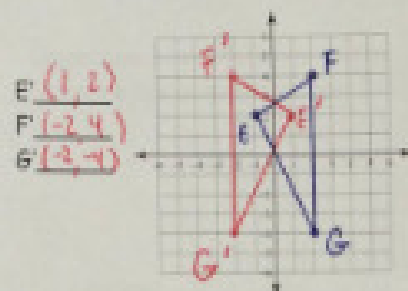
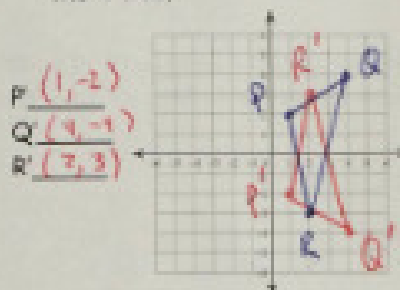


1. Graph each figure and its image under the given reflection. Find the coordinates of the vertices of each image. Label all points.

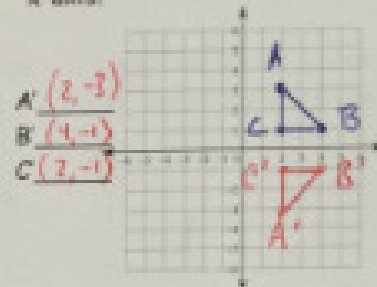
a. $\triangle EFG$ if $E(-1, 2)$, $F(2, 4)$ and $G(2, -4)$ reflected over the y -axis.



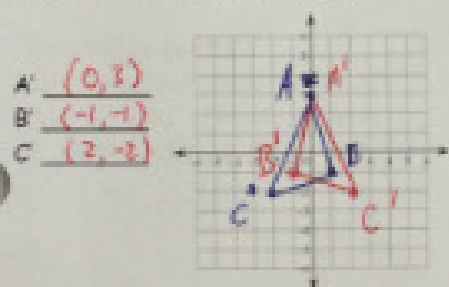
b. $\triangle PQR$ if $P(1, 2)$, $Q(4, 4)$ and $R(2, -3)$ reflected over the x -axis.



c. $\triangle ABC$ with vertices $A(2, 3)$, $B(4, 1)$, and $C(2, 1)$ reflected over the x -axis.



d. $\triangle ABC$ if $A(0, 3)$, $B(1, -1)$, and $C(-2, -2)$ reflected over the line $y = x$.



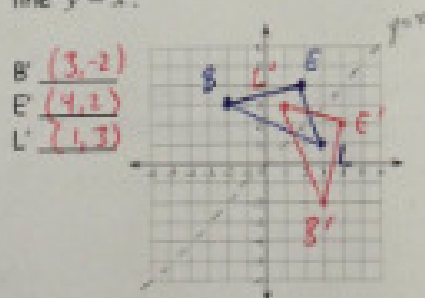
For problems a-d, examine how the coordinates for each point changed after the reflection? Which were the same? Which were different? What pattern did you see?

Reflect over x -axis, x value stays the same
 y value changes to its opposite.
Reflect over y -axis, y value stays the same
 x value changes to its opposite.

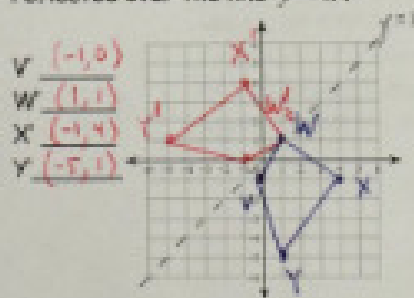
Write a rule for a reflection over the x -axis and one for over the y -axis.

Over x -axis: $(x, y) \rightarrow (x, -y)$ Over y -axis: $(x, y) \rightarrow (-x, y)$

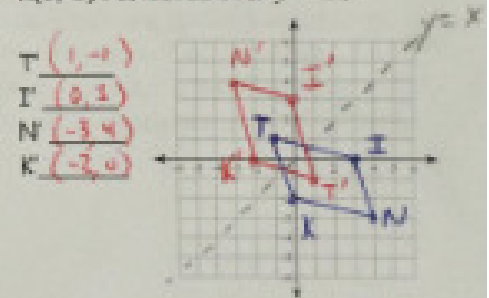
e) $\triangle BEL$ if $B(-2, 3)$, $E(2, 4)$, and $L(3, 1)$ reflected over the line $y = x$.



f) Quadrilateral $VWXY$ if $V(0, -1)$, $W(1, 1)$, $X(4, -1)$, and $Y(1, -5)$ reflected over the line $y = x$.



g) Parallelogram $TINK$ if $T(-1, 1)$, $I(3, 0)$, $N(4, -3)$ and $K(0, -2)$ reflected over $y = x$.



What pattern did you see from problems e - g? How did the coordinates change in this case?

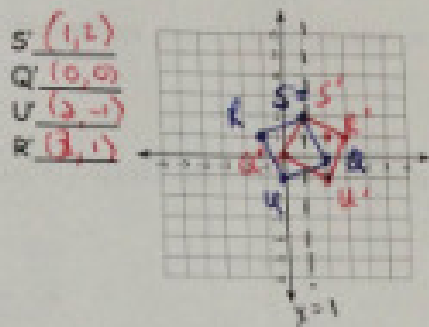
The x and y coordinates changed places.

Using words, write a rule for how to find the coordinates of the image of a reflection over the line $y = x$.

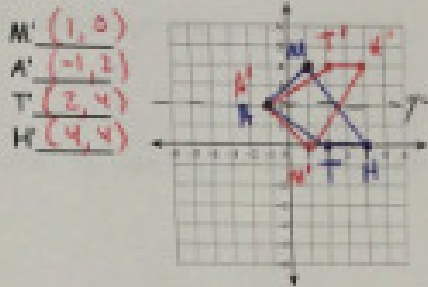
x switches to the y place and
 y switches to the x place

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

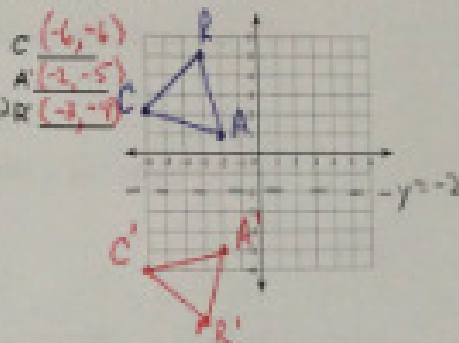
h. Square SQUR if $S(1, 2)$, $Q(2, 0)$, $U(0, -1)$, $R(-1, 1)$ reflected over the line $x=1$.



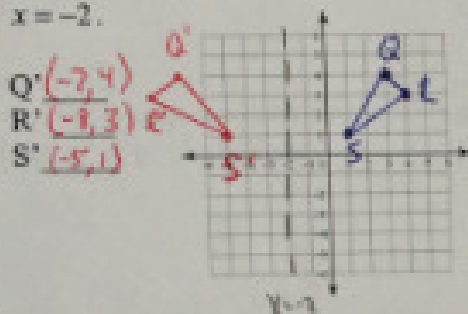
i. Quadrilateral MATH if $M(1, 4)$, $A(-1, 2)$, $T(2, 0)$ and $H(4, 0)$ reflected over $y=2$.



j. Triangle CAR if $C(-6, 2)$, $A(-2, 1)$, and $R(-3, 5)$ reflected over the line $y=-2$.



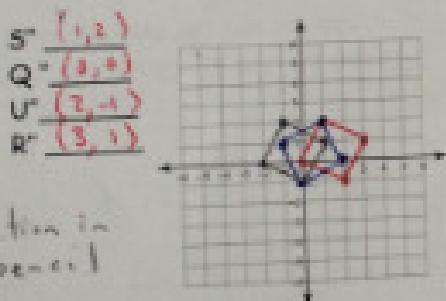
k. Triangle QRS if $Q(3, 4)$, $R(4, 3)$, and $S(1, 1)$ reflected over the line $x=-2$.



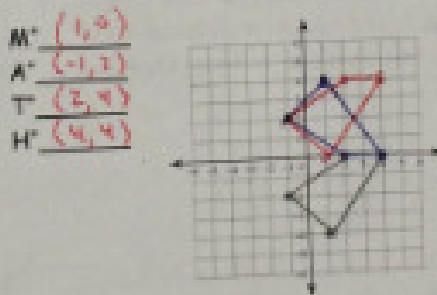
What did you notice from the previous three problems? Could you find a pattern? How did the coordinates change? Could you have written any of them as a reflection over the x or y axis and then a translation? How would that look?

When reflected over a vertical, ($x=$) line, the y value stays the same.
 When reflected over a horizontal, ($y=$) line, the x value stays the same.

l. Square SQUR if $S(1, 2)$, $Q(2, 0)$, $U(0, -1)$, $R(-1, 1)$ reflected over the y-axis and translated by the rule $(x, y) \rightarrow (x+2, y)$.



m. Quadrilateral MATH if $M(1, 4)$, $A(-1, 2)$, $T(2, 0)$ and $H(4, 0)$ reflected over the x-axis and translated by the rule $(x, y) \rightarrow (x, y+4)$.



reflection in pencil

Examine the transformation from l & m. How do they relate to the image from h & i? Write a rule for how a reflection over a line like $x=a$ or $y=b$ could be written as a reflection over the x or y axis and then a translation.

l and m are the same as h and i

To reflect over $x=a$, you can reflect over the y axis and then do the translation $(x, y) \rightarrow (x+2a, y)$

To reflect over $y=b$, you can reflect over the x-axis and then do the translation $(x, y) \rightarrow (x, y+2b)$