

One unit on the grid in Choreo Graph = ¼ mile = .25 mile

Coordinate Translations
When your trains are travelling from station to station, they are sliding or translating across the coordinate grid. The trains are traveling from one (x, y) point to another.

For example a train might go from a point (5, -8) to (-2, -4), as pictured. Notice that this path is a diagonal line. To slide to the right from 5 to -2 with respect to the x-axis, the train traveled left 7 units. And, to go from -8 to 4, the train went up 12 units with respect to the y-axis. See the image that helps illustrate this example.
This image shows the diagonal segment expressing the train traveling from Jones to Simone. This motion from (5, -8) to (-2, 4) can be expressed as \((x - 7, y + 12)\).
This Choreo Graph screenshot shows the coordinates and path of the train between Jones and Simone.
To do:
In Lesson 1 you entered the coordinates for each station into a table.

Looking at the map you made, let's explore how someone would get from one station to another. In the table below, choose two stations that are next to each other and connected by one segment. Fill in the station names, their coordinates, and the translation notation.

<table>
<thead>
<tr>
<th>Station Names</th>
<th>Coordinates</th>
<th>Horizontal Dist (x)</th>
<th>Vertical Dist (y)</th>
<th>Coordinate Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>From: ________</td>
<td>( , , )</td>
<td></td>
<td></td>
<td>(x ______, y _____)</td>
</tr>
<tr>
<td>To: __________</td>
<td>( , , )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions

1) Between which 2 stations on your map do passengers travel the furthest in the horizontal direction? What is that horizontal distance?

2) Between which 2 stations on your map do passengers travel the furthest in the vertical direction? What is that vertical distance?

3) Using the subways lines that you created on your map, the coordinates from your table, and coordinate notation, provide the series of translation steps the following trips:

- a) Armstrong to Fitzgerald
  
- b) Bird to Coltrane
  
- c) Simone to Spalding
4) Using the subway, and walking if necessary, use coordinate notation to describe how could a passenger get from Bird to the Museum?

The map you use for this lesson should look something like this map. Choreo Graph provides the coordinates and line segments of your subway lines.