

Bellwork
02/28/2012

Use the quad. HJK with vertices $H(3,0)$, $I(1,-4)$, $J(0,-4)$, $K(-1,-3)$.

1. Find the coordinates of the image of HJK for a rotation of 180° about the origin.

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

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

$$J'(0, 4)$$

$$K'(1, 3)$$

Geometry
9.5 Apply Compositions of Transformations
Standard(s): 9, 10

Vocabulary:

Glide Reflection: A transformation in which every point P is mapped to a point P'' by 1) A translation maps P to P' and 2) A reflection in a line k parallel to the direction of the translation maps P' to P'' .

Composition of Transformations: When 2 or more transformations are combined to form a single transformation.

THEOREM*For Your Notebook***THEOREM 9.4** Composition Theorem

The composition of two (or more) isometries is an isometry.

Proof: Exs. 35–36, p. 614

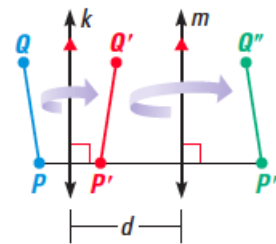
THEOREM*For Your Notebook***THEOREM 9.5** Reflections in Parallel Lines Theorem

If lines k and m are parallel, then a reflection in line k followed by a reflection in line m is the same as a translation.

If P'' is the image of P , then:

1. $\overline{PP''}$ is perpendicular to k and m , and
2. $PP'' = 2d$, where d is the distance between k and m .

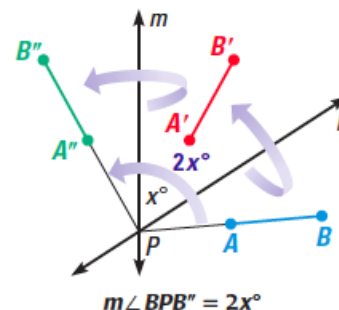
Proof: Ex. 37, p. 614

**THEOREM***For Your Notebook***THEOREM 9.6** Reflections in Intersecting Lines Theorem

If lines k and m intersect at point P , then a reflection in k followed by a reflection in m is the same as a rotation about point P .

The angle of rotation is $2x^\circ$, where x° is the measure of the acute or right angle formed by k and m .

Proof: Ex. 38, p. 614



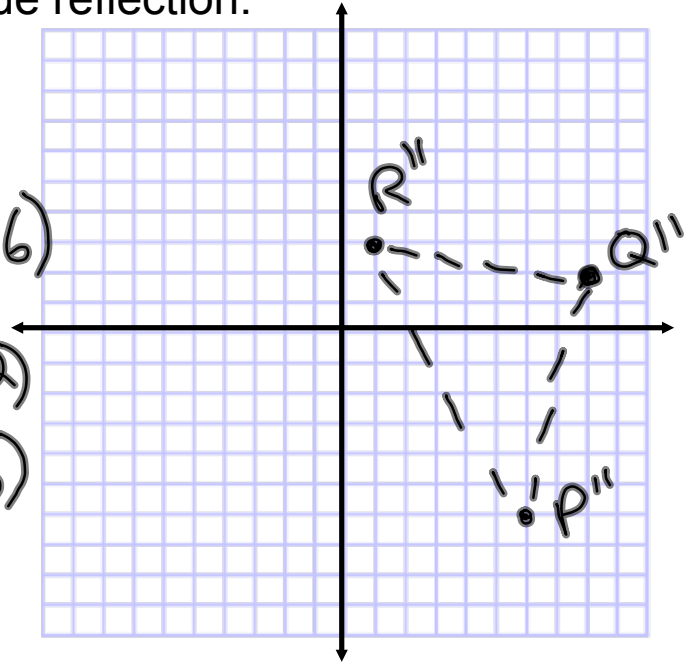
Find the Image of a Glide Reflection

The vertices of $\triangle PQR$ are $P(2,6)$, $Q(4,-2)$, and $R(-3,-3)$. Find the image of $\triangle PQR$ after the glide reflection.

1. **Translation:** $(x,y) \rightarrow (x+4,y)$

2. **Reflection:** in the x -axis

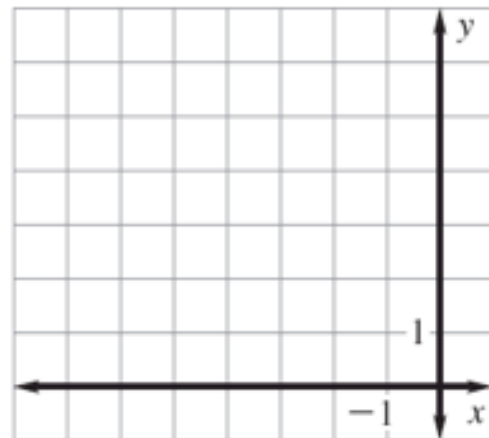
1. $P'(6,6)$ 2. $P''(6,-6)$
 $Q'(8,-2)$ $Q''(8,2)$
 $R'(1,-3)$ $R''(1,3)$



The vertices of $\triangle ABC$ are $A(2,4)$, $B(7,6)$, and $C(5,2)$. Graph the image of $\triangle ABC$ after a composition of the transformations in the order they are listed.

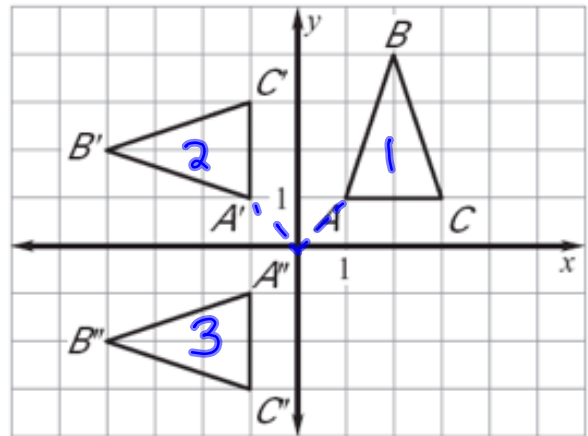
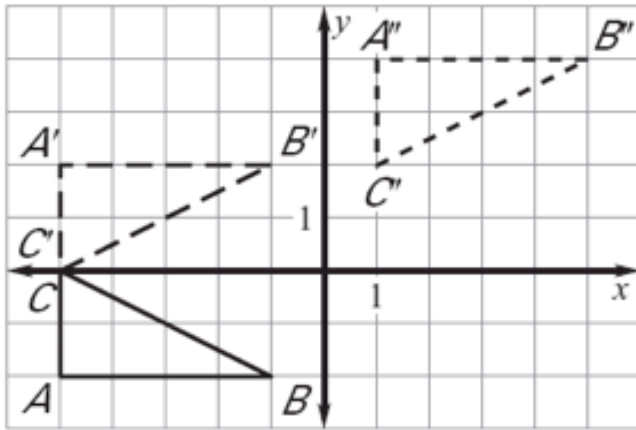
Translation: $(x,y) \rightarrow (x-2,y)$

Reflection: 90° about the origin



Describe a Transformation

Describe the composition of transformations.



Rotation 90°
Reflection x-axis

Reflections in Parallel Lines

In the diagram, $r \parallel s$, \overline{CD} is reflected in line r , and $\overline{C'D'}$ is reflected in line s .

A translation maps \overline{CD} onto which segment?

$\overline{C''D''}$

Which lines are perpendicular to $\overline{DD''}$?

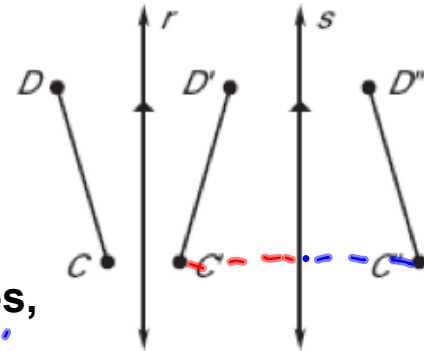
r & s

Name two segments parallel to $\overline{CC''}$

$\overline{DD'}$ $\overline{DD''}$

If the distance between r and s is 2 inches, what is the length of $\overline{CC''}$?

$2(2) = 4 \text{ in.}$

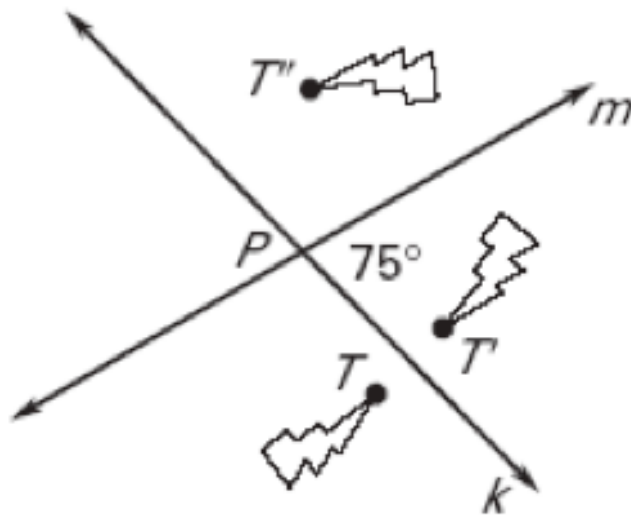


Is the distance from C' to s the same as the distance from C'' to s ? Explain.

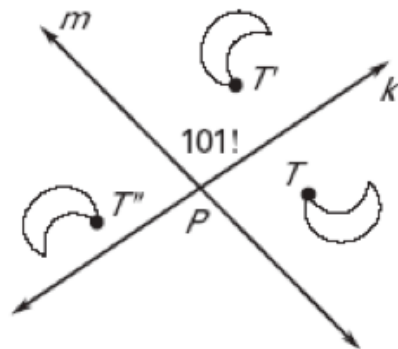
yes, def. of reflection

Angle of Rotation

Find the angle of rotation that maps T onto T'' .



$$75(2) = 150^\circ$$



$$101(2) = 202^\circ$$

Homework Assignment

Worksheet 9.5B