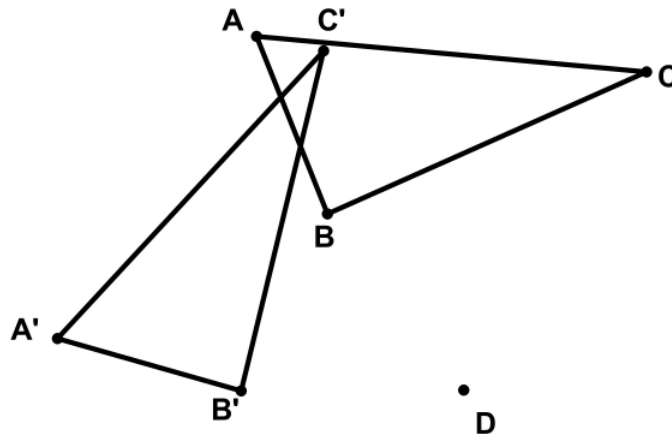


## ROTATIONS

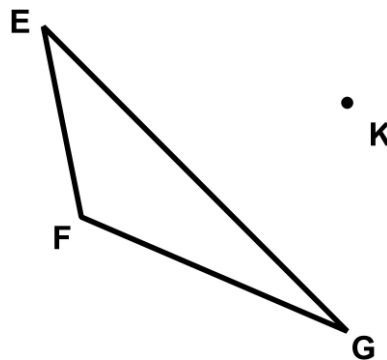
### COMMON CORE GEOMETRY HOMEWORK

#### MEASUREMENT AND CONSTRUCTION

1. Given the rotation of  $\triangle ABC$  shown below, determine the counter-clockwise angle of rotation that occurred about point D. Show all relevant lines and measurements you made to determine your answer.



2. Using only a straightedge and a compass, construct the image of  $\triangle EFG$  after a rotation by  $180^\circ$  about point K shown. Leave all construction marks. Mark the image  $\triangle E'F'G'$ .



3. Construct a line  $\overline{AB}$  such that it is parallel to  $\overline{RS}$  shown below. Use only a straightedge and compass. Leave all construction marks. (Hint, plot a third point not on the line and rotate about this point.)

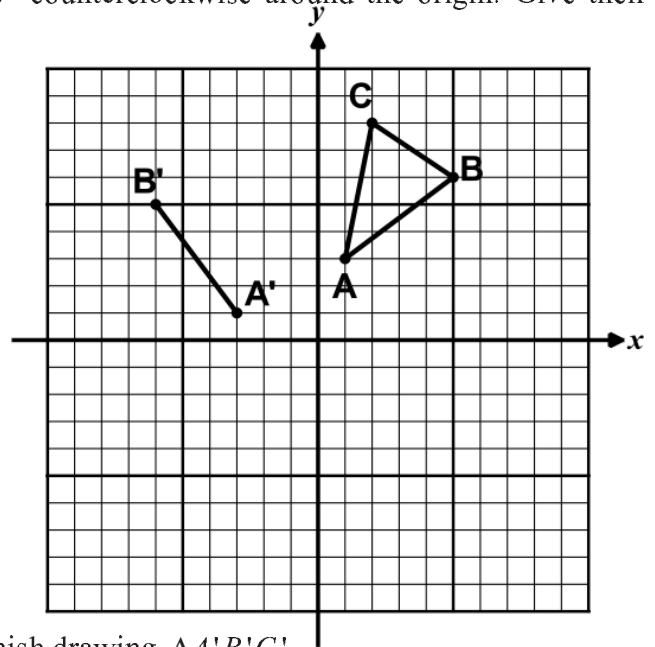


## PROBLEM SOLVING

4. In the grid below, points A and B have been rotated  $90^\circ$  counterclockwise around the origin. Give their image coordinates.

$$A(1, 3) \rightarrow$$

$$B(5, 6) \rightarrow$$



5. Which of the following algebraic rules is equivalent to the rotation in #4?

(1)  $(x, y) \rightarrow (y, x)$

(2)  $(x, y) \rightarrow (-x, y)$

(3)  $(x, y) \rightarrow (-y, x)$

(4)  $(x, y) \rightarrow (-x, -y)$

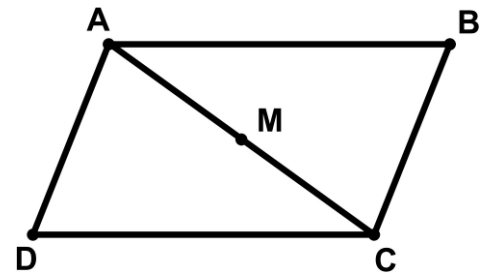
6. Find the image of C using the same rotation. Plot it and finish drawing  $\triangle A'B'C'$ .

## REASONING

7. Parallelograms are four sided figures that have two pairs of opposite, parallel sides. Quadrilateral  $ABCD$  shown below is a parallelogram. One of its two diagonals,  $\overline{AC}$ , is drawn and its midpoint  $M$  is located. Use tracing paper in this problem to help you answer the following questions.

- (a) If  $\overline{CD}$  was rotated  $180^\circ$  about  $M$ , explain why it would have to lie on top of  $\overline{AB}$ .

- (b) For the same reason, if  $\overline{AD}$  was rotated  $180^\circ$  about  $M$ , what line would it lie on top of?



- (c) At what point would the images of  $\overline{CD}$  and  $\overline{AD}$  have to intersect? Based on this, what can you conclude about opposite sides and opposite angles of a parallelogram? Explain your answer.

