Points on a Coordinate Plane

**Objective**  Locate points in the four quadrants of the coordinate plane.

**Materials** Graph paper

Number lines show positive and negative numbers. Plotting points and reflecting across 0 on a number line form the basis for graphing and reflecting points across axes on the coordinate plane. The use of both horizontal and vertical number line facilitates the movement from number lines to coordinate grids.

Plotting points on a coordinate plane is a skill that students will eventually use to find the distance between two points on a grid when either the $x$-coordinates or the $y$-coordinates are the same. Later, they will plot points to draw curves and lines as well as graph equations.

When working with a coordinate plane, students are most often challenged in plotting coordinate pairs that contain both a negative and a positive integer. The order of the integers in the pair is very important and will be emphasized in this activity to help solidify their understanding of where to plot points on a coordinate plane.

**Step by Step**  20–30 minutes

1. **Set up the coordinate plane.**
   - Help the student use a piece of graph paper to draw a coordinate grid with $x$- and $y$-axes that extend from $-10$ to $10$.
   - Have the student label the Quadrants I through IV for reference.

2. **Plot points in each quadrant.**
   - Have the student plot and label the following points (Quadrant I): $(4, 4)$, $(4, 5)$, $(4, 6)$.
   - Have the student plot and label the following points (Quadrant II): $(-4, 4)$, $(-4, 5)$, $(-4, 6)$.
   - Have the student plot and label the following points (Quadrant III): $(-4, -4)$, $(-4, -5)$, $(-4, -6)$.
   - Have the student plot and label the following points (Quadrant IV): $(4, -4)$, $(4, -5)$, $(4, -6)$.

3. **Discuss the location of points.**
   - Discuss the locations of the points and the signs of the integers in the coordinate pairs.
   - Ask: *What is true about the points that all have 4 as an $x$-coordinate? What about the ones that all have $-4$ as an $x$-coordinate?* (those with 4 as an $x$-coordinate are all on the right side of the $y$-axis in Quadrant I or IV; those with $-4$ as an $x$-coordinate are all on the left side of the $y$-axis, in Quadrants II or III)
   - Ask: *What is true about the points that have a positive $y$-coordinate?* (They are all above the $x$-axis in quadrants I or II.)
   - Ask: *What is true about the points that have a negative $y$-coordinate?* (They are all below the $x$-axis in quadrants III or IV.)
Have the student label each quadrant with either $(+, +)$, $(-, -)$, $(+, -)$, or $(-, +)$ to show what the signs of the coordinate pairs that fall in that quadrant are.

**4 Practice identifying quadrants given ordered pairs.**
- Provide the student with different ordered pairs and have him name the quadrant in which each point is located based only on the signs of the point’s coordinates.

**Check for Understanding**

Have the student plot and label the following points on a coordinate plane: $(-3, 2)$, $(2, -3)$, $(3, 2)$, and $(-2, -3)$.

For student who struggles, use the chart below to help pinpoint where extra help may be needed.

<table>
<thead>
<tr>
<th>If you observe…</th>
<th>the student may…</th>
<th>Then try…</th>
</tr>
</thead>
<tbody>
<tr>
<td>the student has difficulty locating negative numbers on the $x$- or $y$-axes</td>
<td>not have a firm grasp of negative numbers on a number line.</td>
<td>emphasizing the location of 0. Talk about the location for negative numbers—left and down—in terms of horizontal and vertical number lines.</td>
</tr>
<tr>
<td>the student transposes the $x$- and $y$-coordinates of an ordered pair</td>
<td>not understand the importance of the order of the coordinates in an ordered pair.</td>
<td>pointing out that the coordinates in an ordered pair are always in the same order and that order is alphabetical; the $x$-coordinate comes before the $y$-coordinate. To help the student remember this, remind the student that $x$ comes before $y$ in alphabetical order.</td>
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</tbody>
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