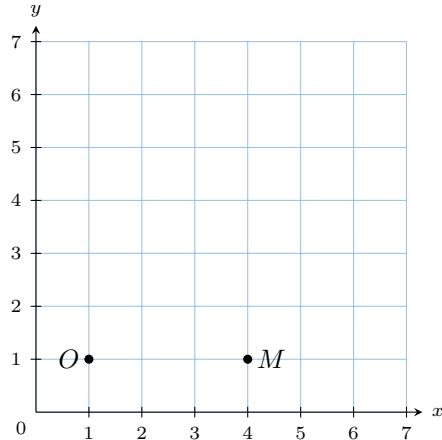


ROTATION

A WHAT IS A ROTATION?

A.1 FINDING THE IMAGE OF A POINT UNDER A 90° ROTATION

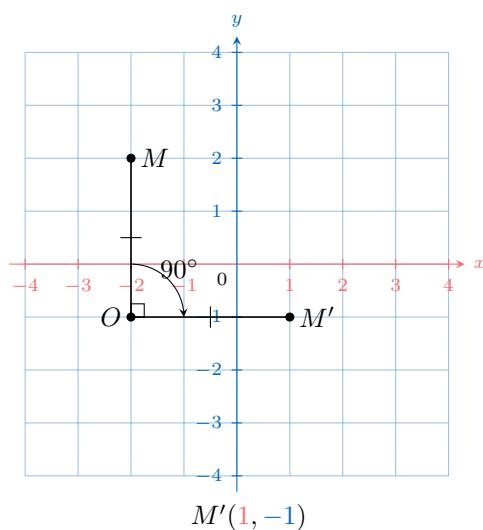
Ex 1: Find the coordinates of the image of point M under a rotation of 90° counterclockwise about center O .



$$M'([1], [4])$$

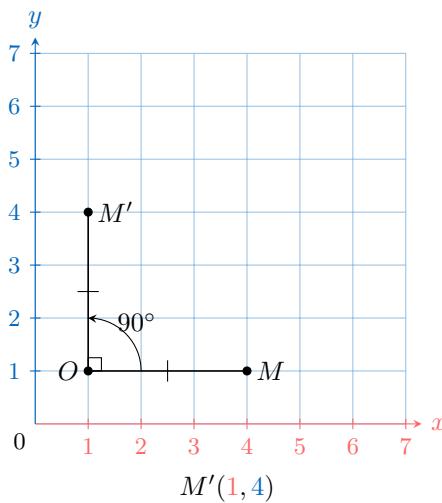
Answer:

$$M'([1], [-1])$$



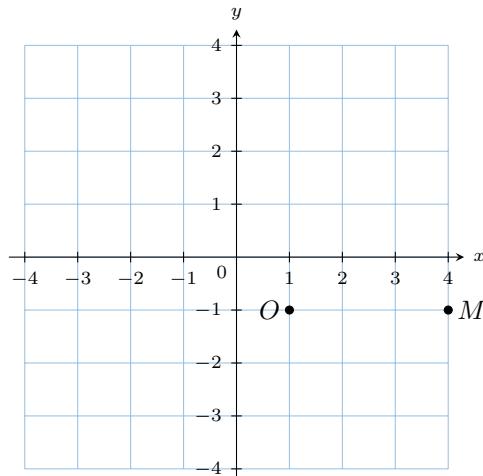
$$M'([1], [-1])$$

Ex 3: Find the coordinates of the image of point M under a rotation of 90° counterclockwise about center O .



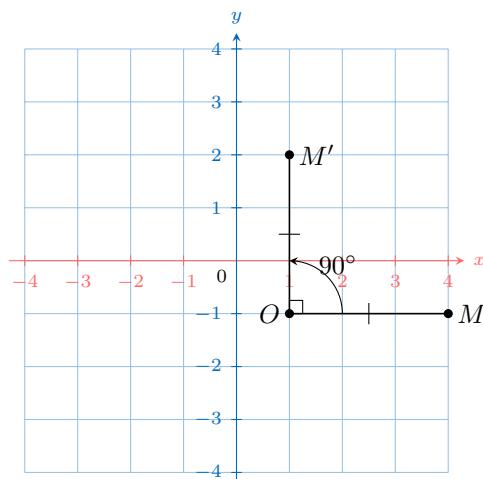
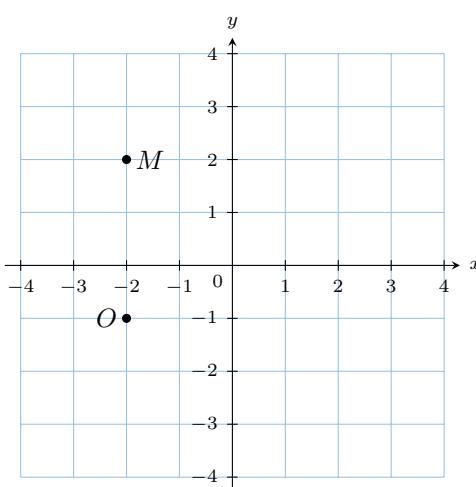
$$M'([1], [4])$$

Answer:



$$M'([1], [2])$$

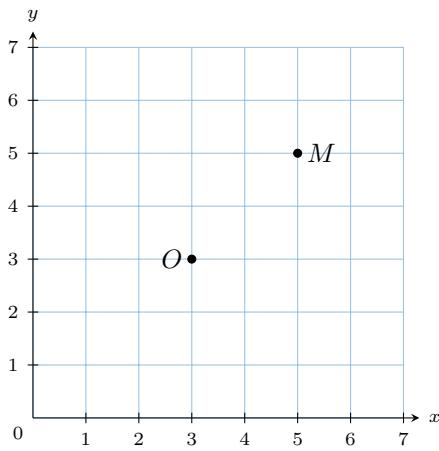
Answer:



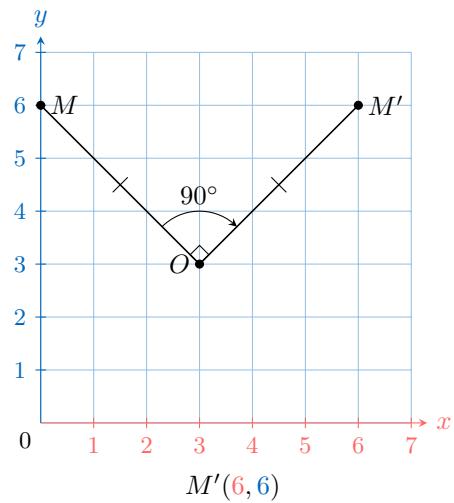
$$M'([1], [2])$$

Ex 2: Find the coordinates of the image of point M under a rotation of 90° clockwise about center O .

Ex 4: Find the coordinates of the image of point M under a rotation of 90° counterclockwise about center O .



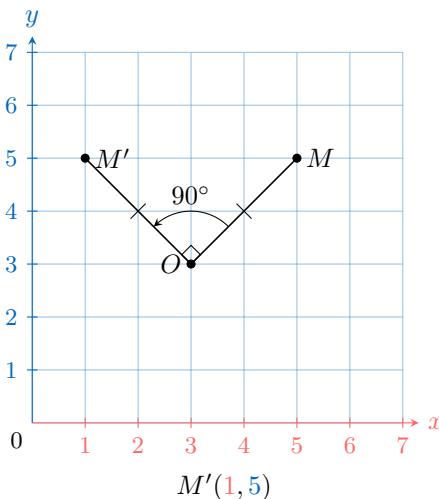
$$M'([1], [5])$$



$$M'([6], [6])$$

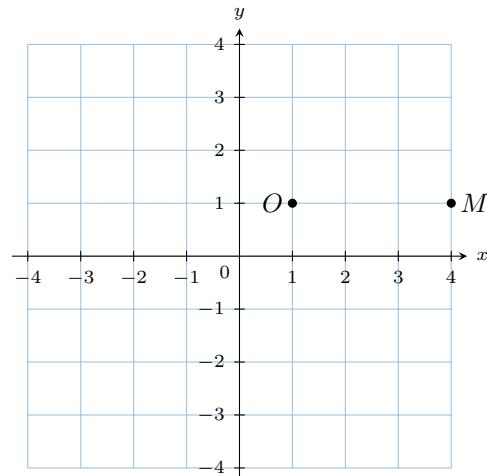
A.2 FINDING THE IMAGE OF A POINT UNDER A 180° ROTATION

Answer:



$$M'([1], [5])$$

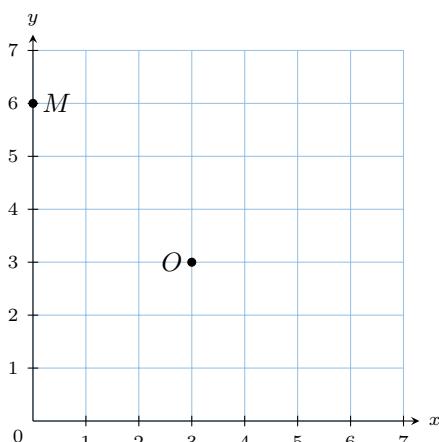
Ex 6: Find the coordinates of the image of point M under a rotation of 180° about center O .



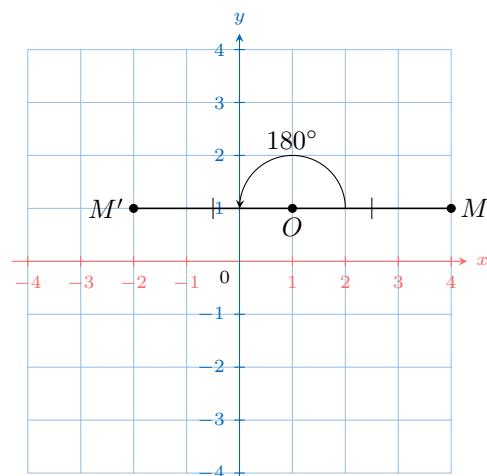
$$M'([-2], [1])$$

Ex 5: Find the coordinates of the image of point M under a rotation of 90° clockwise about center O .

Answer:



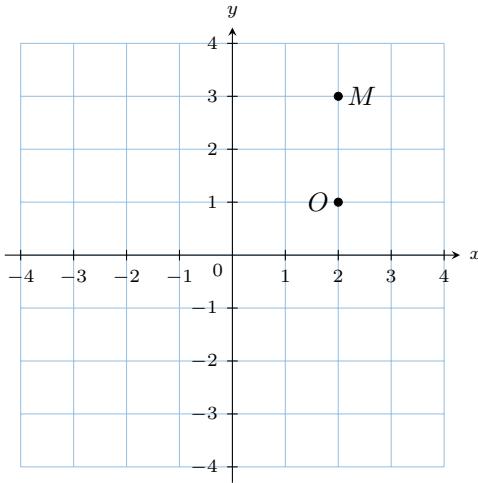
$$M'([6], [6])$$



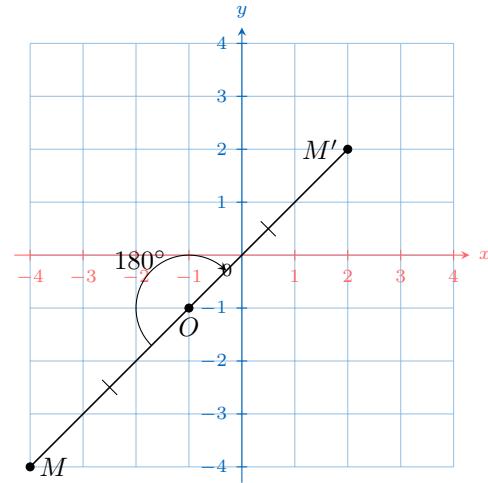
$$M'([-2], [1])$$

Ex 7: Find the coordinates of the image of point M under a rotation of 180° about center O .

Answer:



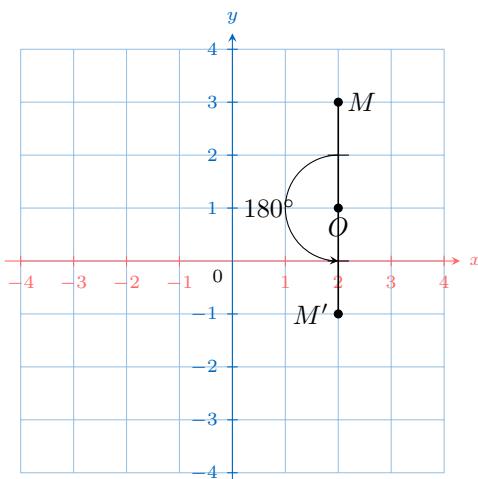
$$M'([2], [-1])$$



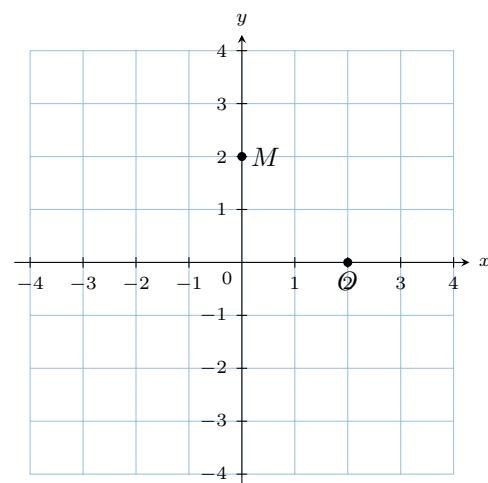
$$M'(\textcolor{red}{2}, \textcolor{blue}{-1})$$

Ex 9: Find the coordinates of the image of point M under a rotation of 180° about center O .

Answer:



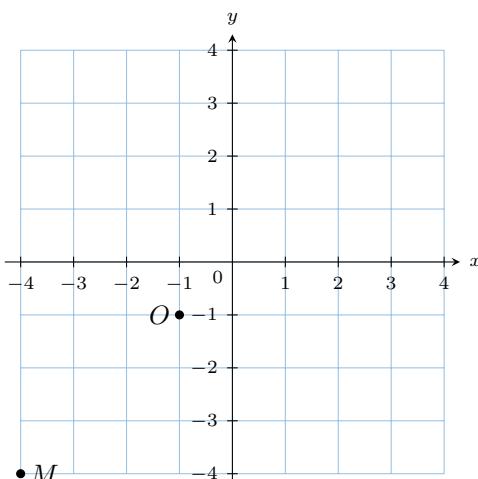
$$M'(\textcolor{red}{2}, \textcolor{blue}{-1})$$



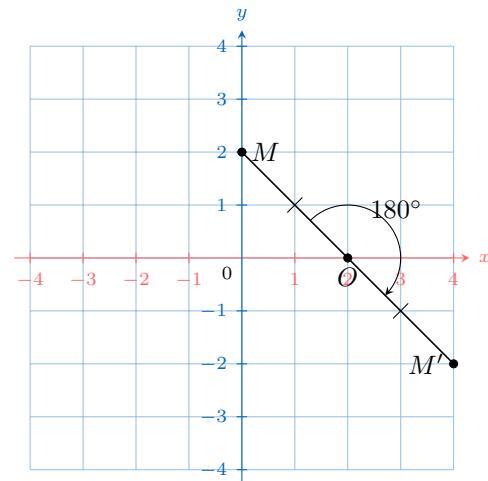
$$M'(\textcolor{red}{4}, \textcolor{blue}{-2})$$

Ex 8: Find the coordinates of the image of point M under a rotation of 180° about center O .

Answer:



$$M'(\textcolor{red}{2}, \textcolor{blue}{2})$$

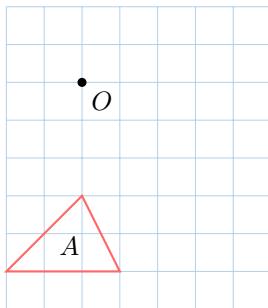


$$M'(\textcolor{red}{4}, \textcolor{blue}{-2})$$

A.3 DRAWING IMAGES OF FIGURES

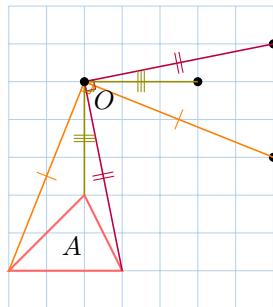
Ex 10: Draw the figure A' , the image of figure A under a rotation of 90° counterclockwise about center O .

Answer:

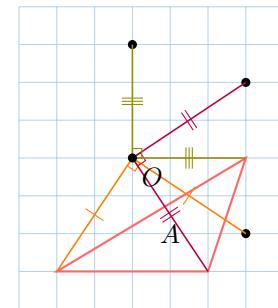


Answer:

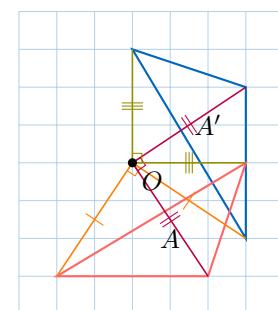
1. **Draw the image vertices:** For each vertex, locate its position relative to center O and rotate it 90° counterclockwise. Place the new points on the grid.



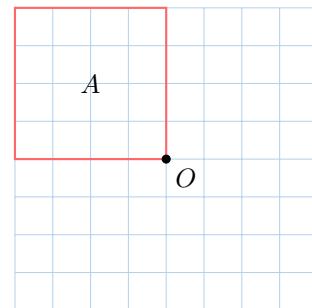
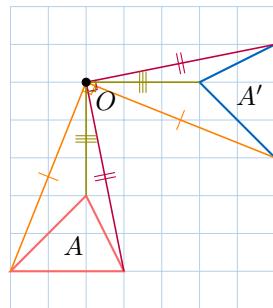
2. **Draw the image figure:** Connect the image vertices with lines in the same order as the original figure.



2. **Draw the image figure:** Connect the image vertices with lines in the same order as the original figure.

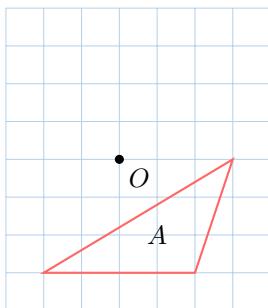


Ex 12: Draw the figure A' , the image of figure A under a rotation of 90° clockwise about center O .



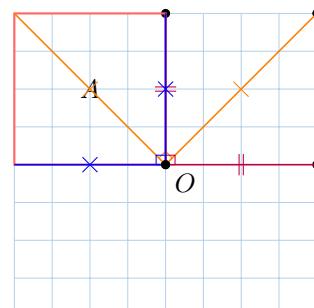
Answer:

Ex 11: Draw the figure A' , the image of figure A under a rotation of 90° counterclockwise about center O .



Answer:

1. **Draw the image vertices:** For each vertex, locate its position relative to center O and rotate it 90° counterclockwise by swapping the relative coordinates and negating the new x-coordinate (i.e., for a point at (x, y) relative to $O(x_O, y_O)$, move to $(-y, x)$ relative to O). Place the new points on the grid.



2. **Draw the image figure:** Connect the image vertices with lines in the same order as the original figure.

