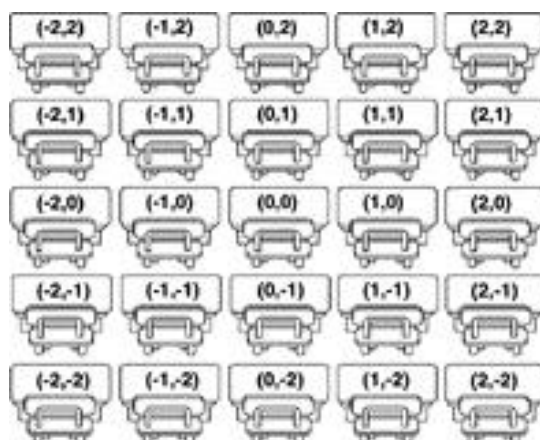
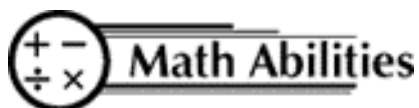


Human Coordinate Plane: Teacher Notes



MA.C. 3.3.2



Conceptual Knowledge
Coordinate Plane
Axis
Slope
Intercept

Procedural Knowledge
Graphing Coordinate Pairs
Representing Lines and Inequalities



Problem Solving
Reasoning
Communication
Connections
Representation



Hook

Arrange 25 desks in a square array and have students sit in them. Explain that they are a human coordinate plane and each of them is to receive a card with an ordered pair (x,y) on it. Ask students who are not seated to distribute the ordered pair cards to the appropriate location. They may need to refer to a grid with points labeled as shown:

$(-2,2)$	$(-1,2)$	$(0,2)$	$(1,2)$	$(2,2)$
$(-2,1)$	$(-1,1)$	$(0,1)$	$(1,1)$	$(2,1)$
$(-2,0)$	$(-1,0)$	$(0,0)$	$(1,0)$	$(2,0)$
$(-2,-1)$	$(-1,-1)$	$(0,-1)$	$(1,-1)$	$(2,-1)$
$(-2,-2)$	$(-1,-2)$	$(0,-2)$	$(1,-2)$	$(2,-2)$



Group Arrangement

Students work individually and as a class



Tools

- Σ 25 large ordered pair cards labeled as shown above
- Σ large grid with the points shown above labeled
- Σ overhead projector or chalkboard



Procedure

1. Ask the student whose ordered pair card has 0 as the first number to stand. Through discussion identify 0 as the x-coordinate and the students standing as the y-axis, they should now sit and students whose ordered card pair has 0 as the second number should stand. Again, discussion should identify the 0 as the y-coordinate and the students standing as the x-axis.

2. Ask each student with an x-coordinate of 1 to stand up and write $x = 1$ on the board. Now ask students with an x-coordinate of -2 to stand and write $x = -2$ on the board. Through discussion, lead students to see that equations of the form shown are:
 - a. a vertical line
 - b. parallel to the y-axis
3. Ask each student with a y-coordinate of 1 to stand up and write $y = 1$ on the board. Now ask students with a y-coordinate of -1 to stand and write $y = -1$ on the board. Through discussion, lead students to see that equations of the form shown are:
 - a. a horizontal line
 - b. parallel to the x-axis
4. Ask the students whose ordered pair has a sum of 1 to stand and write $x + y = 1$. These students should remain standing while students whose ordered pair first number - the second number equals 1 stand. Write $x - y = 1$ on the board. Through discussion, lead student to see that (1,0) is a point on both lines and represents the point of intersection. Substitute values in the equations on the board to show that (1,0) makes both $x + y = 1$ and $x - y = 1$ true.
5. Repeat the above process using $x + y = 1$ and $x + y = 2$. Guide students to discover that if there is no point of intersection, the lines are parallel.



Math Connection

As a result of this activity, students will have a better understanding of the coordinate plane.



Assessment

Ask students whose ordered pair sum is 2 to raise their hands. Now ask students whose ordered pair sum is less than 2 to stand and write $x + y < 2$ on the board. Show the students a graph with a dotted line for $x + y = 2$ and shading for $x + y < 2$. Note that the shading includes all points, not just integral values. Repeat the process for other inequalities.