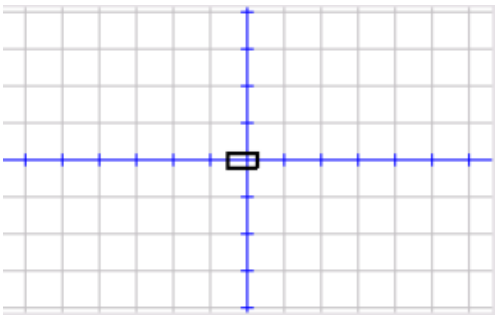
Unit 6: Coordinates | **Skill Builder 1: Introduction to Coordinates**

In this first lesson for Unit 6, you will learn about the TI-Innovator Rover's coordinate system and movement to coordinates.

Objectives:

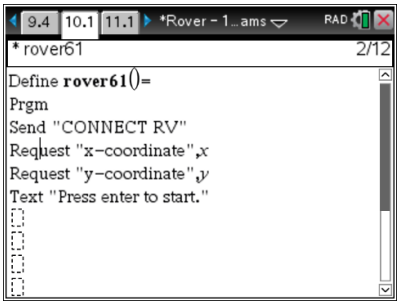
- Understand the Rover coordinate system and initial position and heading
- Make the Rover move to a certain point on the coordinate plane
- Use mathematics to determine distance

The Rover has a 'built-in' coordinate system just like a graphing system. When you **Send** "**CONNECT RV**", the Rover's position on the coordinate grid is set to (0,0) and its heading is 0 degrees (points toward the positive x-axis).



FORWARD moves the Rover to the right.
LEFT turns the Rover 90 degrees counterclockwise.

Our program will tell the Rover to move to a point on its coordinate grid. We'll use **Request** statements to enter values for *x* and *y* and then make the Rover drive to the point (x, y) and then move back to the origin.



1. Start your program with the usual instructions.

2. Include **Request** statements for *x* and *y*.

   Recall that **Request** will display the message entered in quotes (the 'prompt').

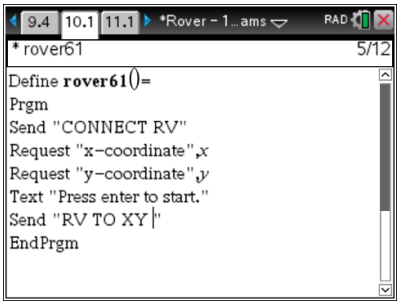
3. The **Text** statement gives you time to place the Rover at the origin and face the Rover in the 'right' direction.

   Teacher Tip: Students should be familiar with the Cartesian coordinate system. If they are not, then this is the perfect opportunity to teach them. The 'right' direction is the one that is considered the positive x-axis, or east.

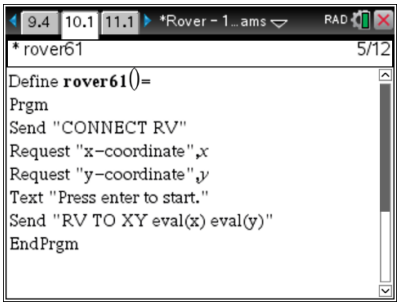
4. Add the Rover command to drive **TO XY**. The command is found in the **menu > Hub > Rover (RV) > Drive RV** menu. and will appear in your program as an incomplete statement.

   Send "RV TO XY "

   The command will appear in your program as an incomplete statement.



5. The x- and y-coordinates must be added and will be stored in the variables *x* and *y,* respectively. In order for the TI-Innovator™ Hub to use these values, you must use the **eval( )** function twice.

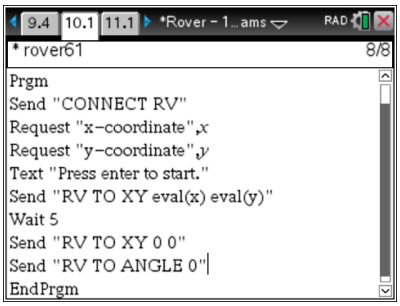


6. Add **eval(x) eval(y)** to the command.
   Send "RV TO XY eval(x) eval(y)"

7. Test your program now. Depending on the coordinate values you enter, the Rover will move to that position.

Teacher Tip: The Rover behaves the same regardless of the optional **XYLINE** parameter at the end of the **RV TO XY** command. **XYLINE** is in the **RV Settings** menu.
Send "RV TO XY eval(x) eval(y) XYLINE"

8. Add a **Wait** command to let the Rover move to your point, and then tell the Rover to return to the origin. Simply use the numbers 0 and 0 separated by a space. We also add a statement to make the Rover point in its original direction (**TO ANGLE 0**).



9. Test your program again. This time, the Rover should travel to your entered point and then return to the origin and face in the original direction.