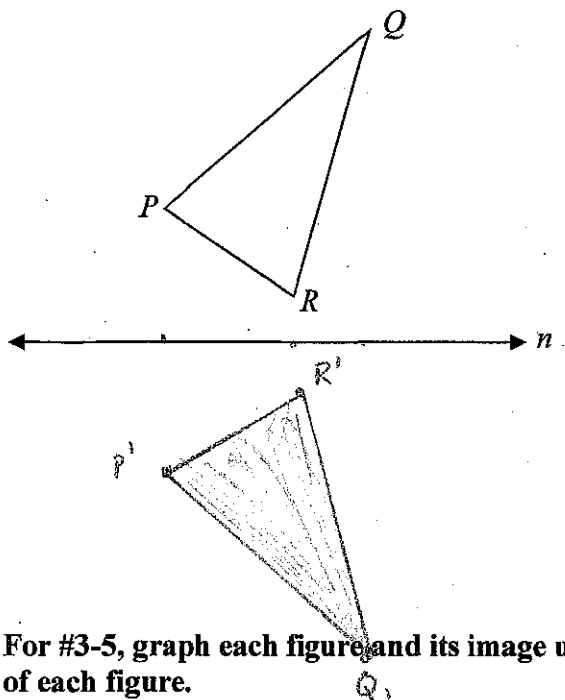


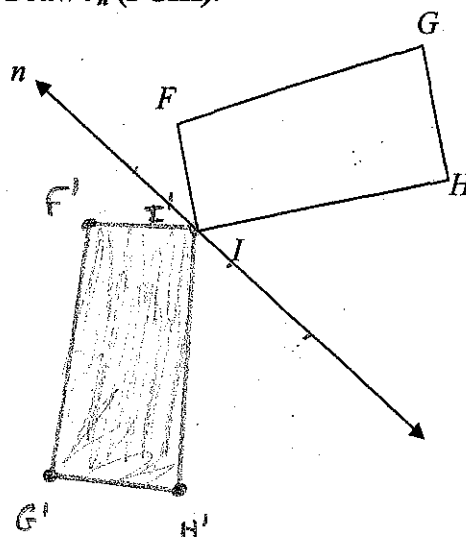
ASSIGNMENT

For #1-2, perform the transformation, then label the image.

1. Draw $r_n(PQR)$.

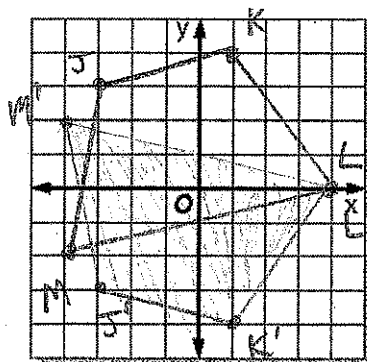


2. Draw $r_n(FGHI)$.



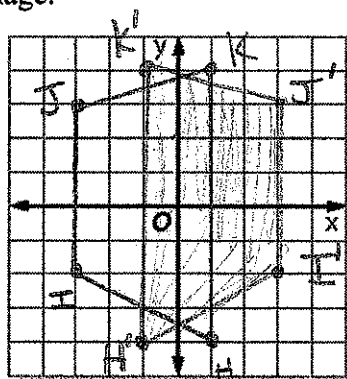
For #3-5, graph each figure and its image under the given reflection. Record the coordinates of the image of each figure.

3. Graph $JKLM$ with vertices $J(-3, 3)$, $K(1, 4)$, $L(4, 0)$, $M(-4, -2)$. Draw $r_{x\text{-axis}}(JKLM)$ and record the coordinates of the image.



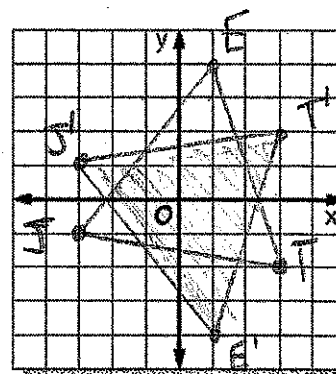
- $J'(-3, -3)$
- $K'(1, -4)$
- $L'(4, 0)$
- $M'(-4, 2)$

4. Graph HJK with vertices $H(1, -4)$, $I(-3, -2)$, $J(-3, 3)$, $K(1, 4)$. Draw $r_{y\text{-axis}}(HJK)$ and record the coordinates of the image.



- $H'(-1, -4)$
- $I'(3, -2)$
- $J'(3, 3)$
- $K'(-1, 4)$

5. Graph $\triangle JET$ with vertices $J(-3, -1)$, $E(1, 4)$, $T(3, -2)$. Draw $r_{x\text{-axis}}(\triangle JET)$ and record the coordinates of the image.

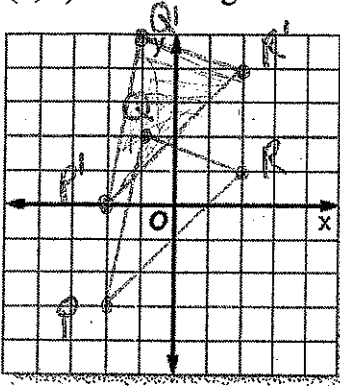


- $J'(-3, 1)$
- $E'(1, -4)$
- $T'(3, 2)$

ASSIGNMENT

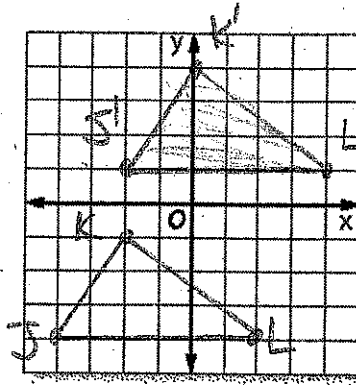
For #1-4, graph each figure and its image under the given translation. Record the coordinates of the image.

1. Graph $\triangle PQR$ with $P(-2, -3)$, $Q(-1, 2)$, and $R(2, 1)$ and its image under the translation $T_{(0, 3)}$.



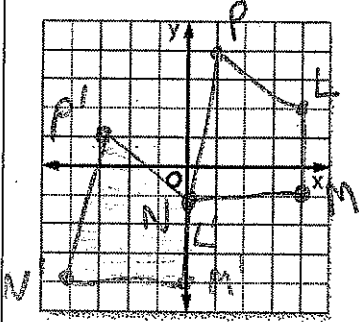
$P'(-2, 0)$
 $Q'(-1, 5)$
 $R'(2, 4)$

2. $\triangle JKL$ with vertices $J(-4, -4)$, $K(-2, -1)$, and $L(2, -4)$ under the translation $(x, y) \rightarrow (x + 2, y + 5)$



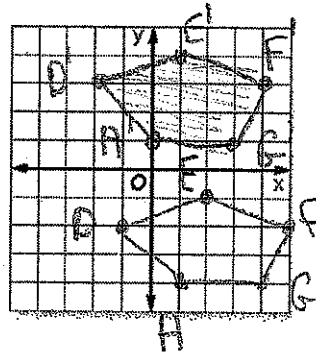
$J'(-2, 1)$
 $K'(0, 4)$
 $L'(4, 1)$

3. Graph quadrilateral $LMNP$ with $L(4, 2)$, $M(4, -1)$, $N(0, -1)$ and $P(1, 4)$ and its image under the translation $T_{(-4, -3)}$.



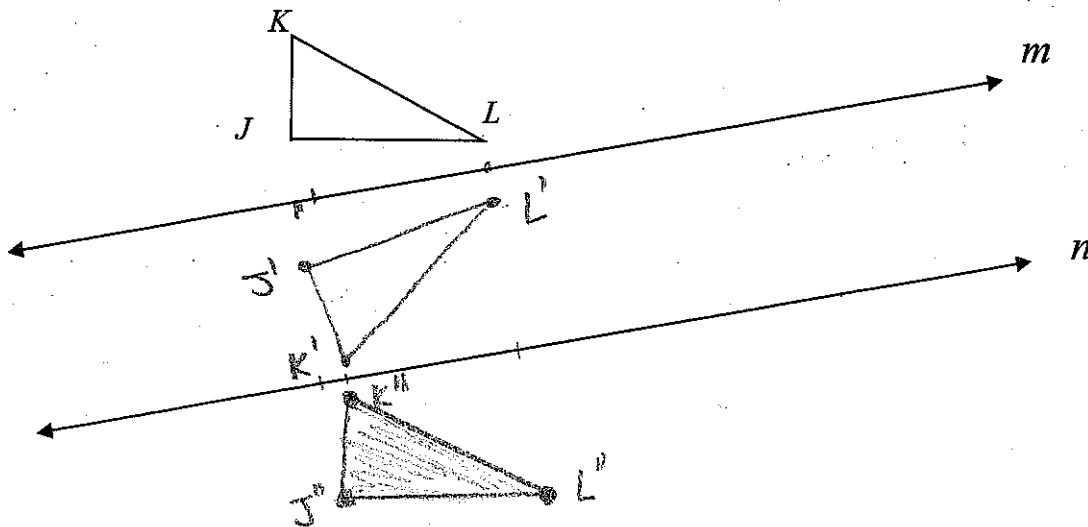
$L'(0, -1)$
 $M'(0, -4)$
 $N'(-4, -4)$
 $P'(-3, 1)$

4. pentagon $DEFGH$ with vertices $D(-1, -2)$, $E(2, -1)$, $F(5, -2)$, $G(4, -4)$ and $H(1, -4)$ under the translation $(x, y) \rightarrow (x - 1, y + 5)$

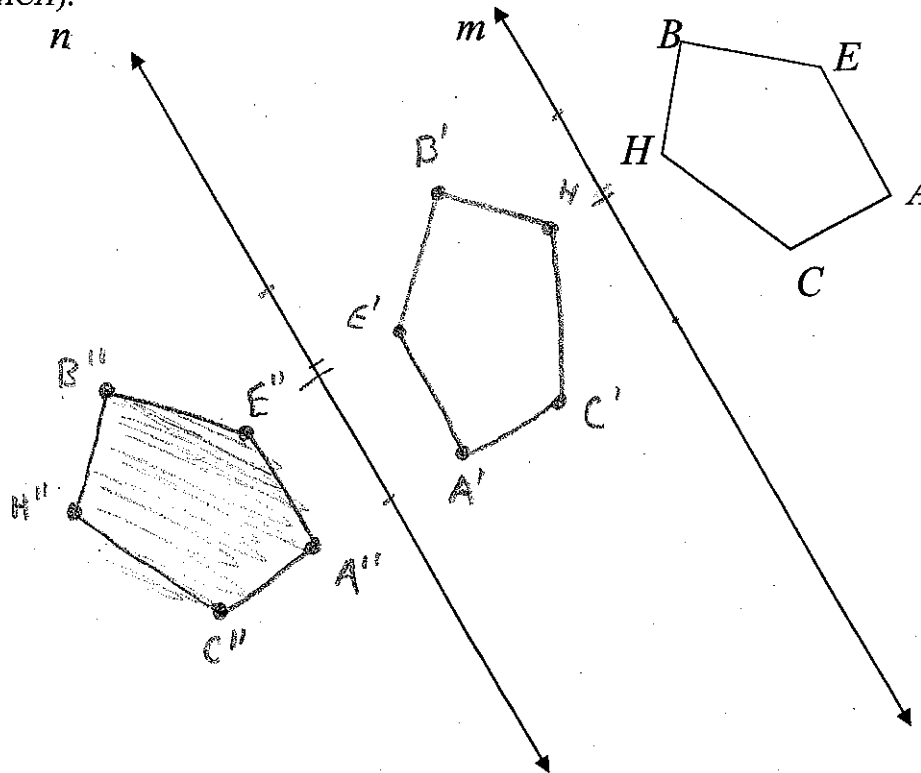


$D'(-2, 3)$
 $E'(1, 4)$
 $F'(4, 3)$
 $G'(3, 1)$
 $H'(0, 1)$

5. Reflect $\triangle JKL$ over line m and then over line n .



6. Draw $r_n \circ r_m$ (BEACH).



b. If lines m and n were 8 centimeters apart, how far is E from E'' ? 16 cm

7. Identify the translation in both words and symbols that moves each figure.

a. figure 1 \rightarrow figure 2

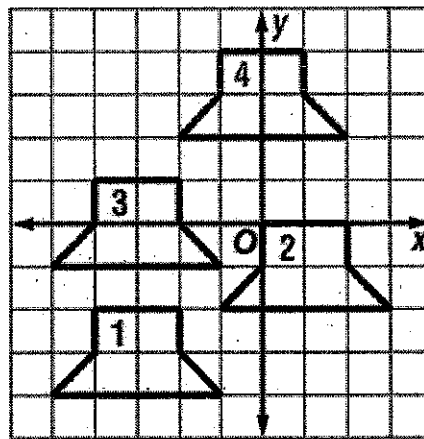
words: to the right 4 and up 2

symbols: $(x, y) \rightarrow (x+4, y+2)$

b. figure 2 \rightarrow figure 3

words: to the left 4 and up 1

symbols: $(x, y) \rightarrow (x-4, y+1)$



c. figure 3 \rightarrow figure 4

words: to the right 3 and up 3

symbols: $(x, y) \rightarrow (x+3, y+3)$

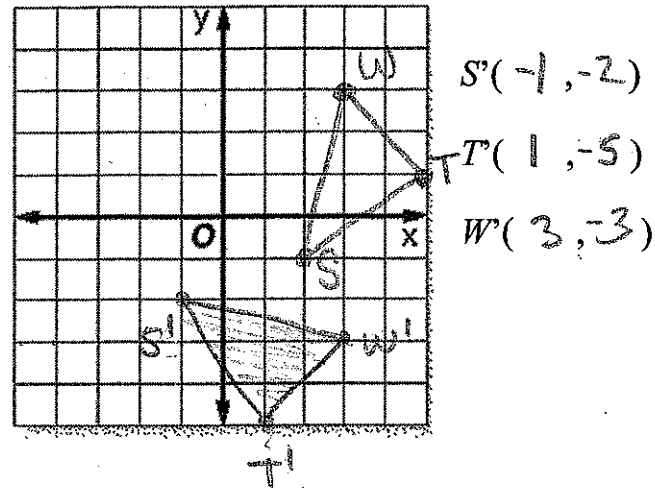
d. figure 4 \rightarrow figure 1

words: to the left 3 and down 6

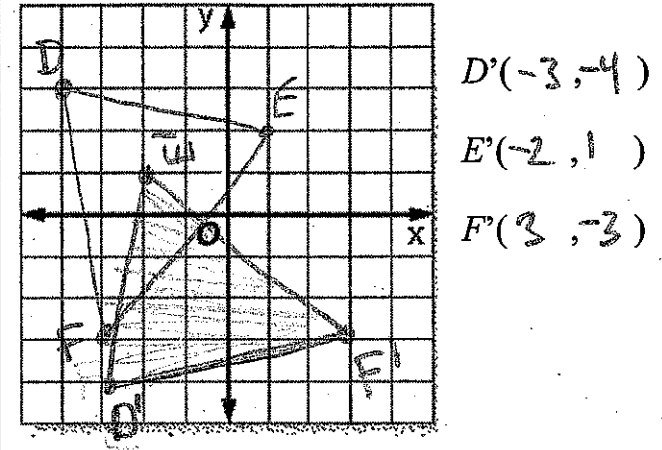
symbols: $(x, y) \rightarrow (x-3, y-6)$

ASSIGNMENT

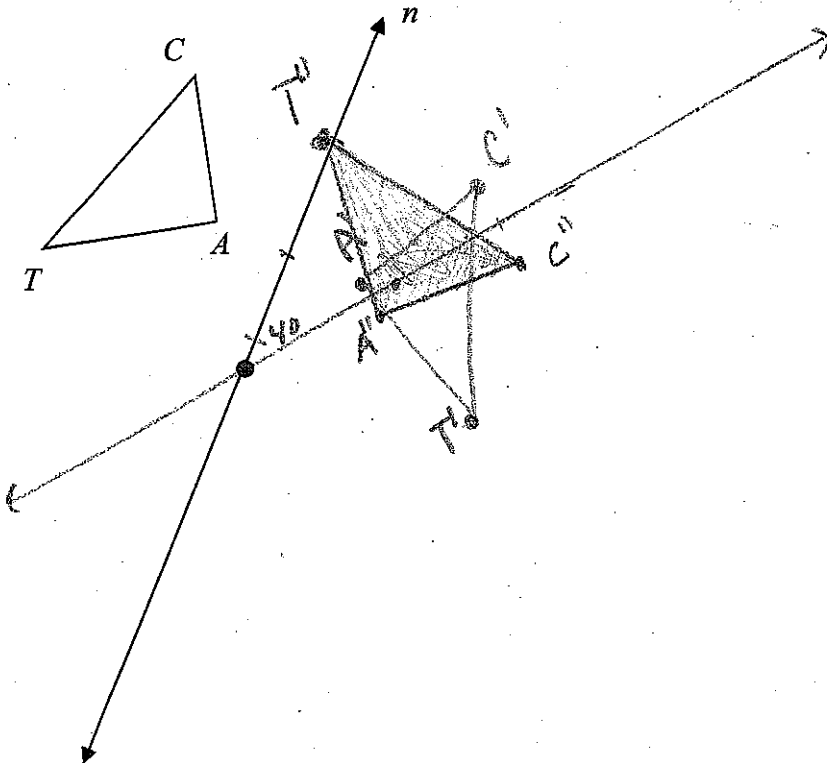
1. Draw $R_{90^\circ}(\triangle STW)$. $\triangle STW$ has vertices $S(2, -1)$, $T(5, 1)$, and $W(3, 3)$. Draw and label both the pre-image and image. Record the coordinates of the image of $\triangle STW$.



2. Draw $R_{-90^\circ}(\triangle DEF)$. $\triangle DEF$ has vertices $D(-4, 3)$, $E(1, 2)$, and $F(-3, -3)$. Draw and label both the pre-image and image. Record the coordinates of the image of $\triangle DEF$.

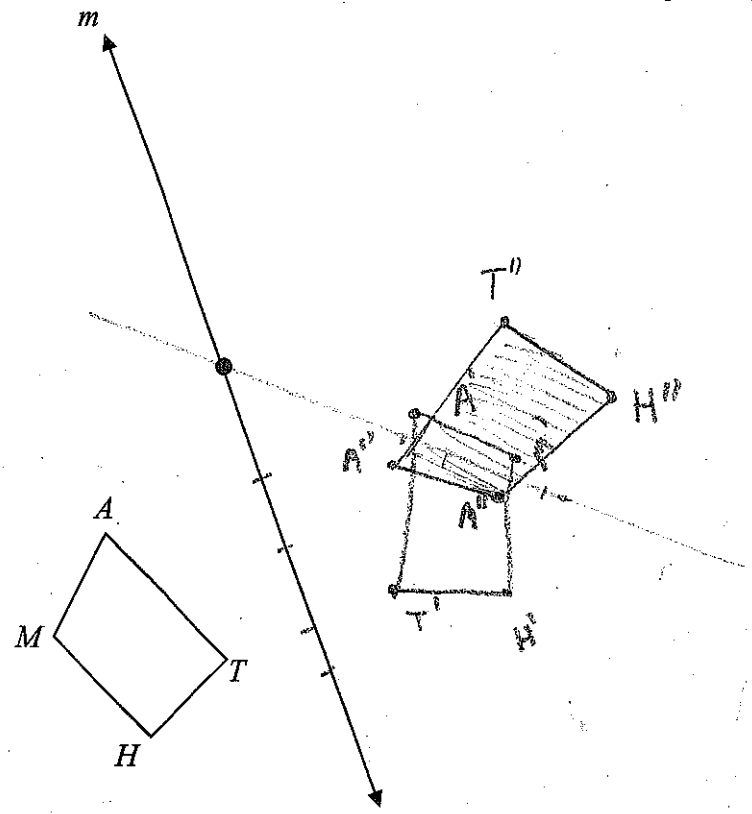


3. Given $\triangle CAT$ and reflection line n , rotate $\triangle CAT$ by 80 degrees by adding a second reflection line.

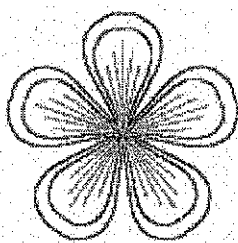
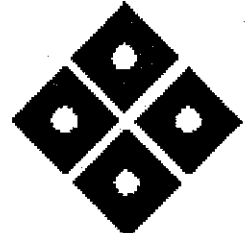
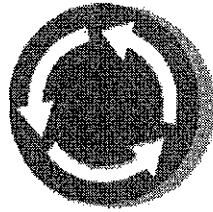
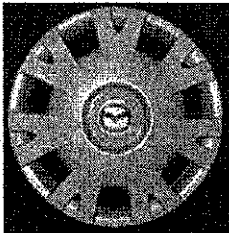


Key

4. Given *MATH* and reflection line *m*, rotate *MATH* by 100 degrees by adding a second reflection line.



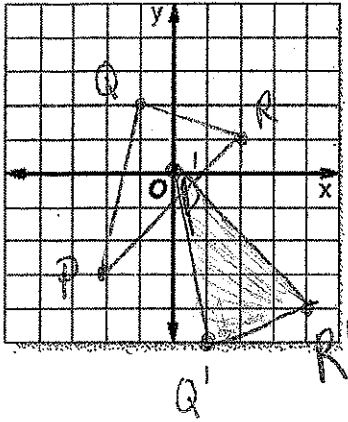
For #5-8, identify the order and magnitude of the rotational symmetry of each figure.

<p>5.</p>  <p>Order: <u>5</u></p> <p>Magnitude: <u>72</u></p>	<p>6.</p>  <p>Order: <u>4</u></p> <p>Magnitude: <u>90</u></p>	<p>7.</p>  <p>Order: <u>3</u></p> <p>Magnitude: <u>120</u></p>	<p>8.</p>  <p>Order: <u>1</u></p> <p>Magnitude: <u>360</u></p>
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ASSIGNMENT

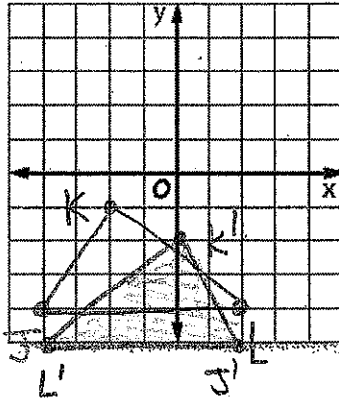
For #1-4, graph each figure and its image under the given translation. Record the coordinates of the image.

1. Graph $\triangle PQR$ with $P(-2, -3)$, $Q(-1, 2)$, and $R(2, 1)$. Draw $r_{x\text{-axis}} \circ T_{(2,3)}$. In other words-translation: $(x, y) \rightarrow (x + 2, y + 3)$, then reflection: over the x -axis



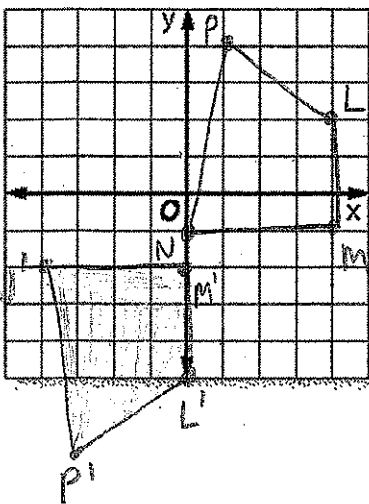
$P'(0, 0)$
 $Q'(1, -5)$
 $R'(4, -4)$

2. Graph $\triangle JKL$ with vertices $J(-4, -4)$, $K(-2, -1)$, and $L(2, -4)$. Draw $r_{y\text{-axis}} \circ T_{(2,-1)}$. In other words-translation: $(x, y) \rightarrow (x + 2, y - 1)$, then reflection: over the y -axis



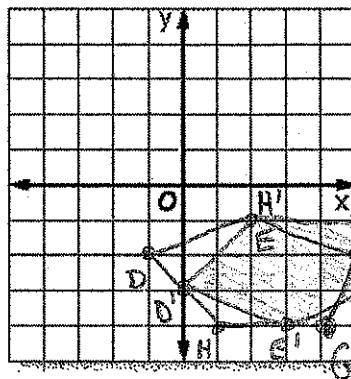
$J'(2, -5)$
 $K'(0, -2)$
 $L'(-4, -5)$

3. Graph quadrilateral $LMNP$ with $L(4, 2)$, $M(4, -1)$, $N(0, -1)$ and $P(1, 4)$. Draw $T_{(-4,-3)} \circ r_{x\text{-axis}}$. In other words- reflection: over the x -axis, then translation: $(x, y) \rightarrow (x - 4, y - 3)$



$L'(4, 2)$
 $M'(0, -2)$
 $N'(-4, -2)$
 $P'(-3, -7)$

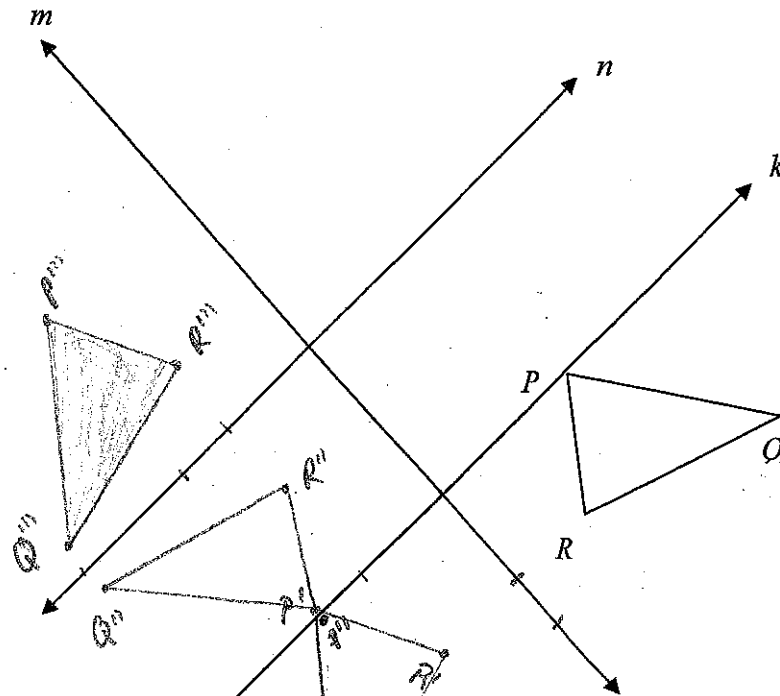
4. Graph pentagon $DEFGH$ with vertices $D(-1, -2)$, $E(2, -1)$, $F(5, -2)$, $G(4, -4)$ and $H(1, -4)$. Draw $T_{(1,-5)} \circ r_{x\text{-axis}}$. In other words- reflection: over the x -axis, then translation: $(x, y) \rightarrow (x + 1, y - 5)$



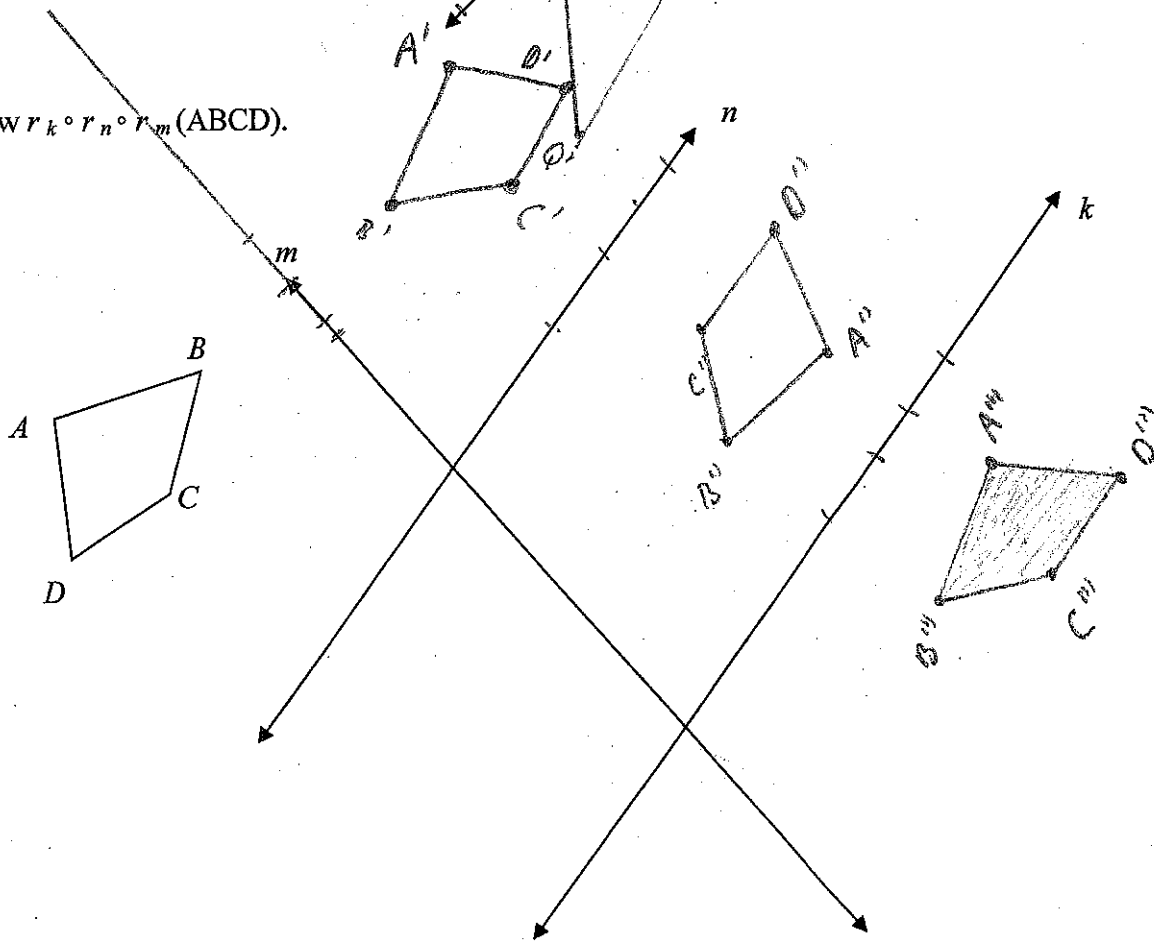
$D'(0, -3)$
 $E'(3, -4)$
 $F'(6, -3)$
 $G'(5, -1)$
 $H'(1, -4)$

5. Draw $r_n \circ r_k \circ r_m(\Delta PQR)$.

key



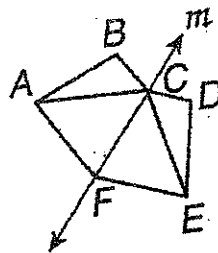
6. Draw $r_k \circ r_n \circ r_m(ABCD)$.



ASSIGNMENT

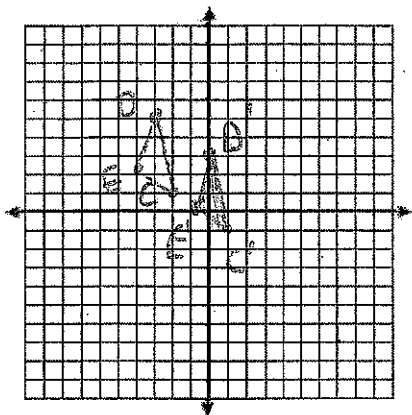
For #1-3, refer to the figure at the right.

Name the image of each figure under a reflection over line m .



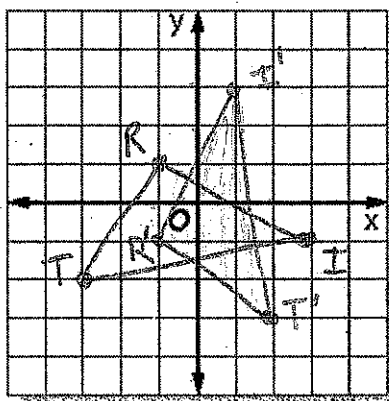
1. A E
 2. \overline{BC} \overline{DE}
 3. $\triangle DCE$ $\triangle BCA$

4. $\triangle DCE$ has vertices $D(-3, 5)$, $C(-2, 1)$, and $E(-4, 2)$. Graph $\triangle DCE$ **and** its image under the translation $(x, y) \rightarrow (x + 3, y - 2)$.



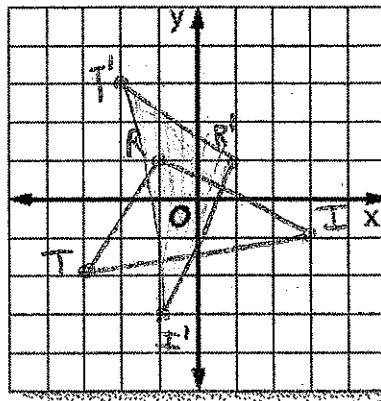
- $D'(0, 3)$
 $C'(2, -1)$
 $E'(-1, 0)$

5. $\triangle TRI$ has vertices $T(-3, -2)$, $R(-1, 1)$, and $I(3, -1)$. Graph **and** label $\triangle TRI$ **and** its image under a rotation of 90° counterclockwise about the origin. Then state the coordinates of the image of $\triangle TRI$.



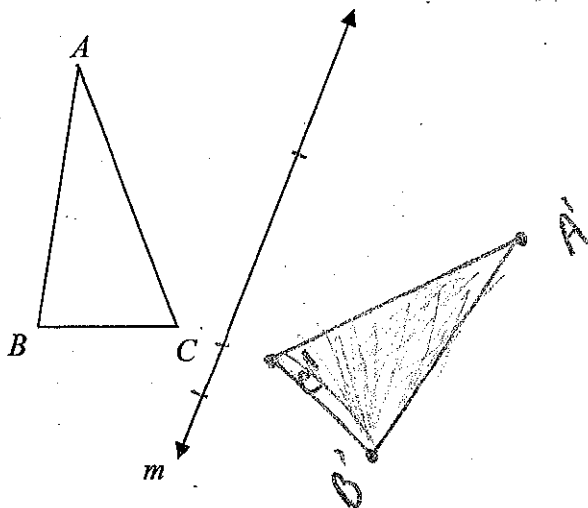
- $T'(2, -3)$
 $R'(-1, 1)$
 $I'(1, 3)$

6. $\triangle TRI$ has vertices $T(-3, -2)$, $R(-1, 1)$, and $I(3, -1)$. Graph **and** label $\triangle TRI$ **and** its image under a rotation of 90° clockwise about the origin. Then state the coordinates of the image of $\triangle TRI$.

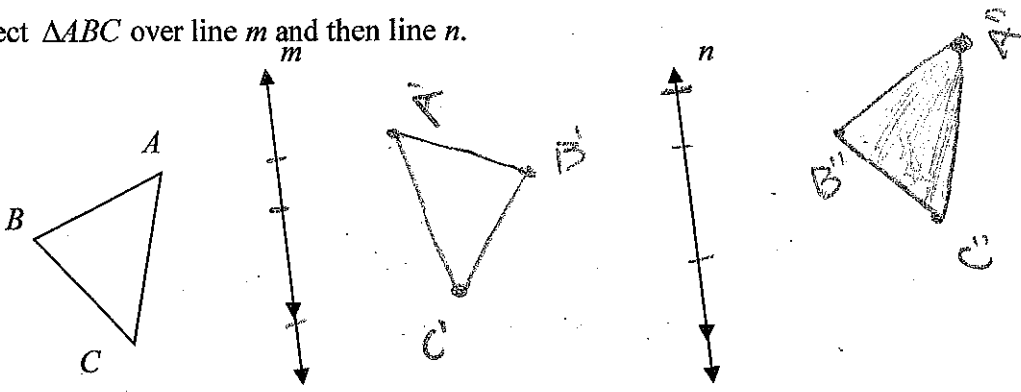


- $T'(-2, 3)$
 $R'(1, 1)$
 $I'(-1, -3)$

7. Reflect $\triangle ABC$ over line m .



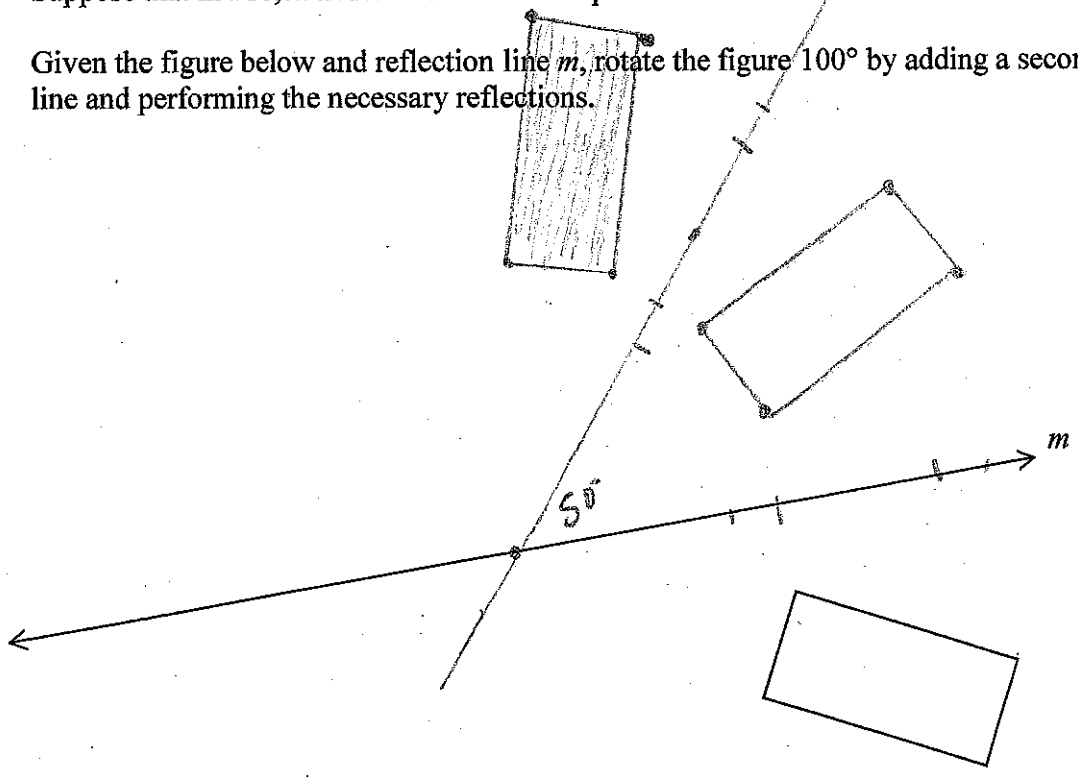
8. Reflect $\triangle ABC$ over line m and then line n .



9. Suppose that in #16, lines m and n were 8 cm apart. How far would C be from C'' ? 16 cm

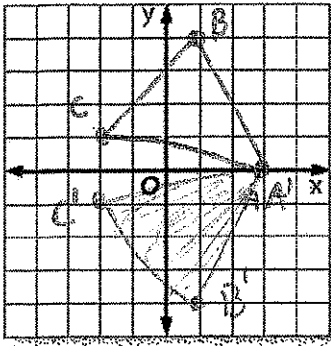
10. Suppose that in #16, A and A'' were 22 mm apart. How far would line m be from line n ? 11 mm

11. Given the figure below and reflection line m , rotate the figure 100° by adding a second reflection line and performing the necessary reflections.



12. For each transformation below, graph $\triangle ABC$ with vertices $A(3, 0)$, $B(1, 4)$, and $C(-2, 1)$ and graph the image of $\triangle ABC$ under the indicated transformation. Then identify the coordinates of the image of $\triangle ABC$.

a. Reflection over the x -axis

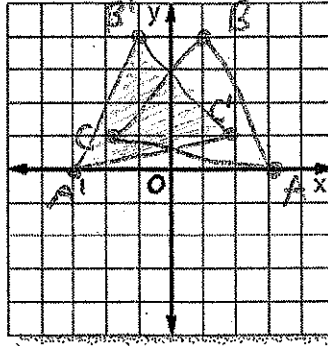


$$A'(3, 0)$$

$$B'(1, -4)$$

$$C'(-2, -1)$$

b. Reflection over the y -axis

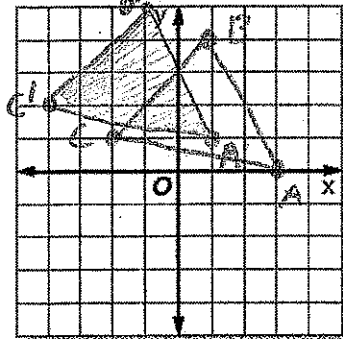


$$A'(-3, 0)$$

$$B'(-1, 4)$$

$$C'(2, 1)$$

c. Translation $(x, y) \rightarrow (x - 2, y + 1)$

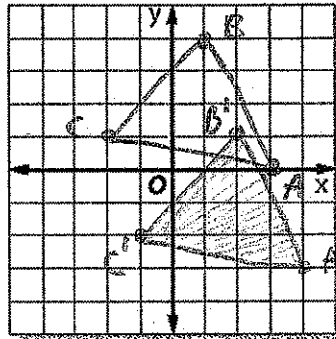


$$A'(1, 1)$$

$$B'(-1, 5)$$

$$C'(-4, 2)$$

d. Translation $(x, y) \rightarrow (x + 1, y - 3)$

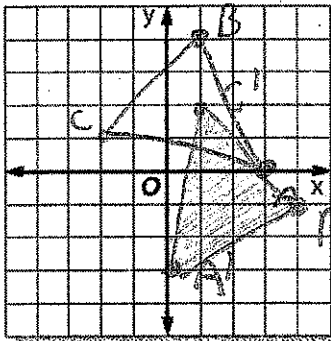


$$A'(4, -3)$$

$$B'(2, 1)$$

$$C'(-1, -2)$$

e. Rotation 90° clockwise about the origin

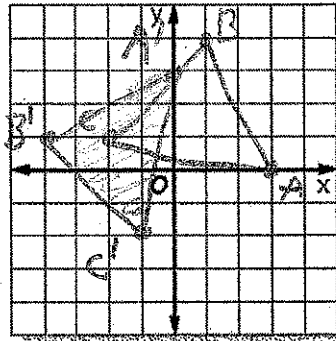


$$A'(0, -3)$$

$$B'(4, 1)$$

$$C'(1, 2)$$

f. Rotation 90° counterclockwise about the origin



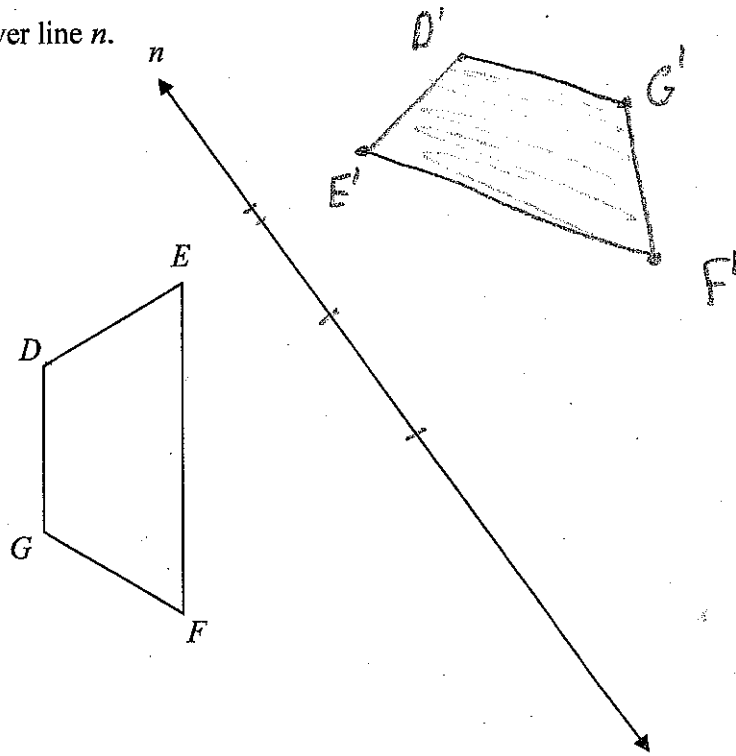
$$A'(0, 3)$$

$$B'(-4, 1)$$

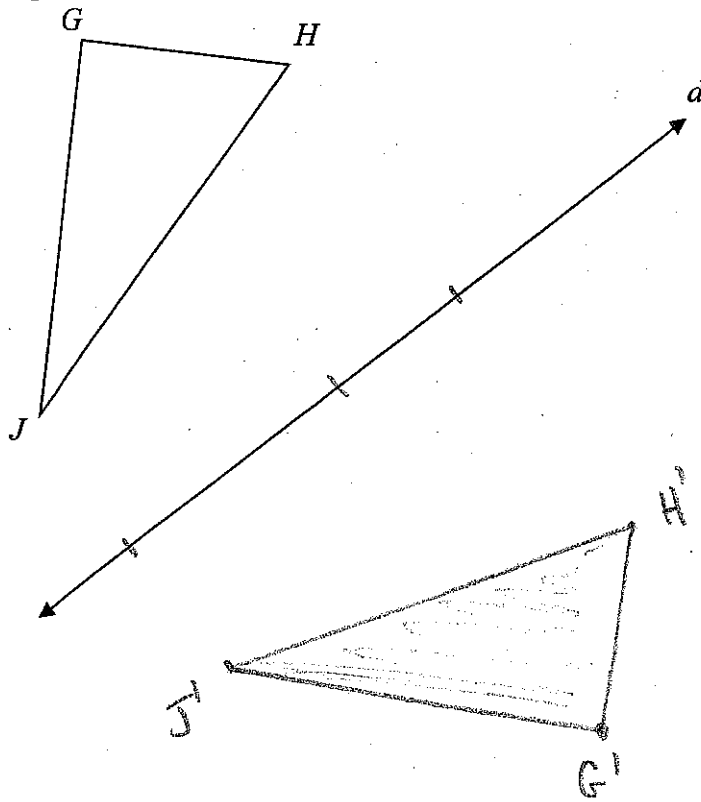
$$C'(-1, -2)$$

ASSIGNMENT

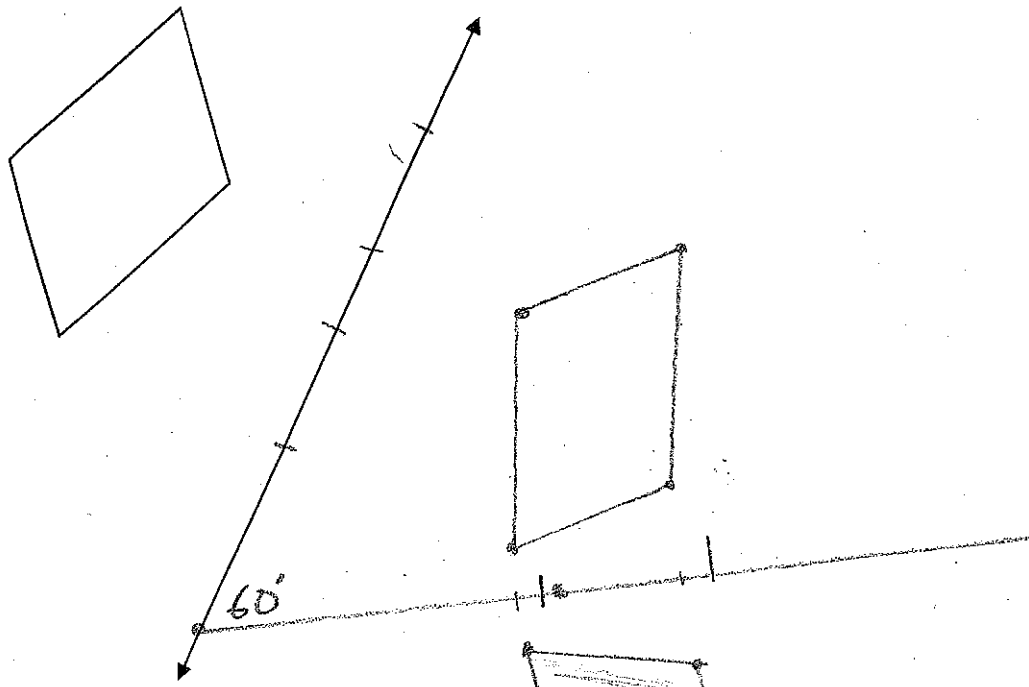
1. Reflect $DEFG$ over line n .



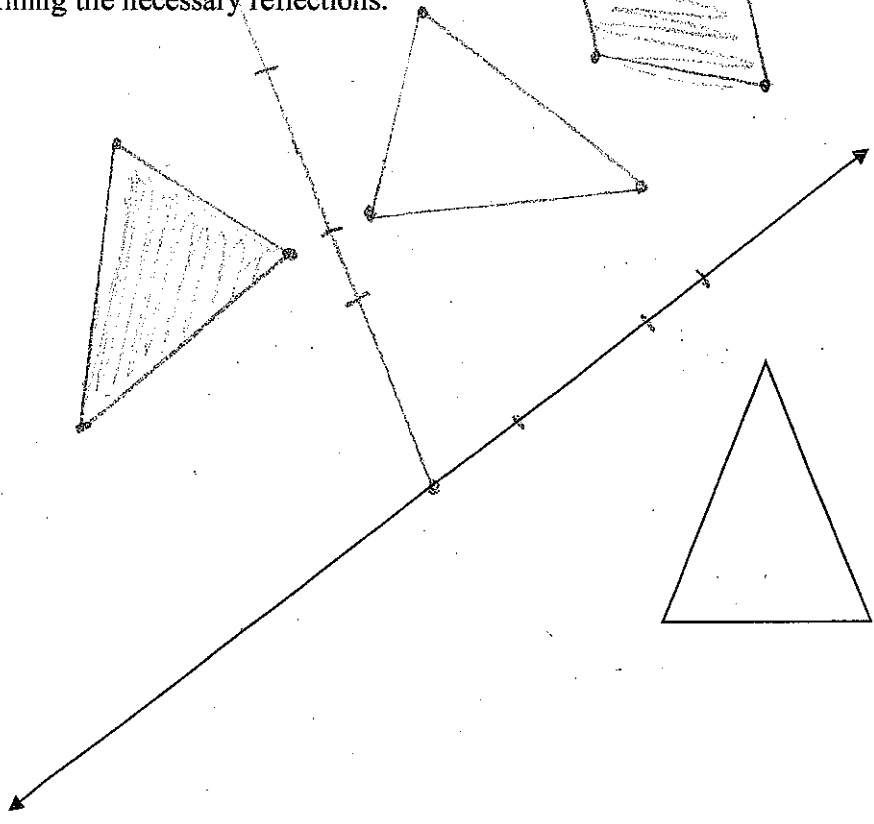
2. Reflect triangle GHI over line d .



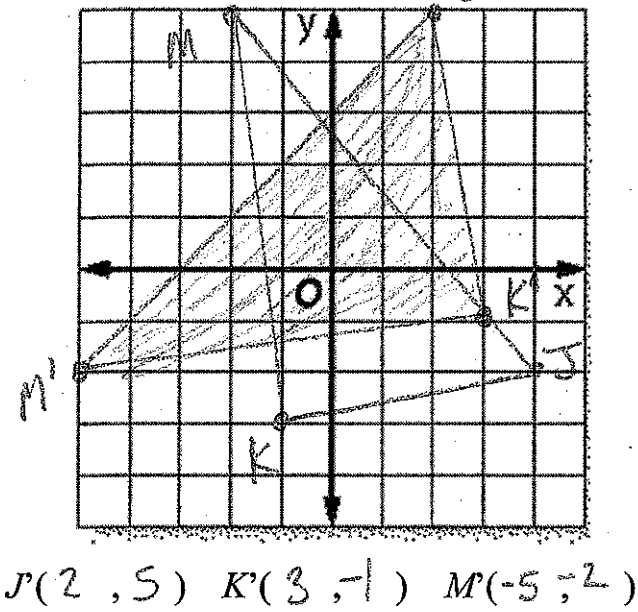
3. Given the figure below and reflection line m , rotate the figure 120° by adding a second reflection line and performing the necessary reflections. Key



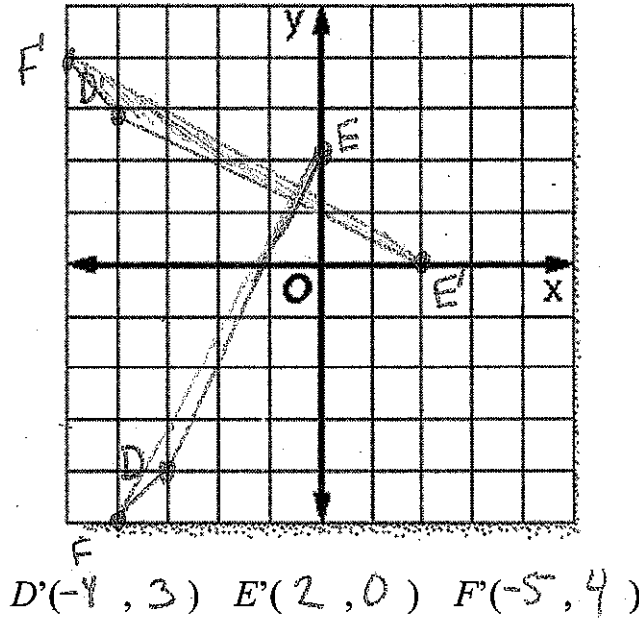
4. Given the figure below and reflection line m , rotate the figure 150° by adding a second reflection line and performing the necessary reflections.



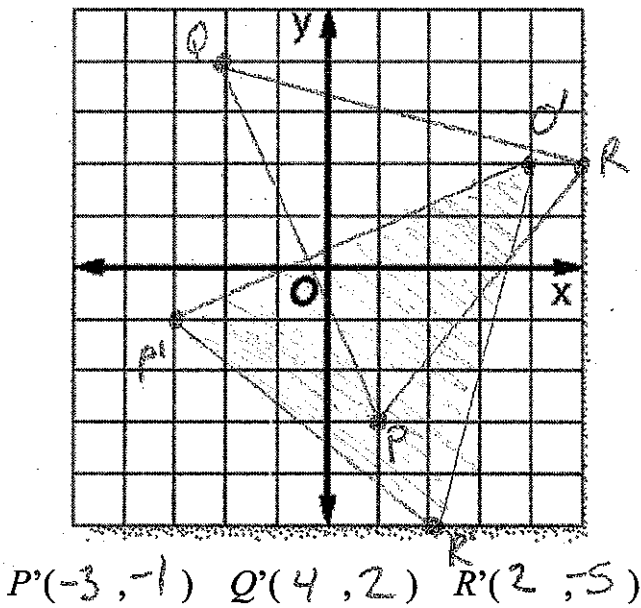
5. Rotate $\triangle JKM$ with vertices $J(4, -2)$, $K(-1, -3)$, and $M(-2, 5)$ 90° counterclockwise about the origin. Draw and label both the pre-image and image. Record the coordinates of the image.



6. Rotate $\triangle DEF$ with vertices $D(-3, -4)$, $E(0, 2)$, and $F(4, -5)$ 90° clockwise about the origin. Draw and label both the pre-image and image. Record the coordinates of the image.



7. Rotate $\triangle PQR$ with vertices $P(1, -3)$, $Q(-2, 4)$, and $R(5, 2)$ 90° clockwise about the origin. Draw and label both the pre-image and image. Record the coordinates of the image.



8. Rotate $\triangle HJK$ with vertices $H(4, 0)$, $J(-1, -2)$, and $K(1, 4)$ 90° counterclockwise about the origin. Draw and label both the pre-image and image. Record the coordinates of the image.

