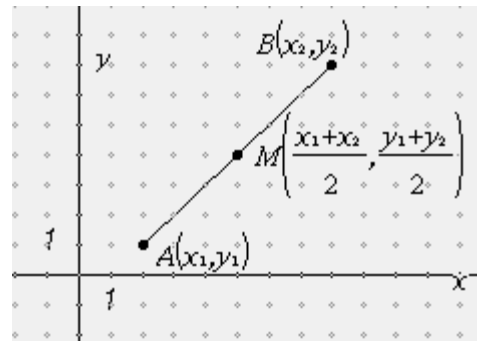


### 8-3: Midpoint of a Line Segment

The *midpoint* of a line segment is the point of the line segment that divides the segment into two congruent segments.

**Theorem:** If the endpoints of a line segment are  $(x_1, y_1)$  and  $(x_2, y_2)$ , then the coordinates of the midpoint of the segment are  $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ .

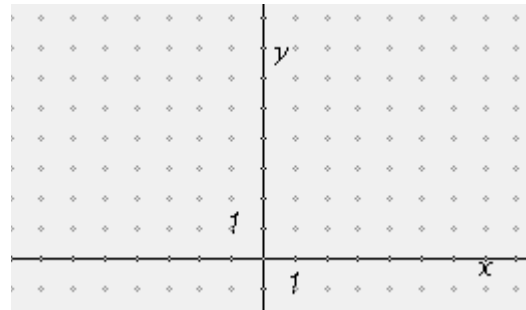
- The proof is left to the reader.



The formula given in the theorem:  $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$  is called the **midpoint formula**.

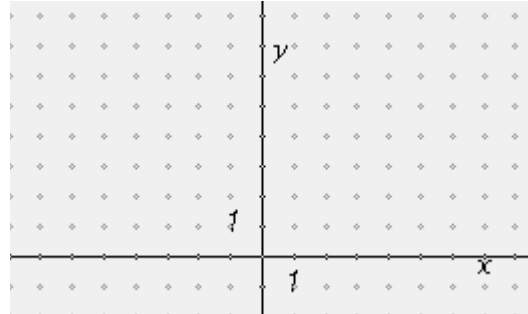
Example:

Find the coordinates of the midpoint of the segment  $\overline{CD}$  whose endpoints are  $C(-1, 5)$  and  $D(4, -1)$ .



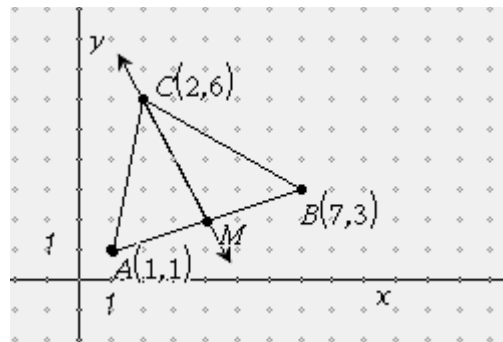
Example:

$M(1, -2)$  is the midpoint of  $\overline{AB}$  and the coordinates of  $A$  are  $(-3, 2)$ . Find the coordinates of  $B$ .



Example:

The vertices of  $\triangle ABC$  are  $A(1, 1)$ ,  $B(7, 3)$ , and  $C(2, 6)$ . Write an equation of the line that contains the median from  $C$  to  $\overline{AB}$ .



Homework: