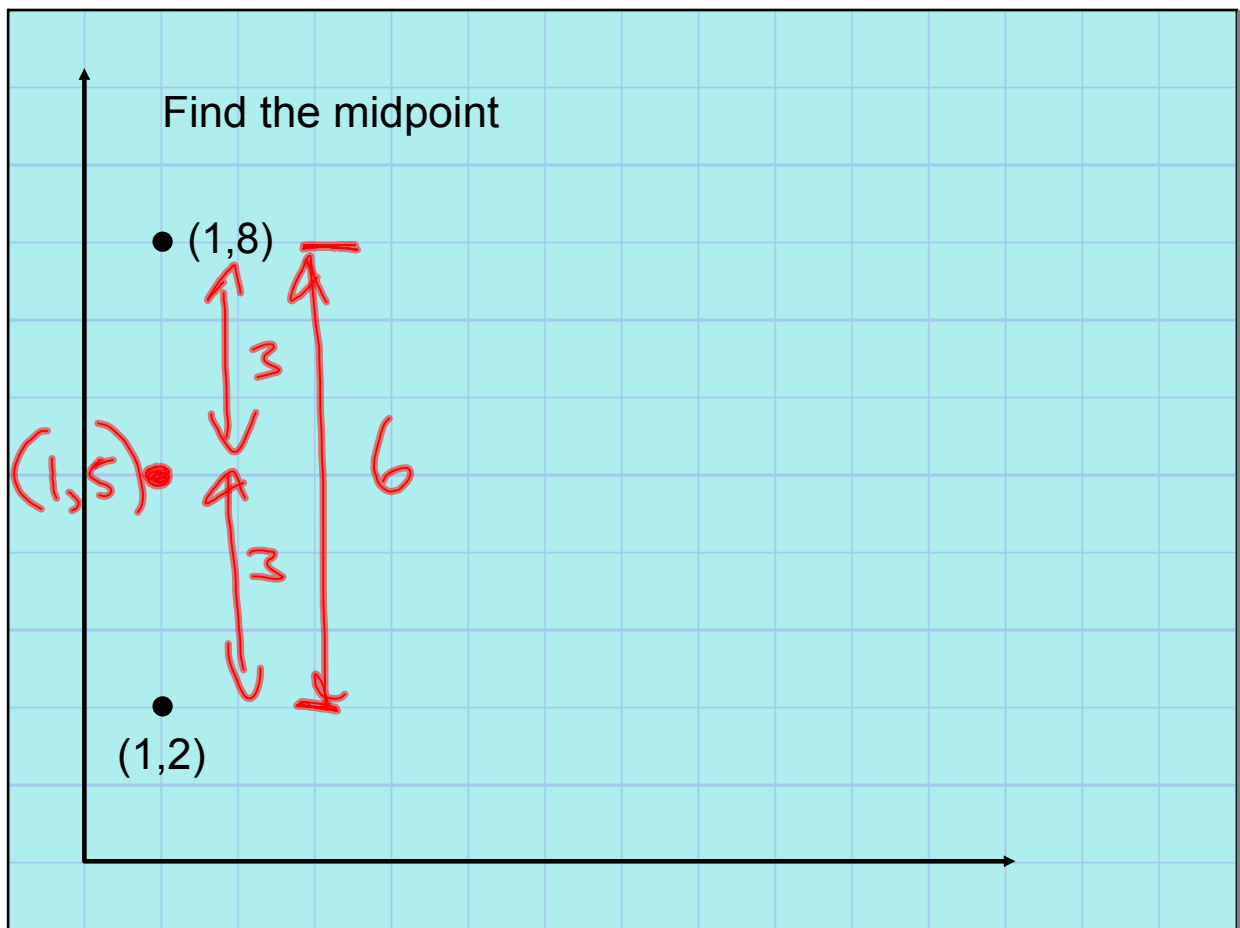
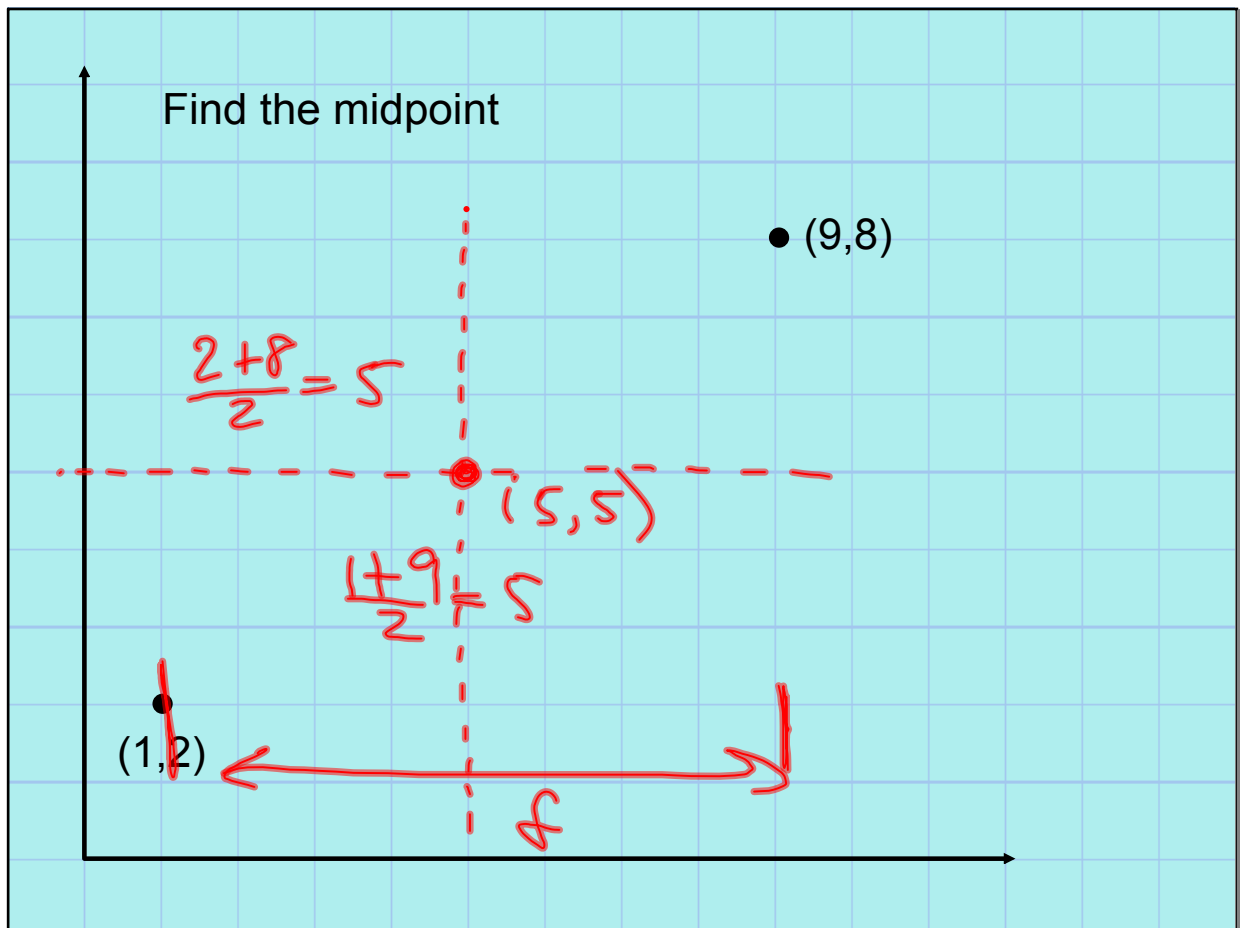


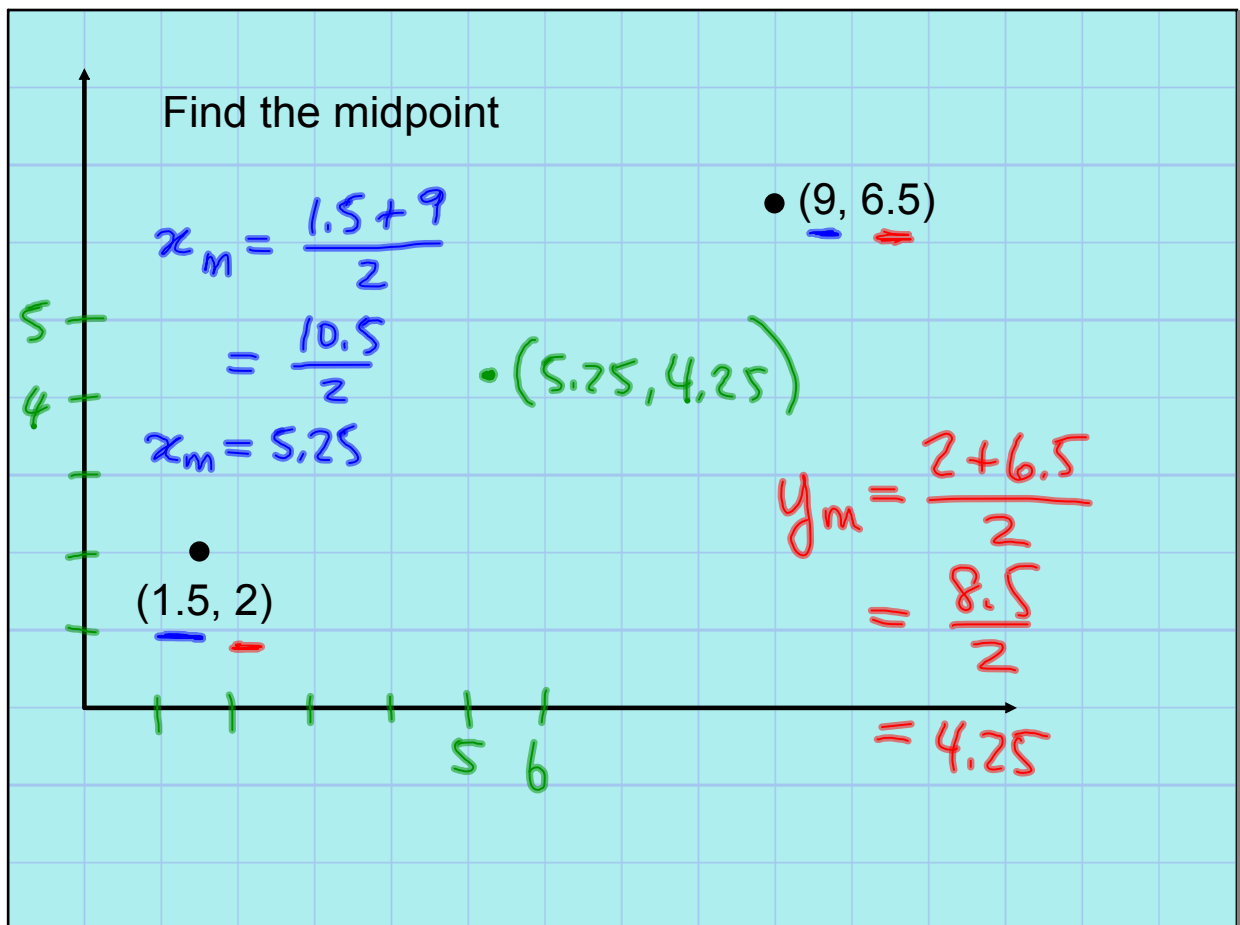
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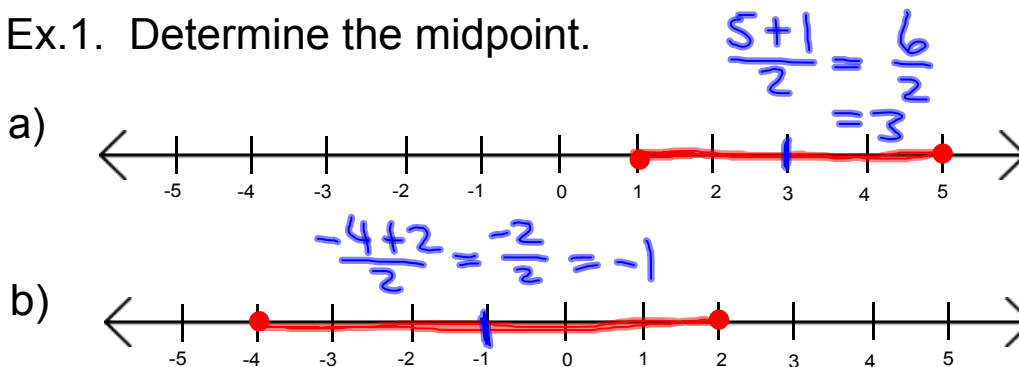
The Midpoint of a Line Segment

Feb 25/201

The midpoint of a line segment is the point halfway between the two endpoints.

Algebraically, we can consider the x-coordinates and y-coordinates separately, finding the halfway value for each.

Ex.1. Determine the midpoint.



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Algebraically, the halfway point between two values is their sum divided by two.

Given two points, (x_1, y_1) and (x_2, y_2) , we can write

$$x_{\text{midpoint}} = \frac{x_1 + x_2}{2} \quad y_{\text{midpoint}} = \frac{y_1 + y_2}{2}$$

In general, the midpoint formula is written

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Note that the midpoint is a point, expressed as (x, y) .

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Ex.2. Determine the coordinates of the Midpoint, M, of the line segment with endpoints A(-2, -3) and B(4, 7).

x_1 y_1 x_2 y_2

$$x_m = \frac{x_1 + x_2}{2}$$

$$= \frac{-2 + 4}{2}$$

$$= \frac{2}{2}$$

$$x_m = 1$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$= \frac{-3 + 7}{2}$$

$$= \frac{4}{2}$$

$$y_m = 2$$

$$M = (1, 2)$$

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Ex.3. One endpoint of a line segment is at (1,2) and has a midpoint of (5,5). What is the other endpoint?

x_m y_m

$$x_m = \frac{x_1 + x_2}{2}$$

$$5 = \frac{1 + x_2}{2}$$

$$2(5) = 2 \left(\frac{1 + x_2}{2} \right)$$

$$10 = 1 + x_2$$

$$\boxed{x_2 = 9}$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$5 = \frac{2 + y_2}{2}$$

$$2(5) = 2 \left(\frac{2 + y_2}{2} \right)$$

$$10 = 2 + y_2$$

$$\boxed{y_2 = 8}$$

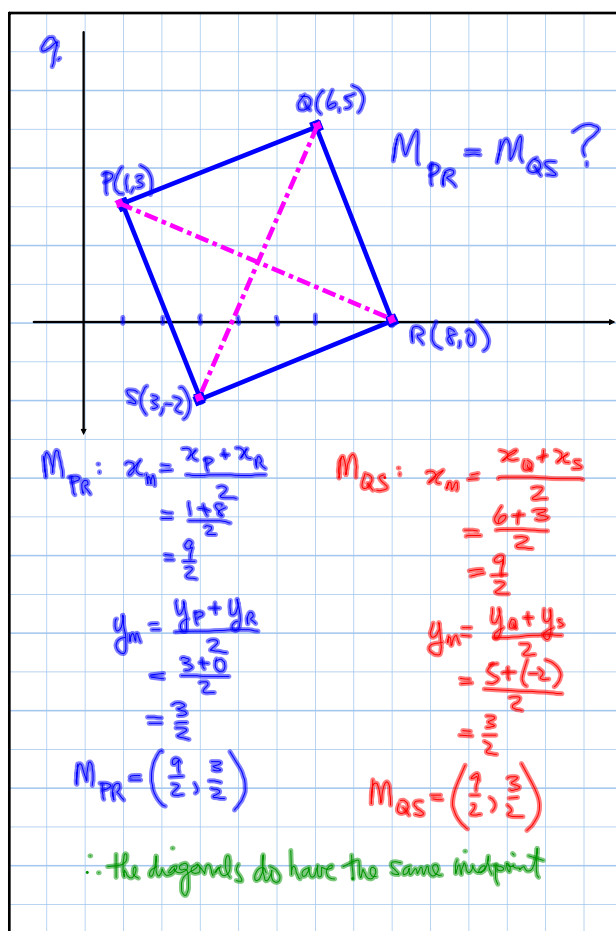
\therefore the other endpoint is (9, 8)

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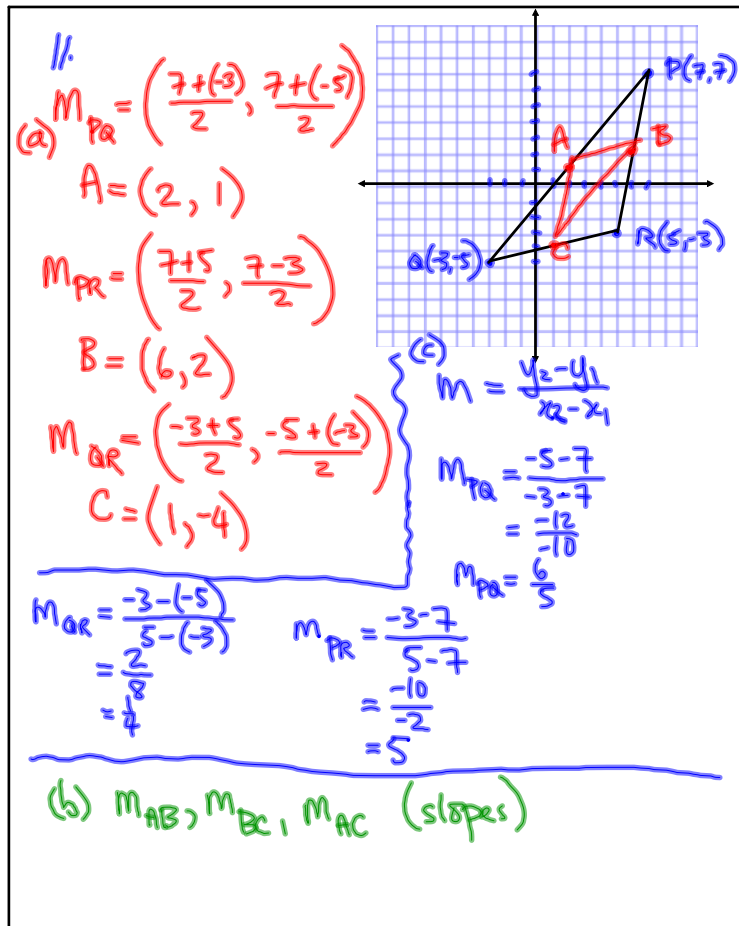
Assigned Work:

p. 78-80 # 2ac, 3, 4e, 5, 6, 8, 9, 11

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