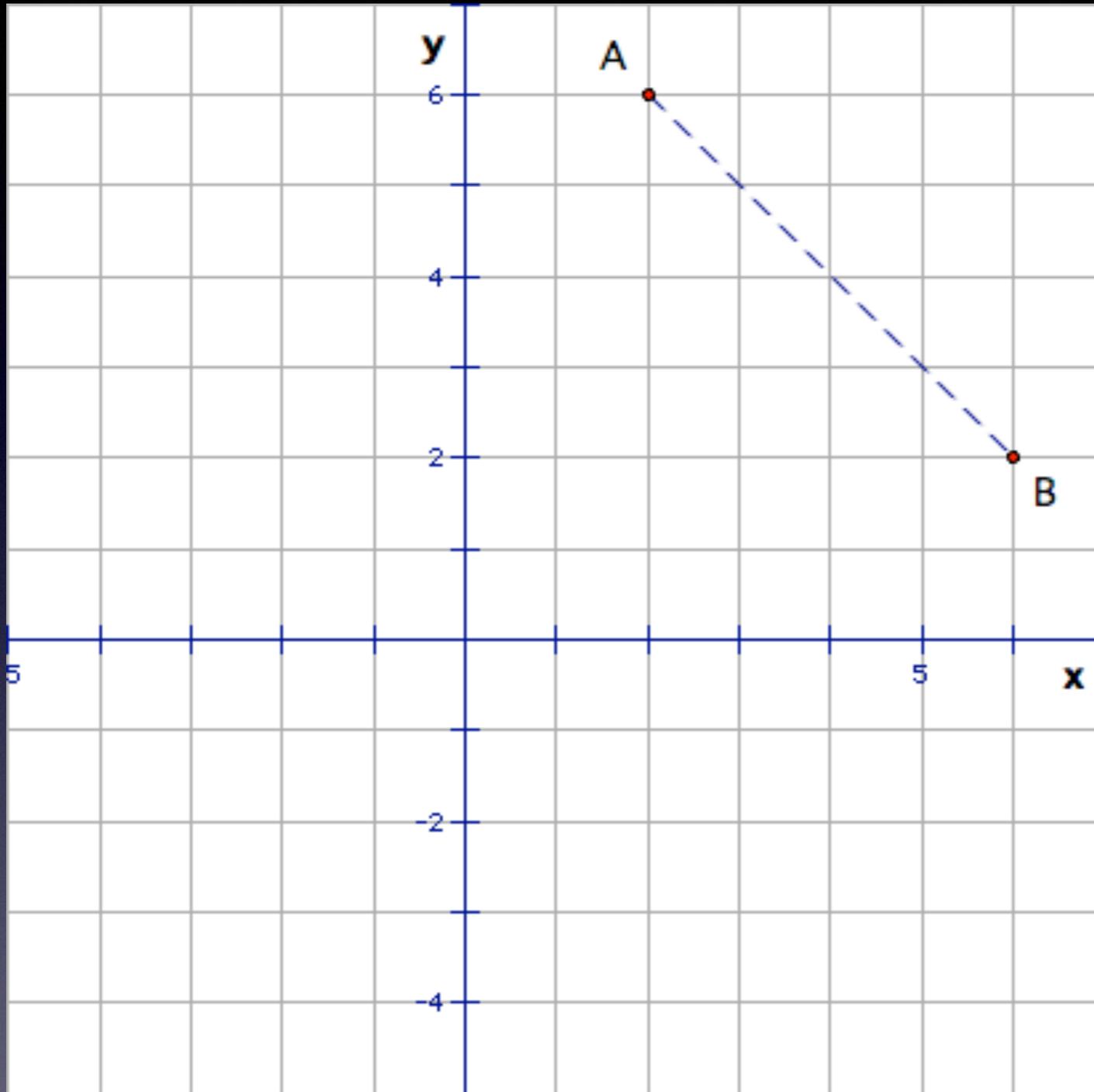
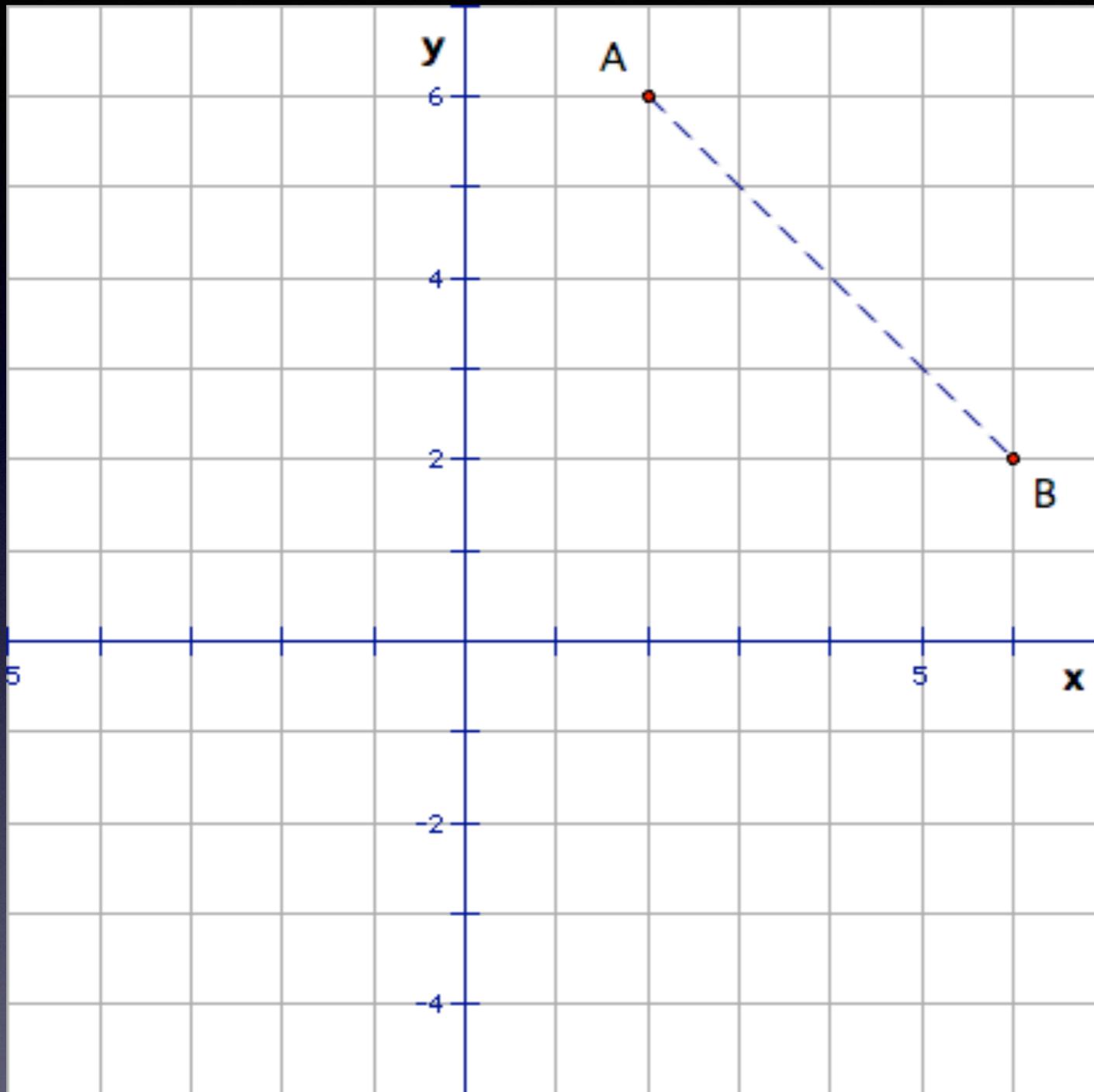


Midpoint of a Line Segment



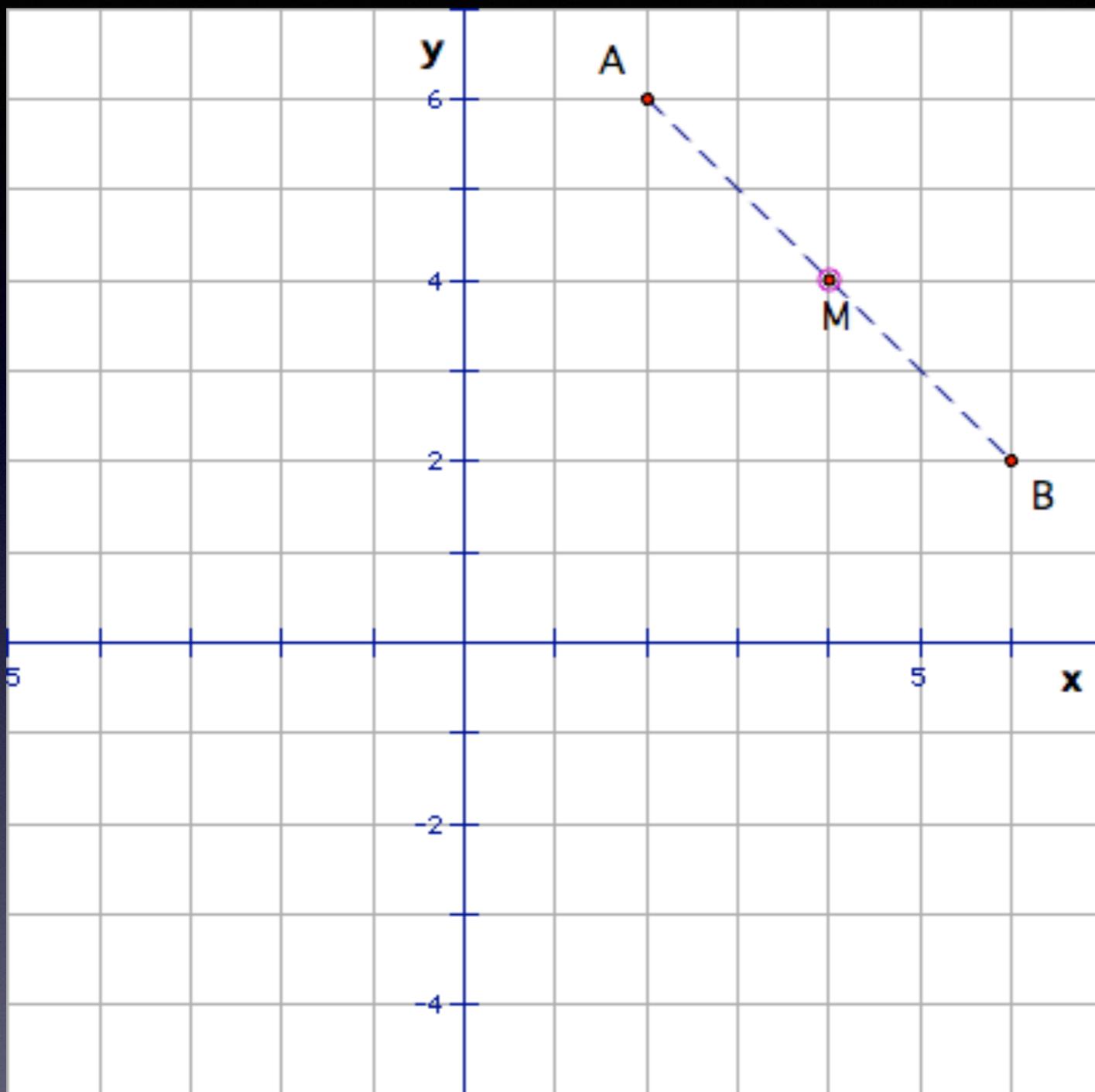
A (2, 6)

B (6, 2)



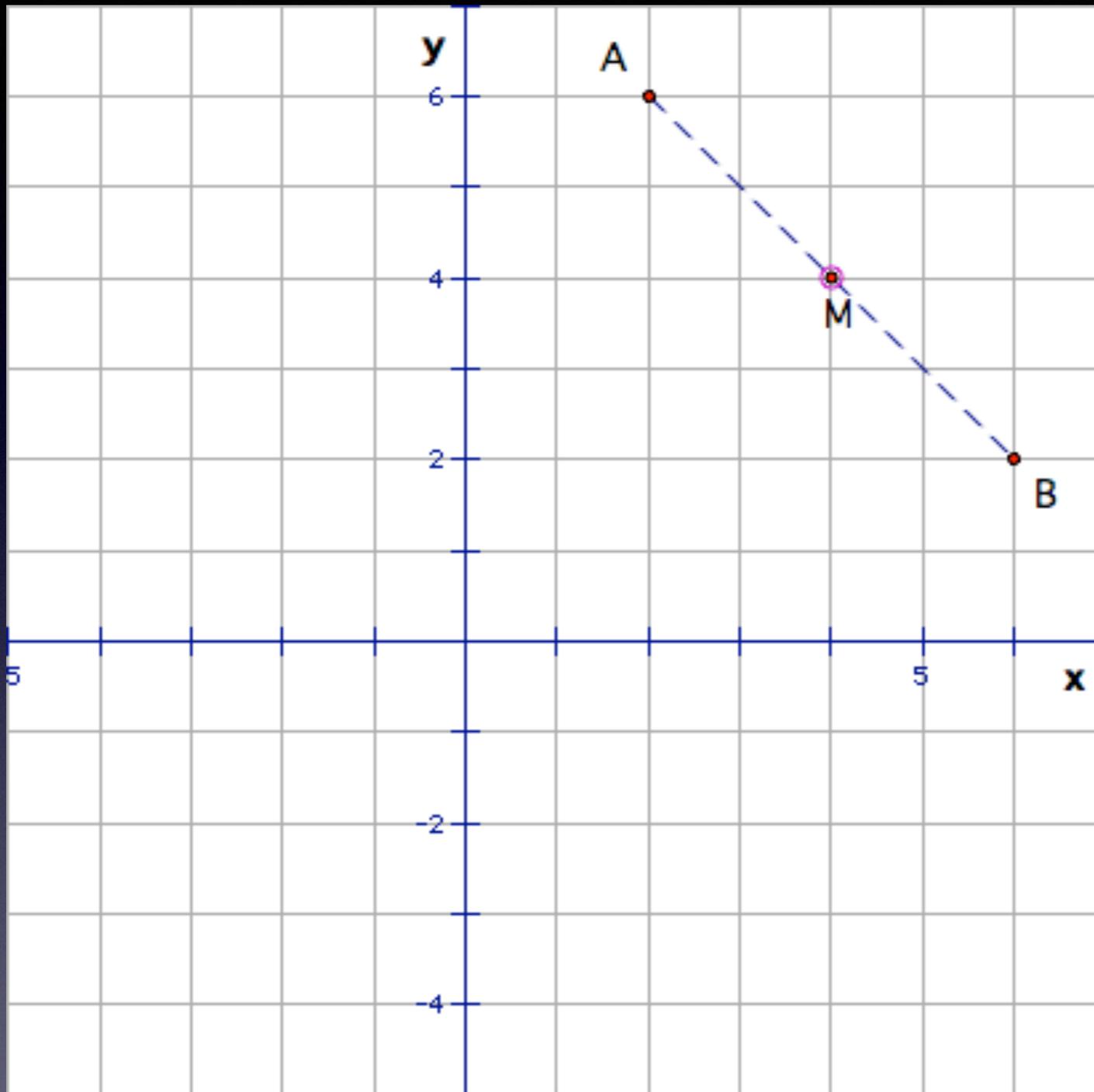
	x	y
A	(2,	6)

B	(6,	2)
---	-----	----

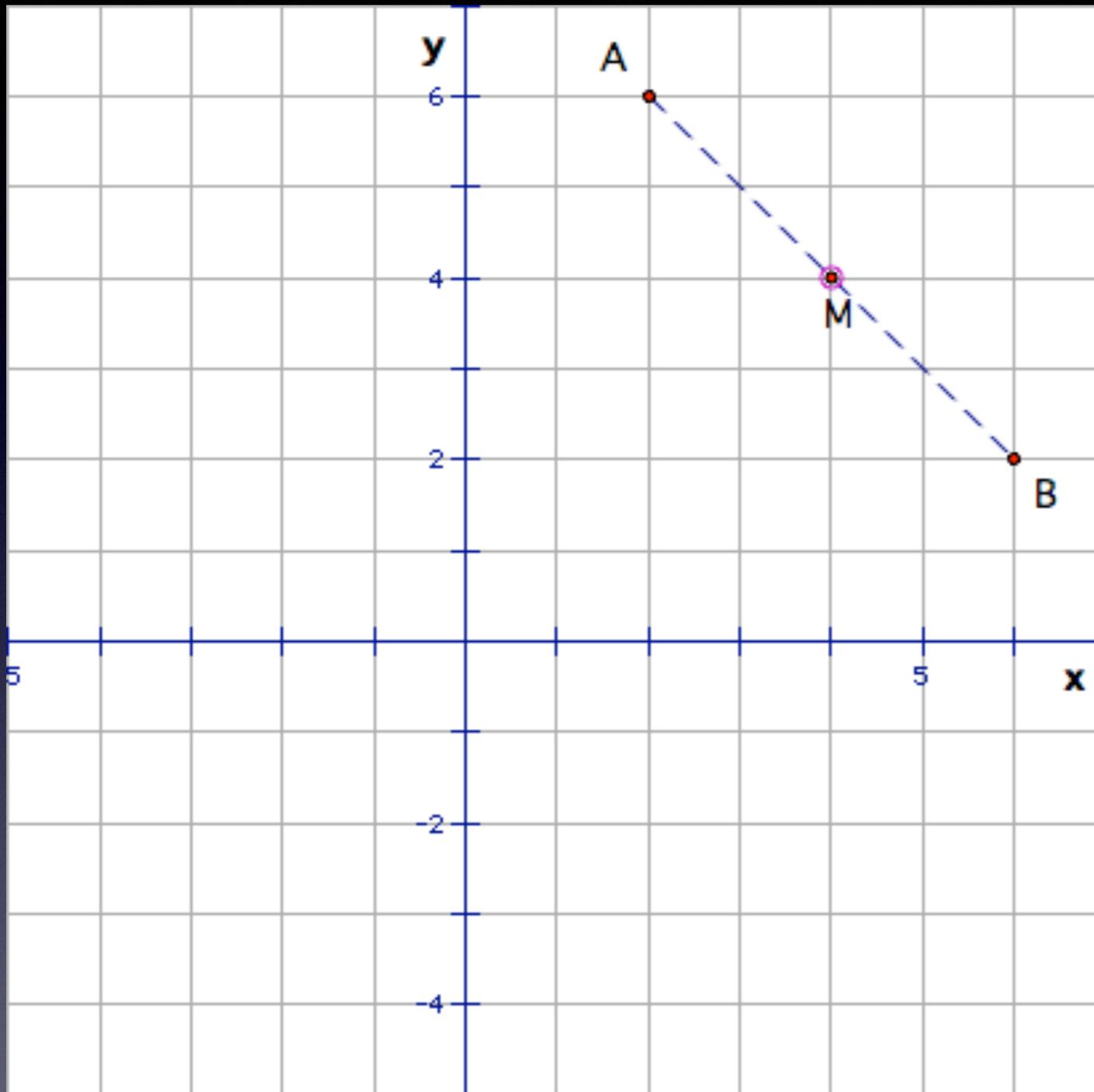


	x	y
A	(2,	6)

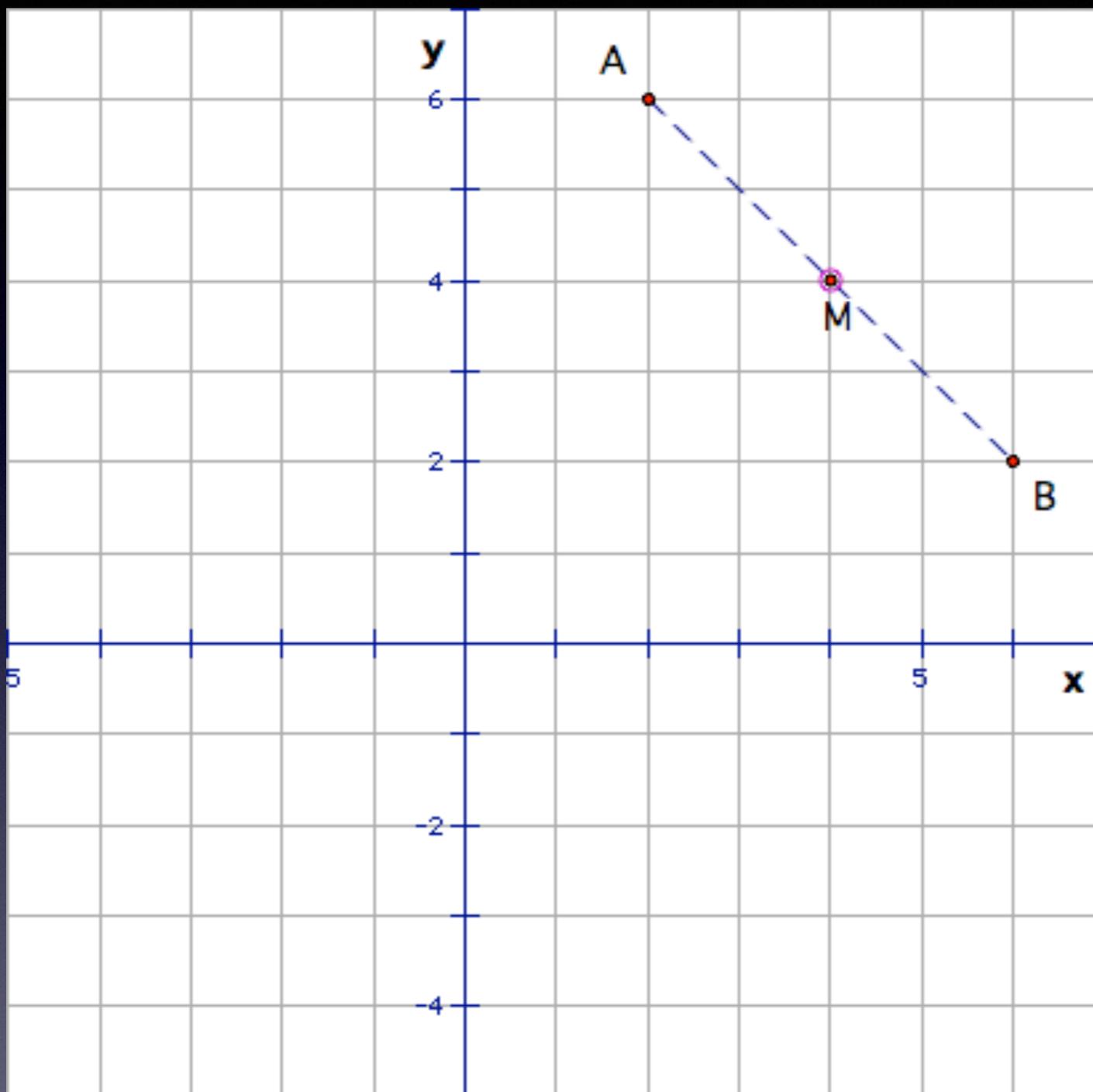
B	(6,	2)
---	-----	----



	x	y
A	(2,	6)
B	(6,	2)
M	(,)



	x	y
A	(2,	6)
B	(6,	2)
M	(4,	4)

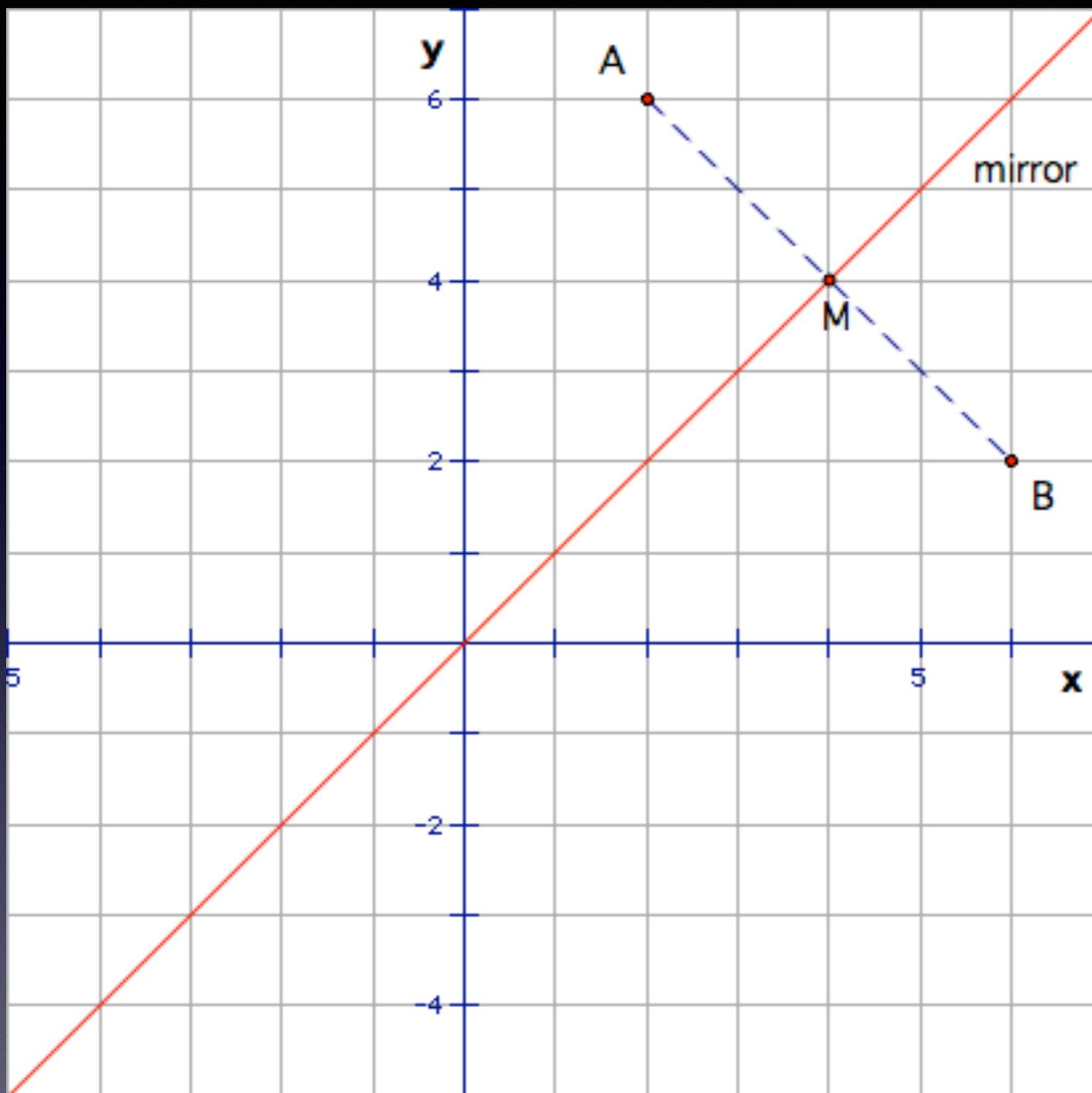


	x	y
A	(2,	6)

B	(6,	2)
---	-----	----

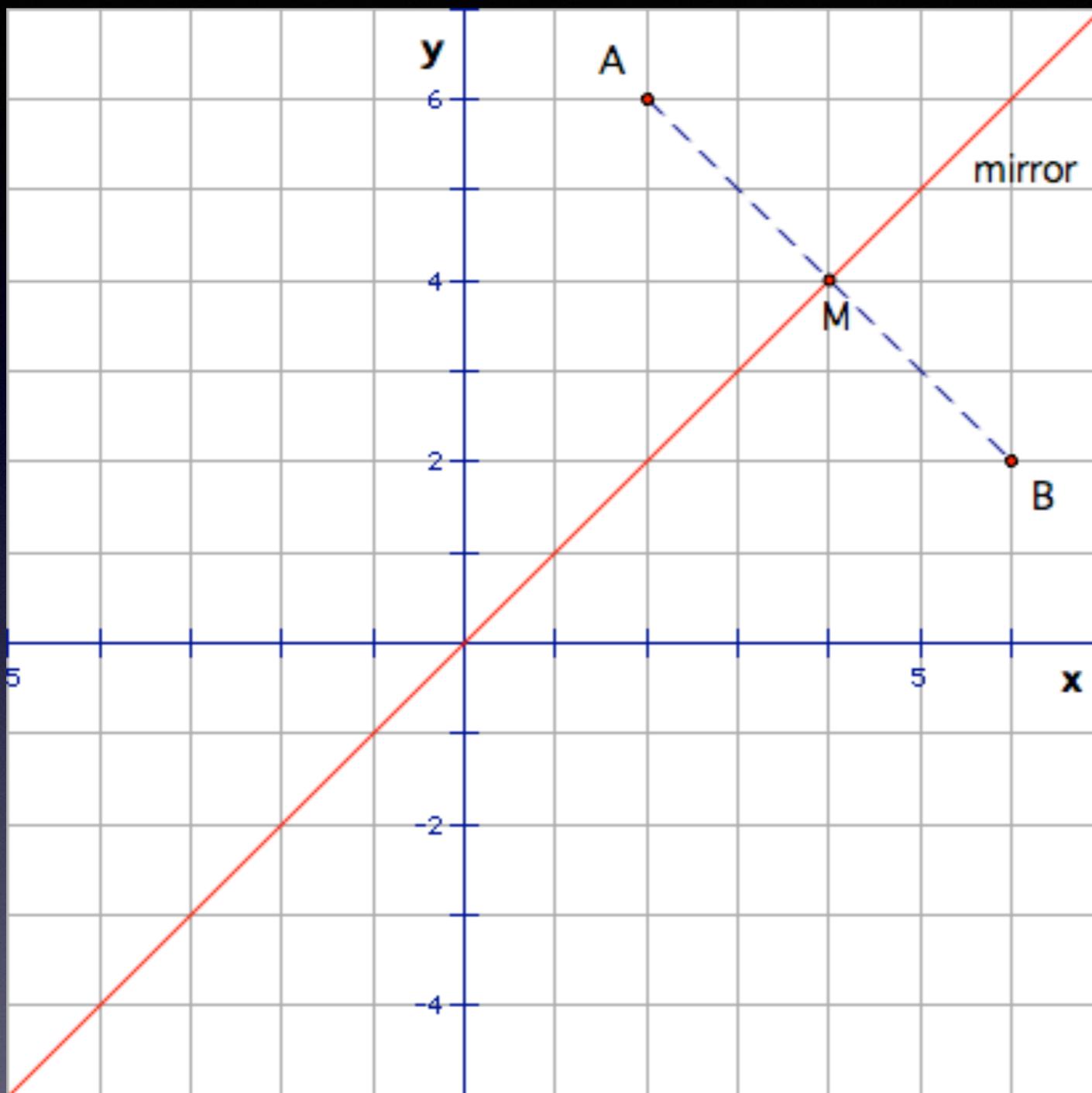
M	(4,	4)
---	-----	----

M is the midpoint
of AB.



	x	y
A	(2,	6)
B	(6,	2)
M	(4,	4)

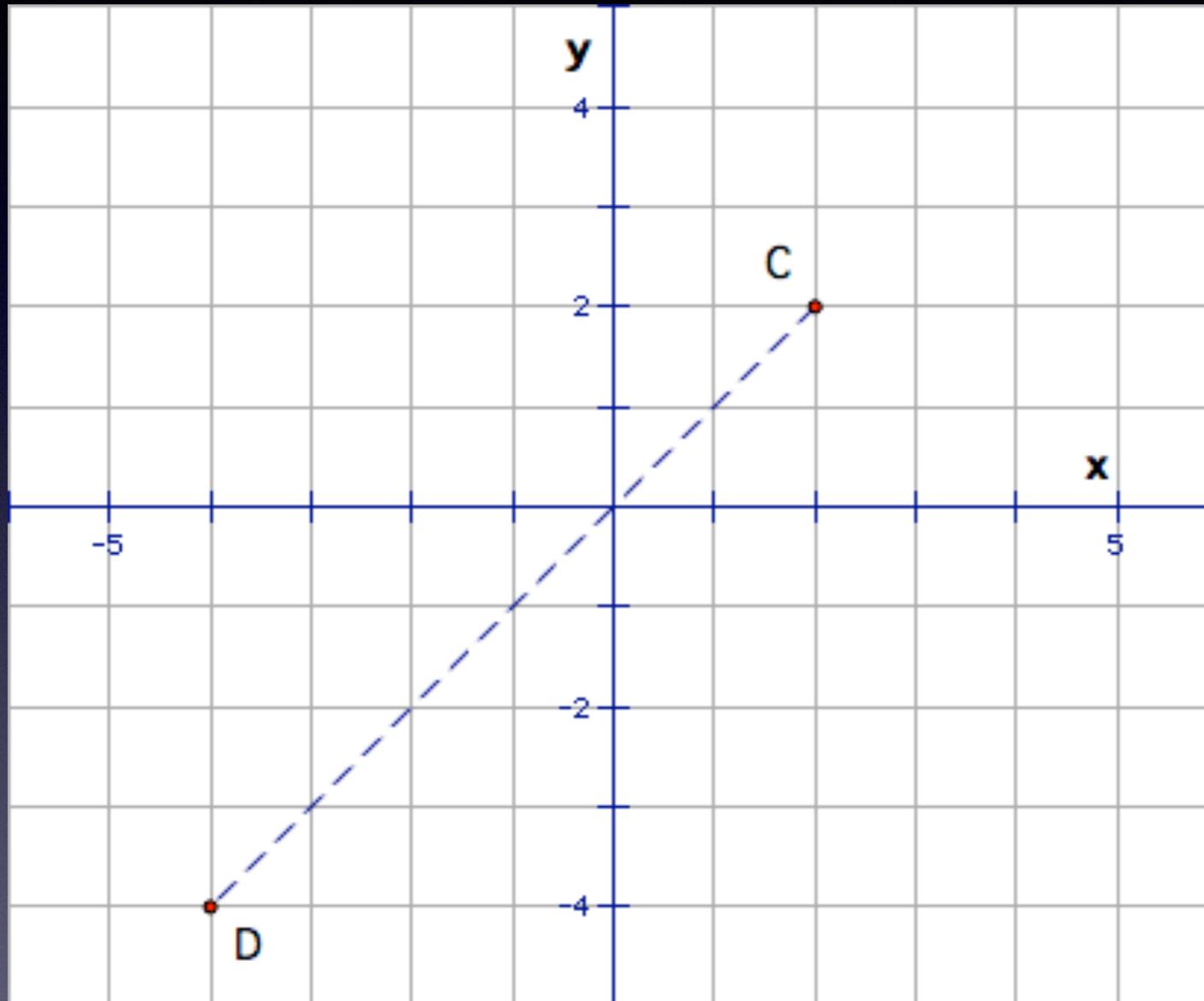
M is the midpoint
of AB.



	x	y
A	2	6
B	6	2
M	4	4

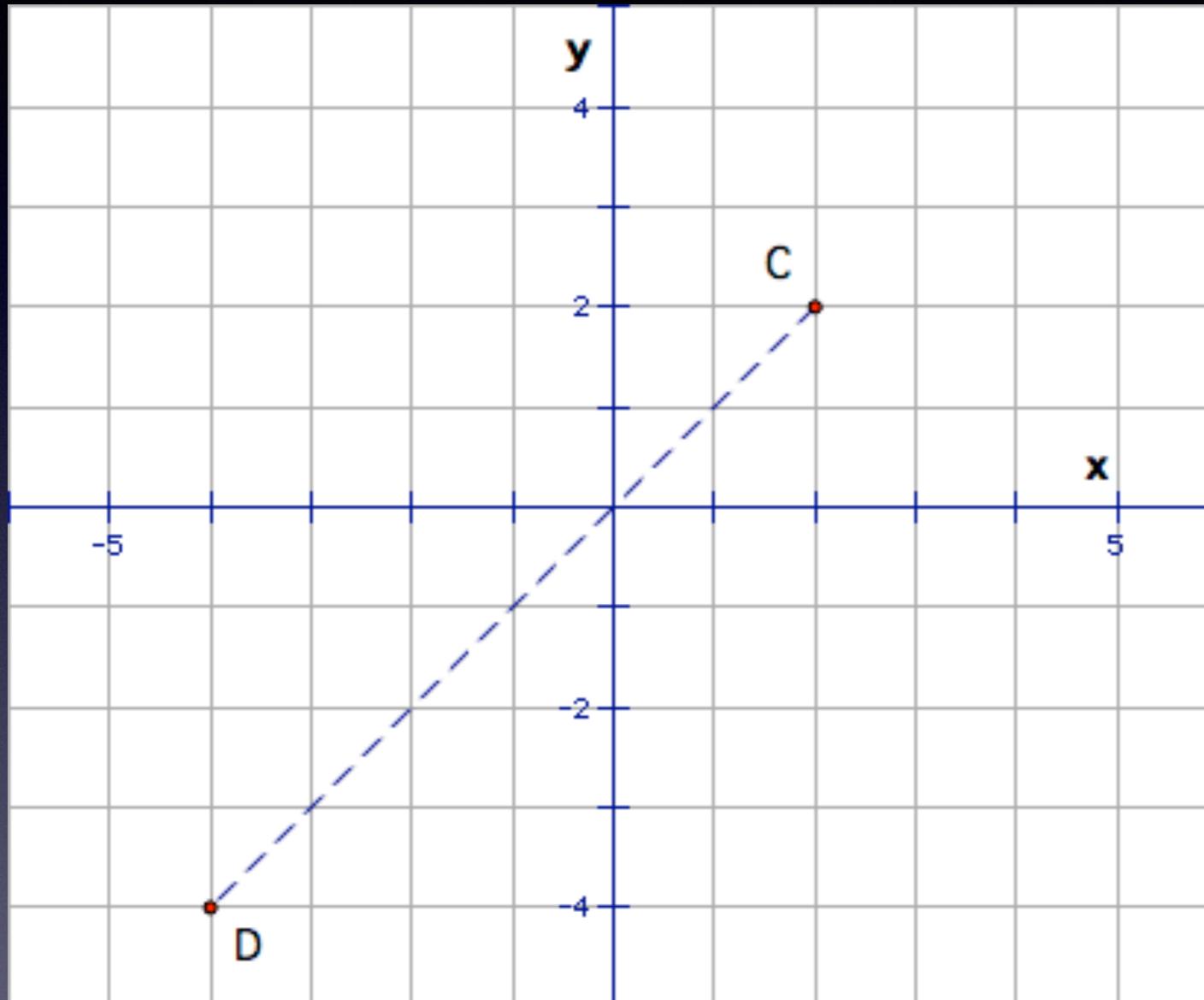
M is the midpoint of AB.

Can think of B as the “reflection” of A.



C (2, 2)

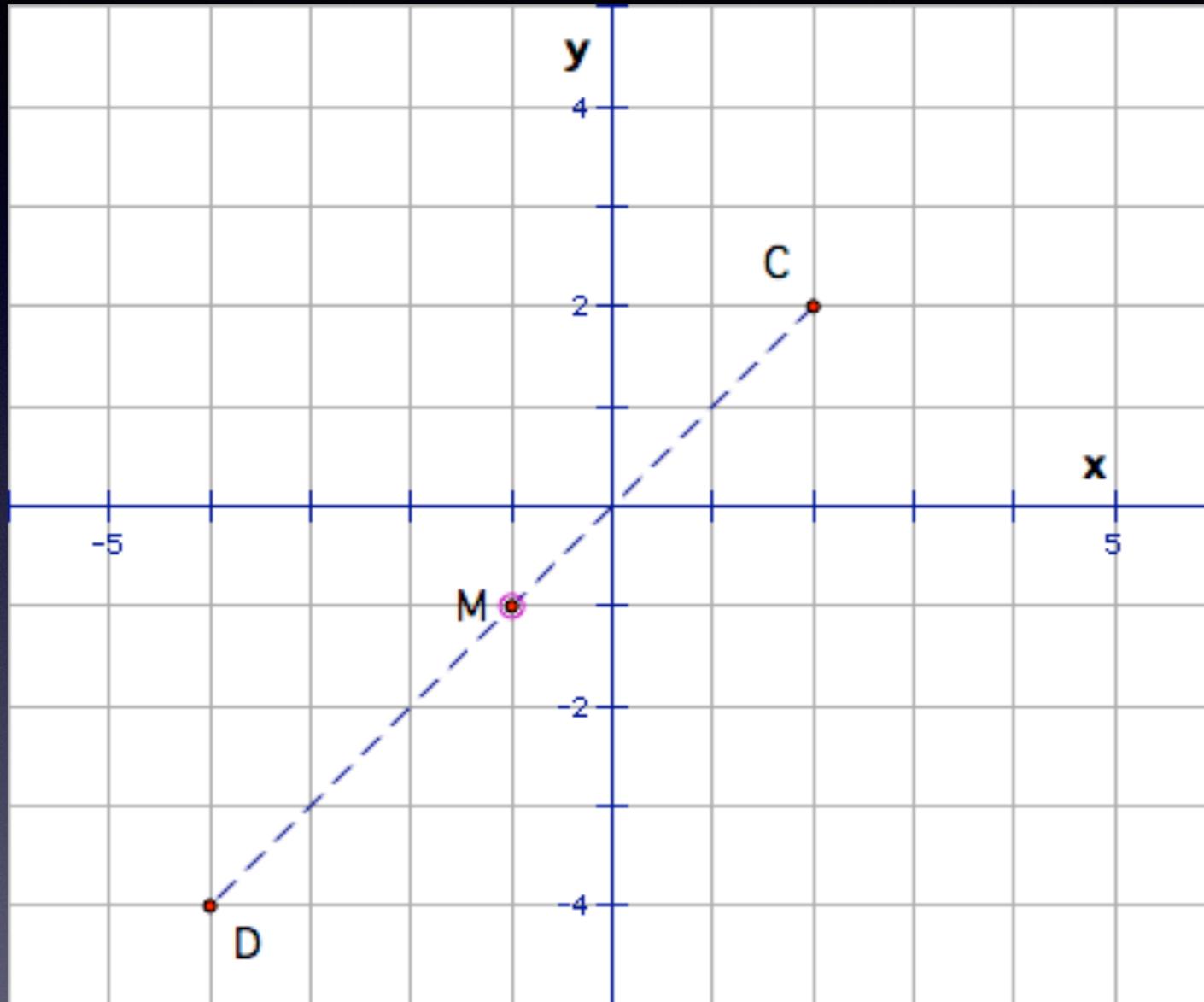
D (-4, -4)



x y

C (2, 2)

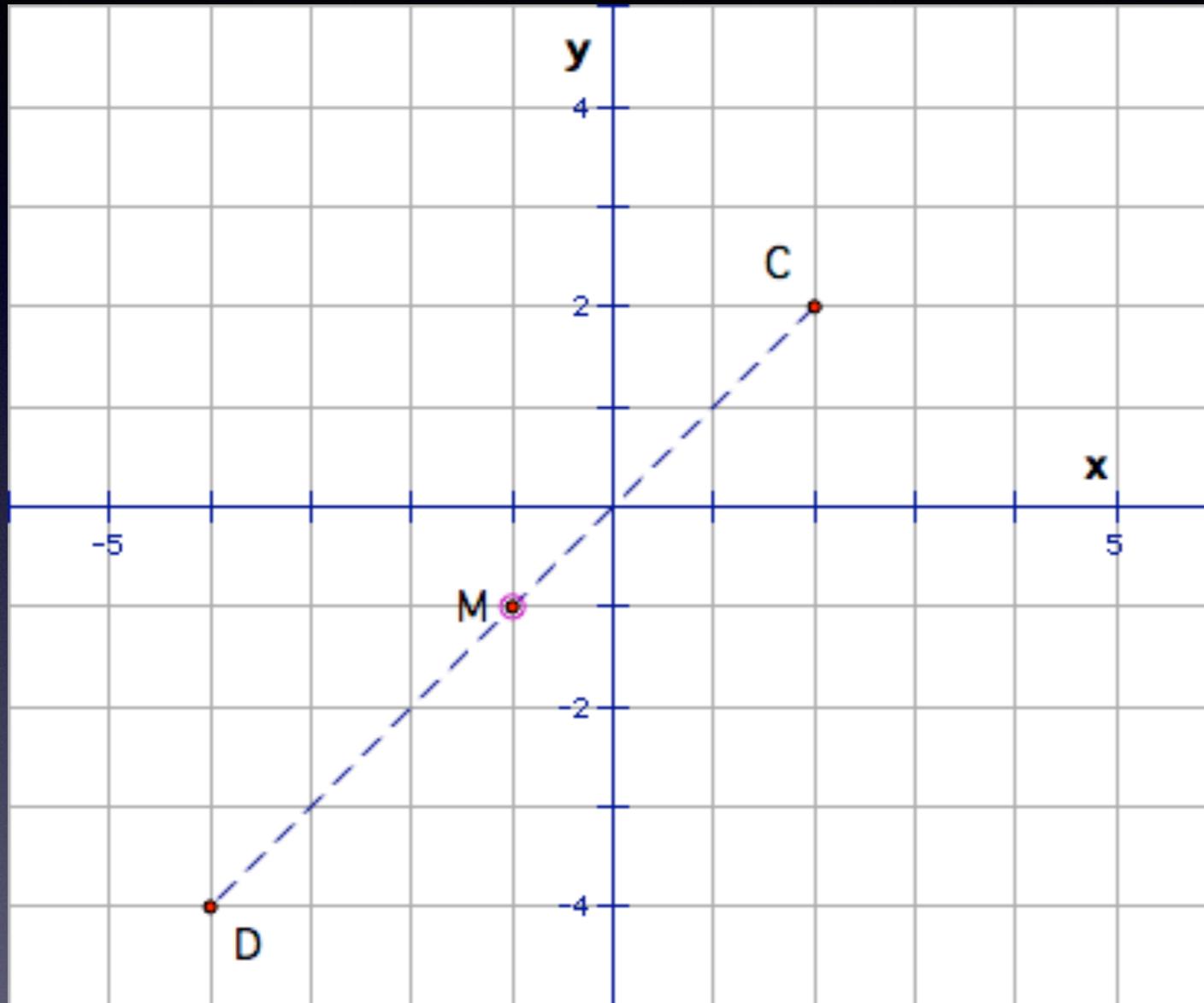
D (-4, -4)



x y

C (2, 2)

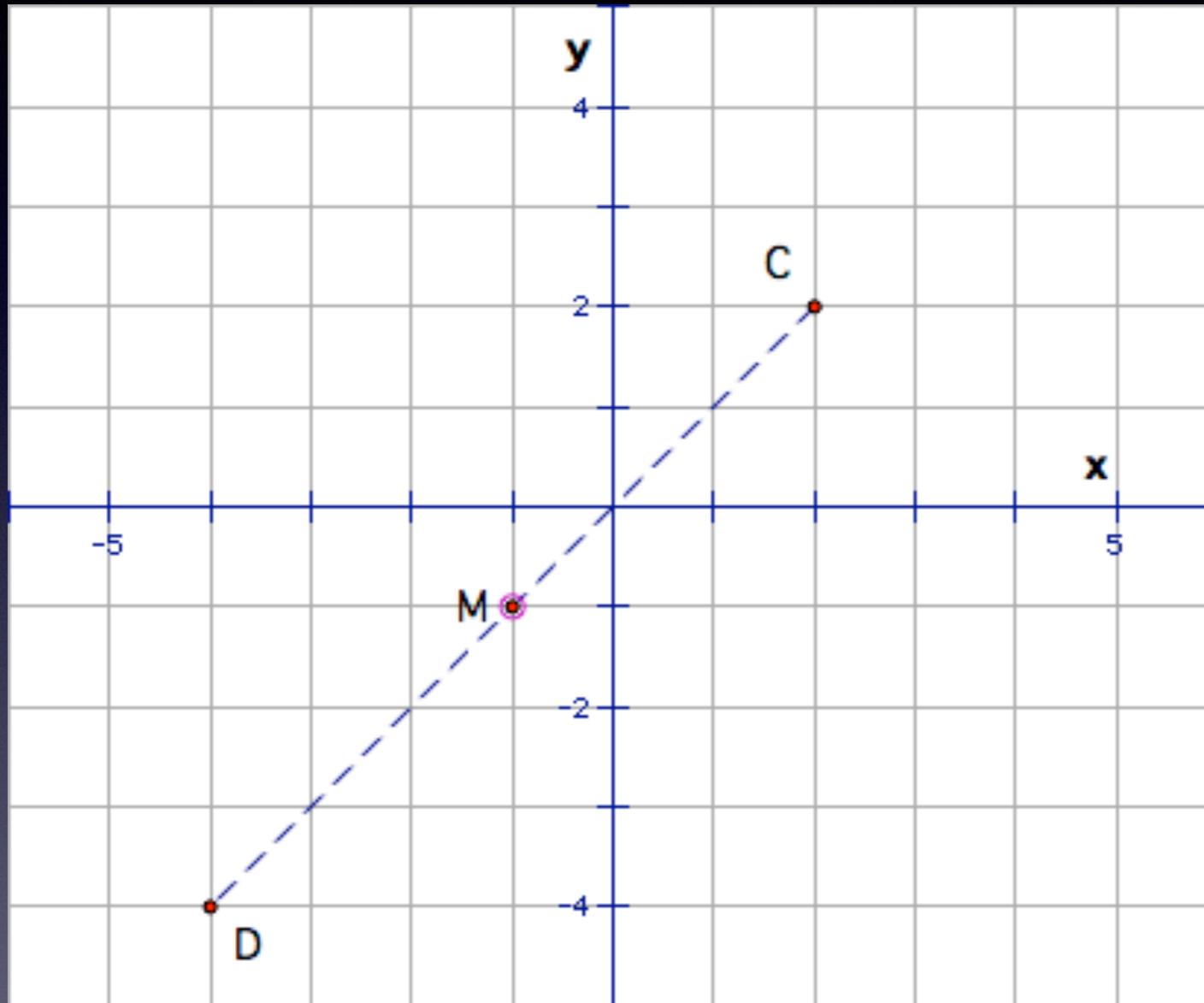
D (-4, -4)



x y
C (2, 2)

D (-4, -4)

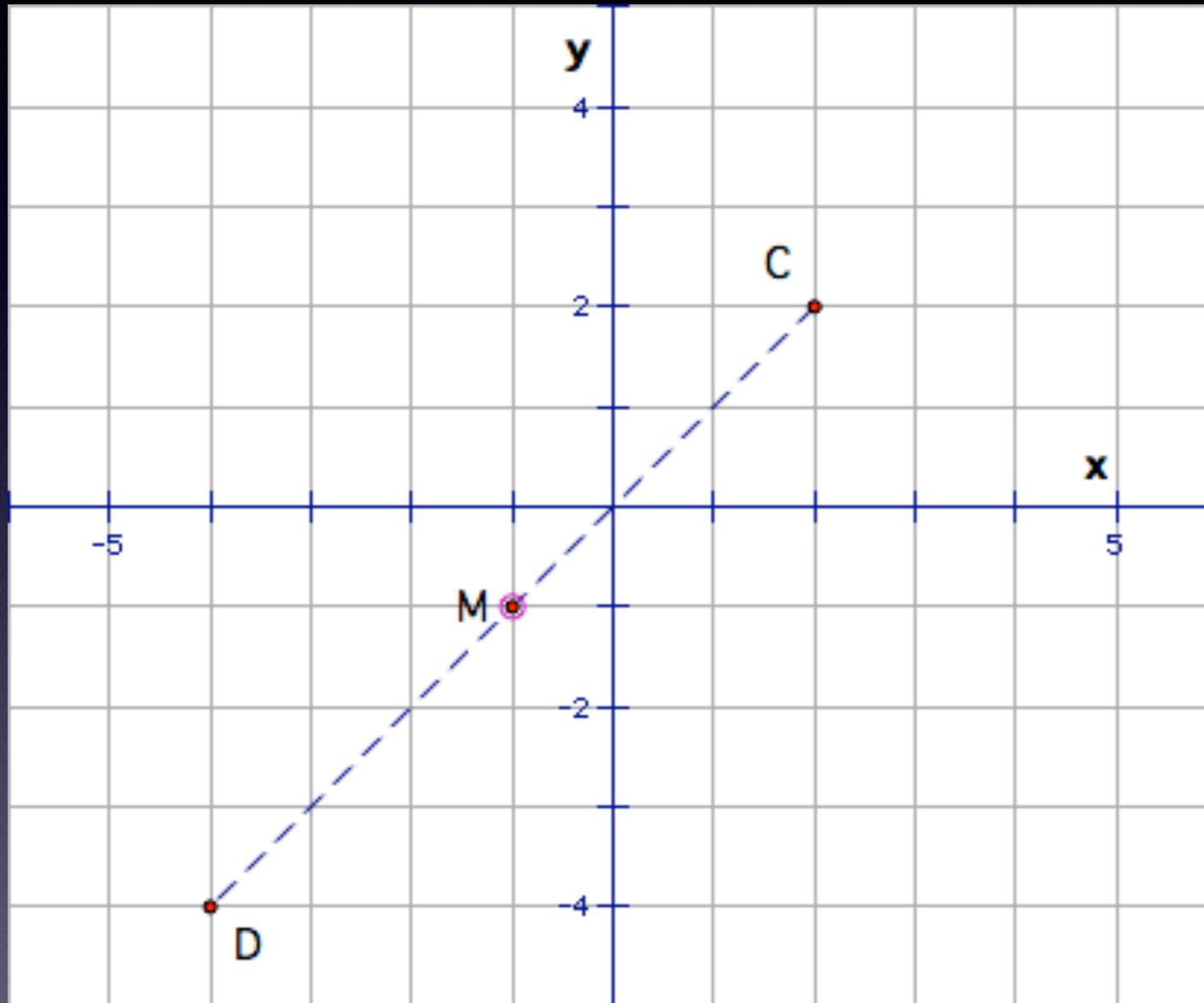
M (,)



	x	y
C	2	2

D	-4	-4
---	----	----

M	-1	-1
---	----	----



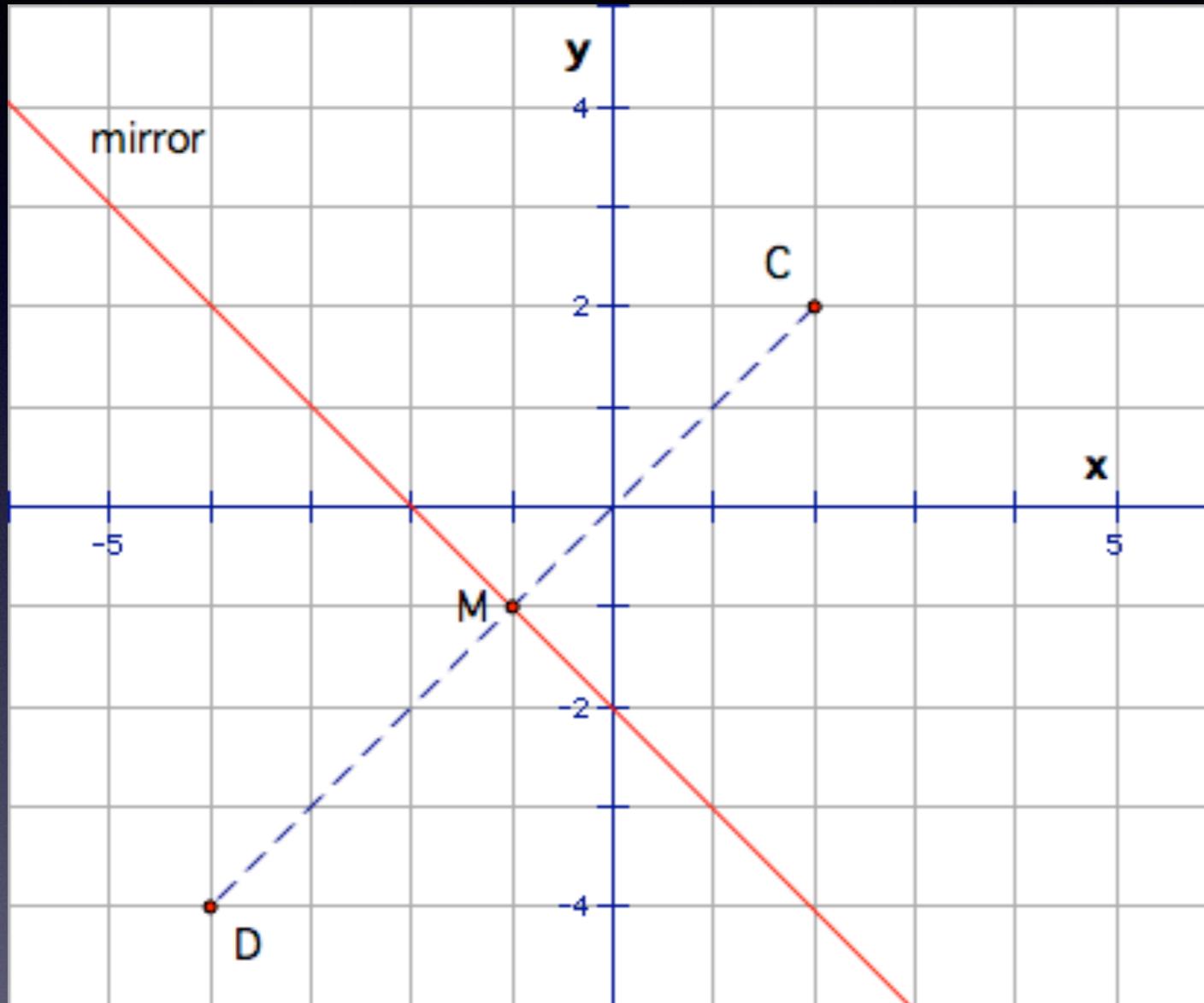
x y

C (2, 2)

D (-4, -4)

M (-1, -1)

M is the midpoint
of CD.



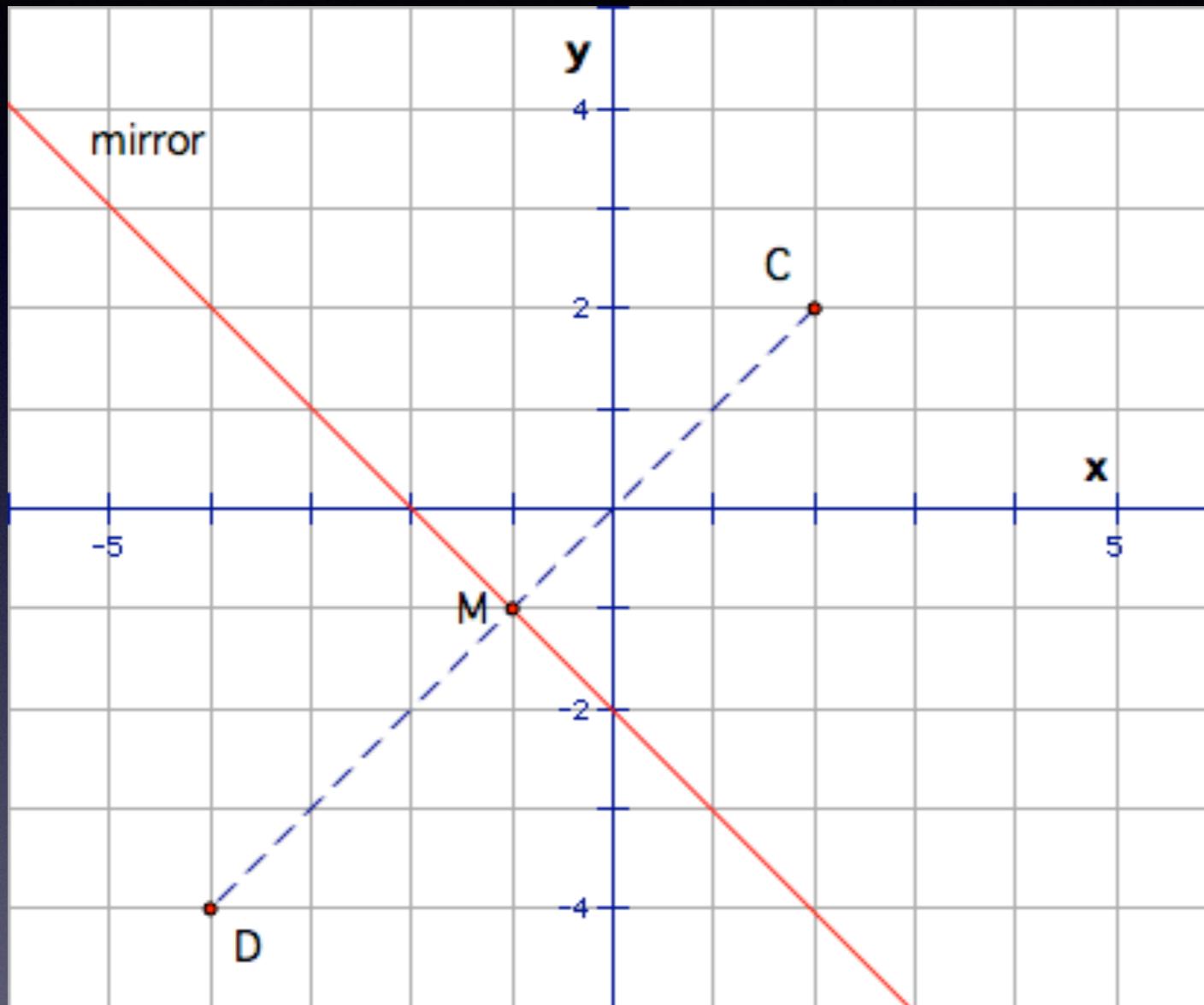
x y

C (2, 2)

D (-4, -4)

M (-1, -1)

M is the midpoint
of CD.



x y

C (2, 2)

D (-4, -4)

M (-1, -1)

M is the midpoint of CD.

Can think of D as the "reflection" of C.

In general...

In general... if A has co-ordinates (x_1, y_1) and B has co-ordinates (x_2, y_2) then the co-ordinates of the midpoint, M, are:

In general... if A has co-ordinates (x_1, y_1) and B has co-ordinates (x_2, y_2) then the co-ordinates of the midpoint, M, are:

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

In general... if A has co-ordinates (x_1, y_1) and B has co-ordinates (x_2, y_2) then the co-ordinates of the midpoint, M, are:

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

**remember
this...**

Ex. 1:

Ex. 1: Determine the co-ordinates of the midpoint, M, of the line segment with endpoints A(-2, -3) and B(4, 7).

Ex. 1: Determine the co-ordinates of the midpoint, M, of the line segment with endpoints A(-2, -3) and B(4, 7).

x_1 y_1

Ex. 1: Determine the co-ordinates 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

Ex. 1: Determine the co-ordinates 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

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

Ex. 1: Determine the co-ordinates 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

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

$$= \left(\frac{-2 + 4}{2}, \frac{-3 + 7}{2} \right)$$

Ex. 1: Determine the co-ordinates 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

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

$$= \left(\frac{-2 + 4}{2}, \frac{-3 + 7}{2} \right)$$

$$= \left(\frac{2}{2}, \frac{4}{2} \right)$$

Ex. 1: Determine the co-ordinates 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

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

$$= \left(\frac{-2 + 4}{2}, \frac{-3 + 7}{2} \right)$$

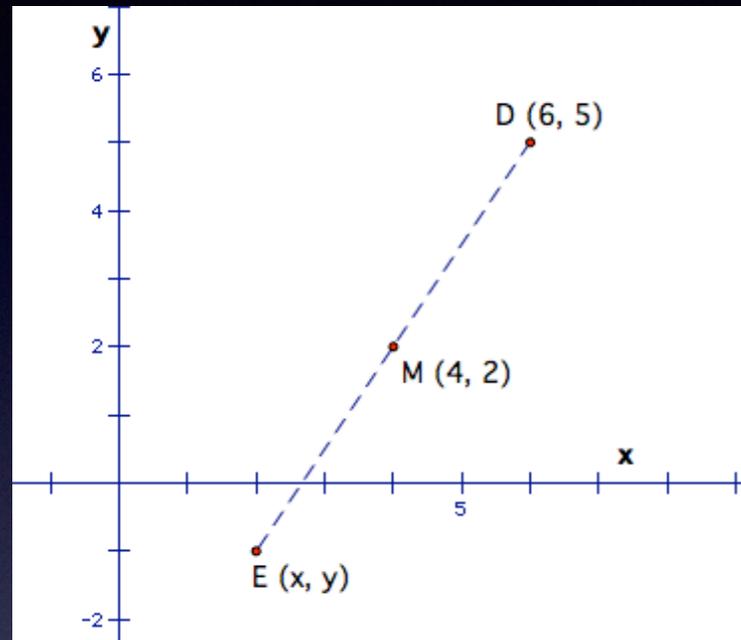
$$= \left(\frac{2}{2}, \frac{4}{2} \right)$$

$$= (1, 2)$$

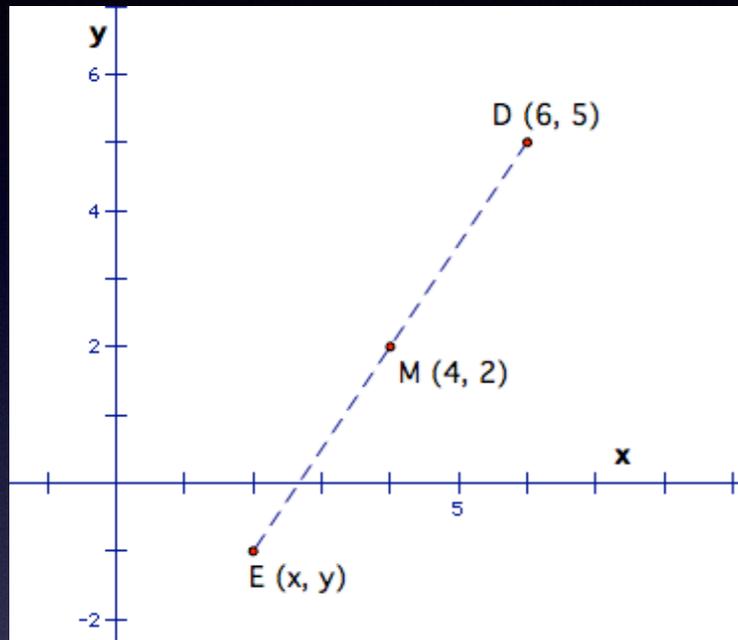
Ex. 2:

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.

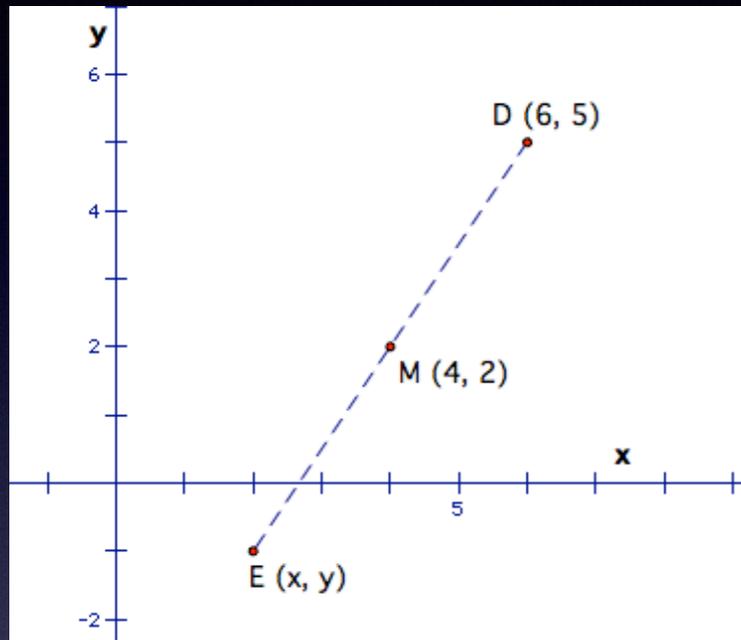


Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.



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

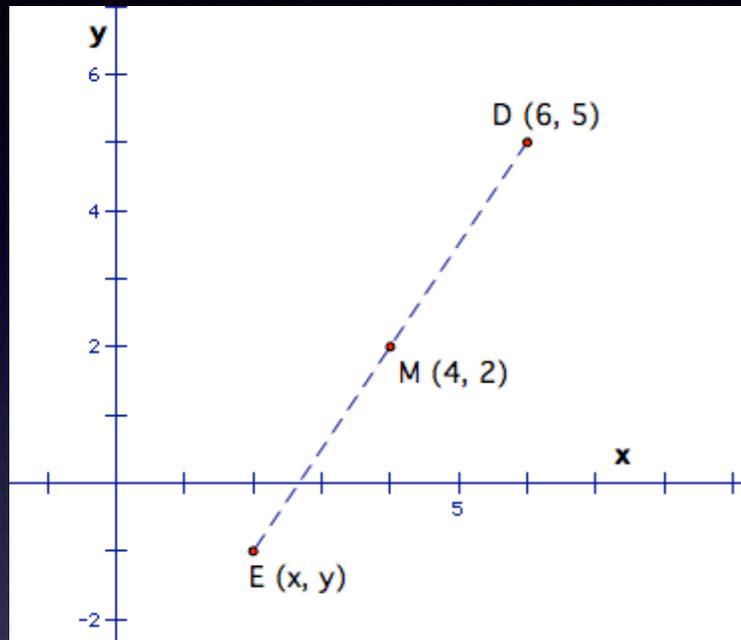
Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.



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

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.

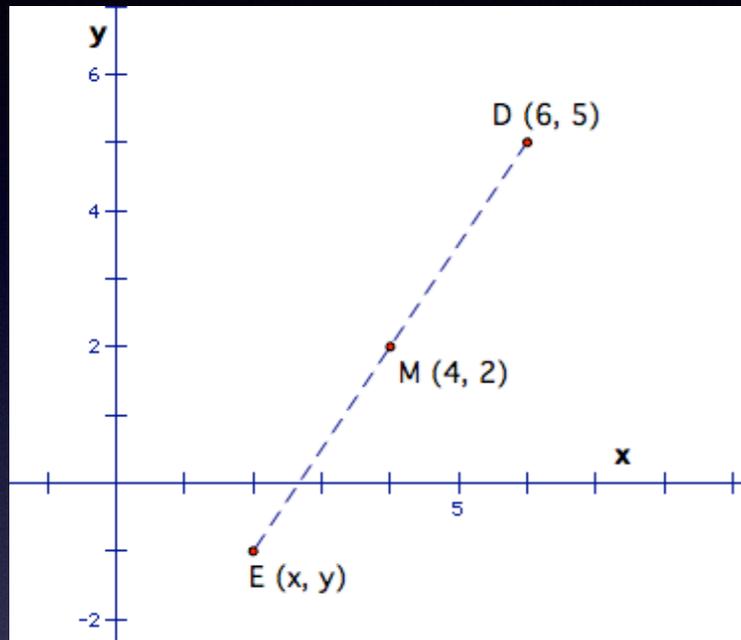


$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

$$4 = \frac{6 + x}{2}$$

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.

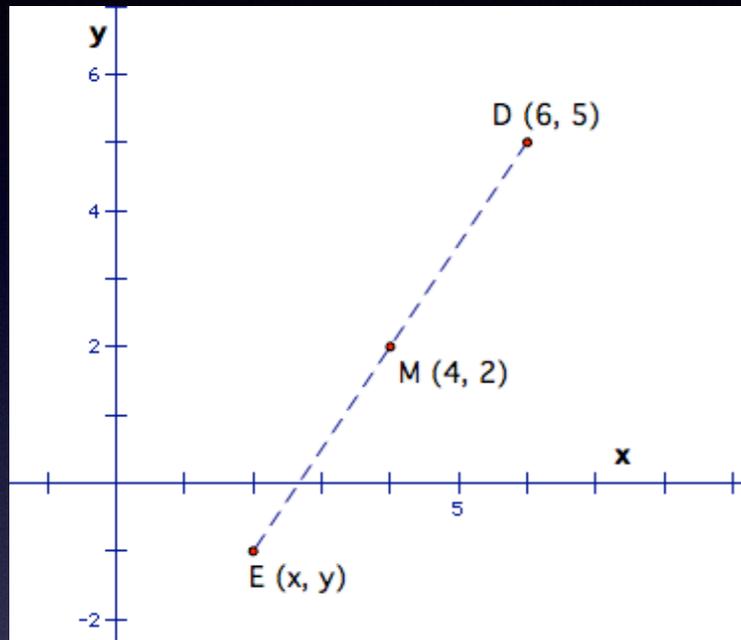


$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

$$4 = \frac{6 + x}{2} \quad \text{and} \quad 2 = \frac{5 + y}{2}$$

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.



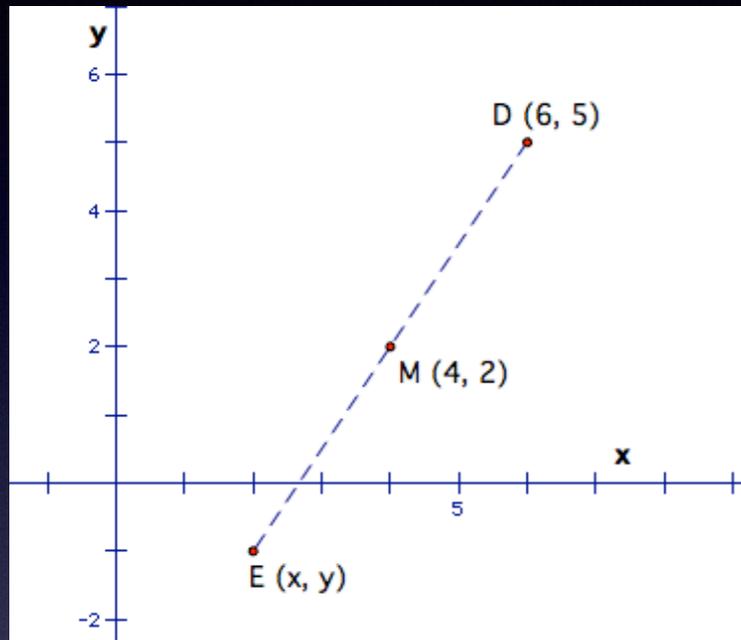
$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

$$4 = \frac{6 + x}{2} \quad \text{and} \quad 2 = \frac{5 + y}{2}$$

$$x = 2$$

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.



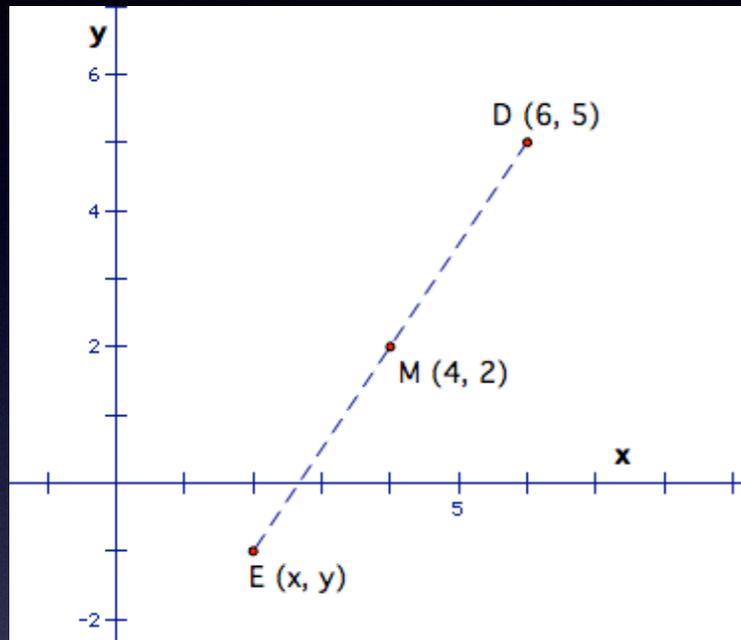
$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

$$4 = \frac{6 + x}{2} \quad \text{and} \quad 2 = \frac{5 + y}{2}$$

$$x = 2 \qquad y = -1$$

Ex. 2: For a line segment DE, one endpoint is D(6, 5) and the midpoint is M(4, 2). Find the co-ordinates of endpoint E.



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

$$(4, 2) = \left(\frac{6 + x}{2}, \frac{5 + y}{2} \right)$$

$$4 = \frac{6 + x}{2} \quad \text{and} \quad 2 = \frac{5 + y}{2}$$

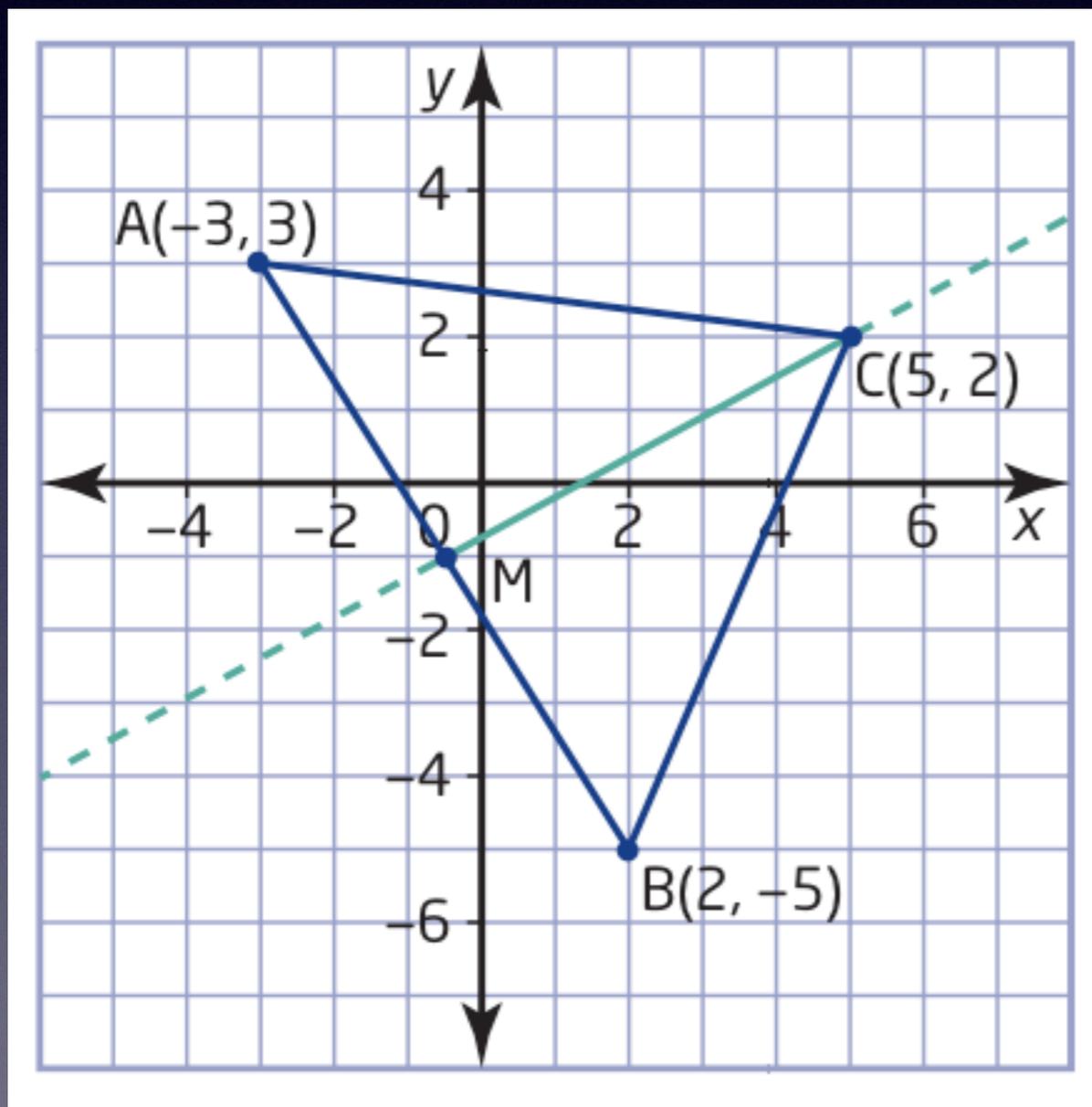
$$x = 2$$

$$y = -1$$

$$\therefore E(2, -1)$$

Ex. 3

Determine an equation for the median from vertex C for the triangle with vertices $C(5, 2)$, $A(-3, 3)$, and $B(2, -5)$.



HINT: If you are stuck on what a question is asking, consult your Geometry Glossary notes!

Let's work on this question in pairs at the whiteboard.