

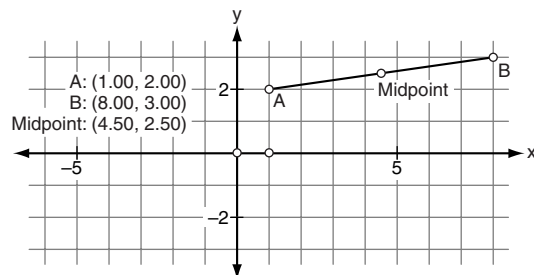
Using Your Algebra Skills 1 • Midpoint

In this activity, you will discover a method for finding the midpoint of a line segment using the coordinate grid.

Investigation: The Coordinate Midpoint Property

Sketch

- Step 1** Open a new sketch. Choose **Show Grid** from the Graph menu. Also be sure **Snap Points** is checked in the Graph menu.
- Step 2** Draw segment AB anywhere on your grid.
- Step 3** Select \overline{AB} and choose **Midpoint** from the Construct menu. Change the label of this point to *Midpoint*.
- Step 4** Select all three points on \overline{AB} and choose **Coordinates** from the Measure menu.
- Step 5** Line up the three measurements vertically so it is easier for you to compare the numbers.



Investigate

1. To look for patterns, drag the endpoints of your segment and watch the six coordinate measurements carefully. It might be easier to focus on the x -coordinates first, then pay attention to the y -coordinates later. The pattern is also easier to see when the segment is shorter and in the first quadrant. Keep experimenting until you are sure you have found a pattern that describes the relationship between the coordinates of the endpoints of a segment and the coordinates of the segment's midpoint. Record your observations.
2. Now you can generalize by writing a conjecture using variables. Suppose that one endpoint of a segment has coordinates (x_1, y_1) and the other has the coordinates (x_2, y_2) . Record the coordinates of the midpoint and write your results as a conjecture (Coordinate Midpoint Property).
3. In the Graph menu, turn off **Snap Points**. Now drag your segment into a new position. Test your conjecture using the coordinates of the new endpoints. Record your results.

EXPLORE MORE

Construct a segment and measure the coordinates of its endpoints: Choose **Abscissa(x)** and **Ordinate(y)** from the Measure menu to find the two coordinates of each endpoint. Then use the calculator to calculate each coordinate of the midpoint. (You may need to use parentheses in the calculator.) Select, in order, the x -coordinate and the y -coordinate of the midpoint and choose **Plot as (x, y)** from the Graph menu. Drag an endpoint and report on your results. Did you successfully calculate the midpoint's coordinates?