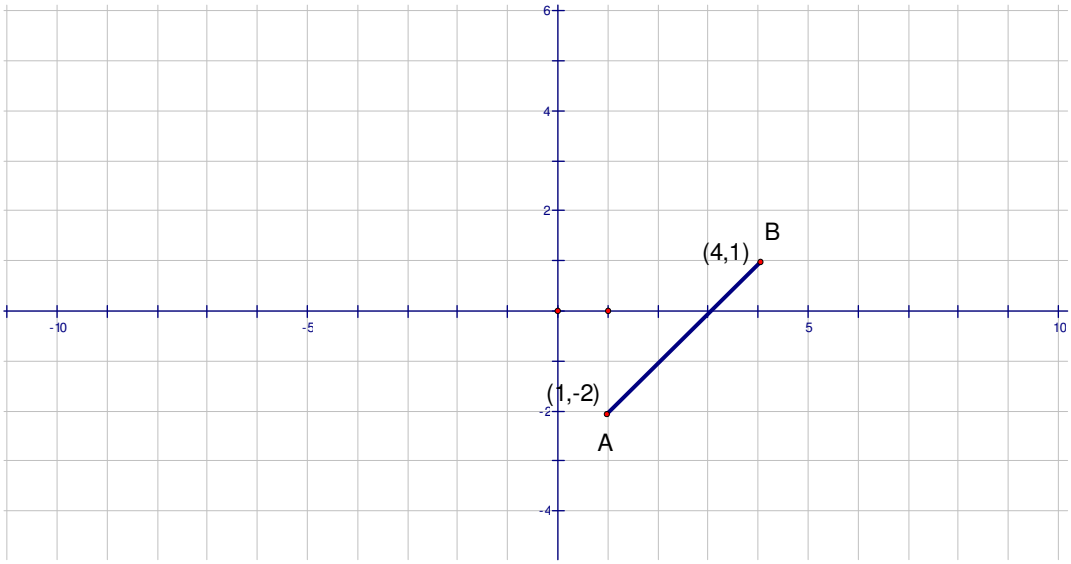
Glide Reflections

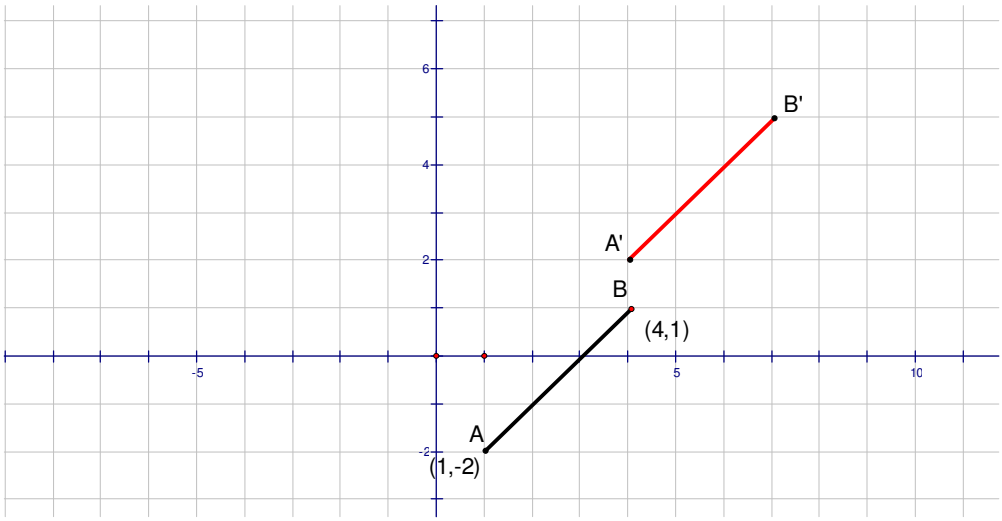
A **glide reflection** is transformation created by a translation followed by a reflection.

Example 1

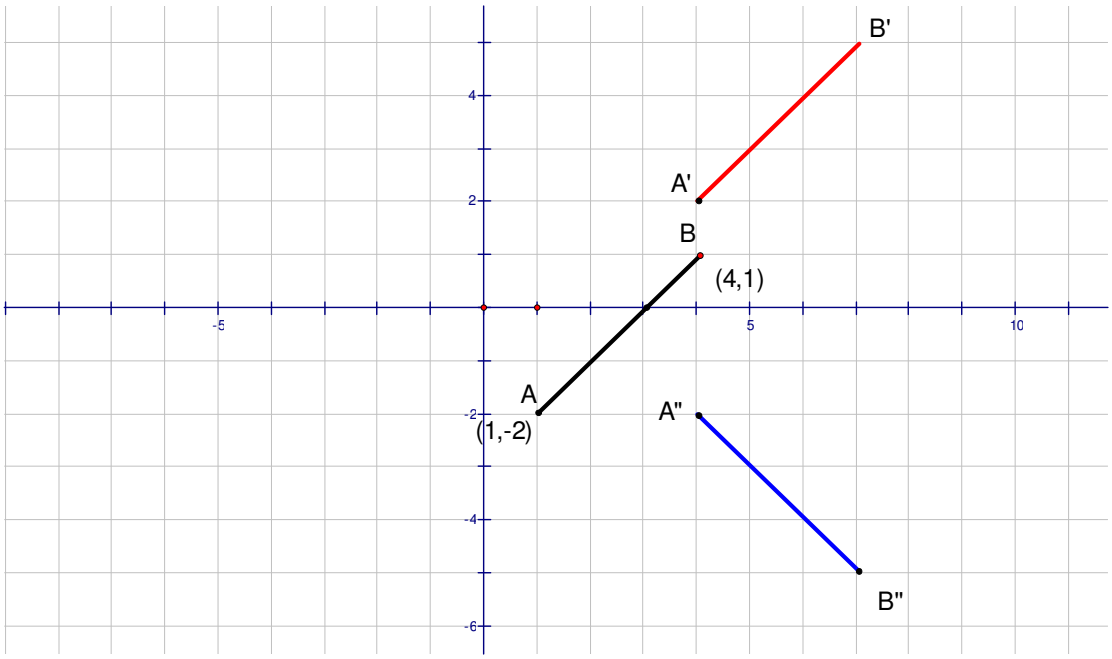
Find the image of $\overline{AB}$ under the glide reflection that translates from (0,0) to (3,4) and reflects about the x-axis.



First translate using the vector $v = (3-0, 4-0) = (3,4)$

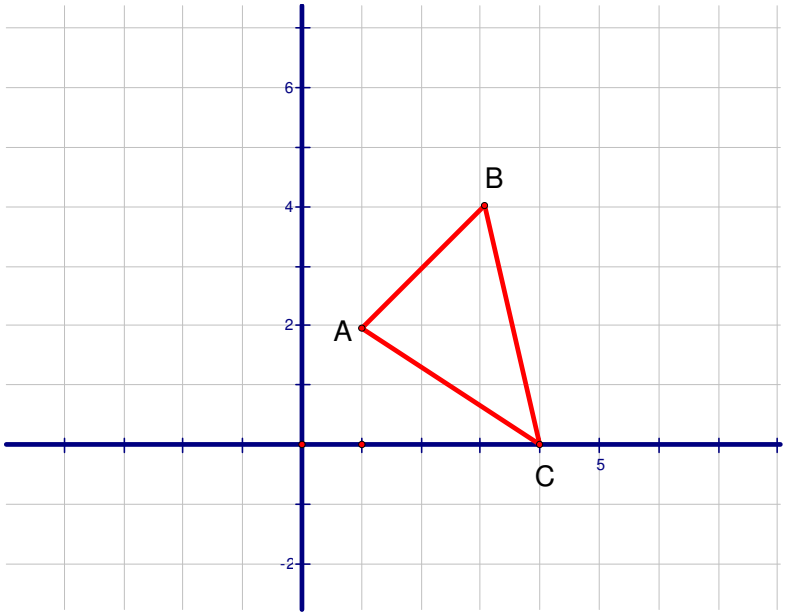


Reflect about the x-axis

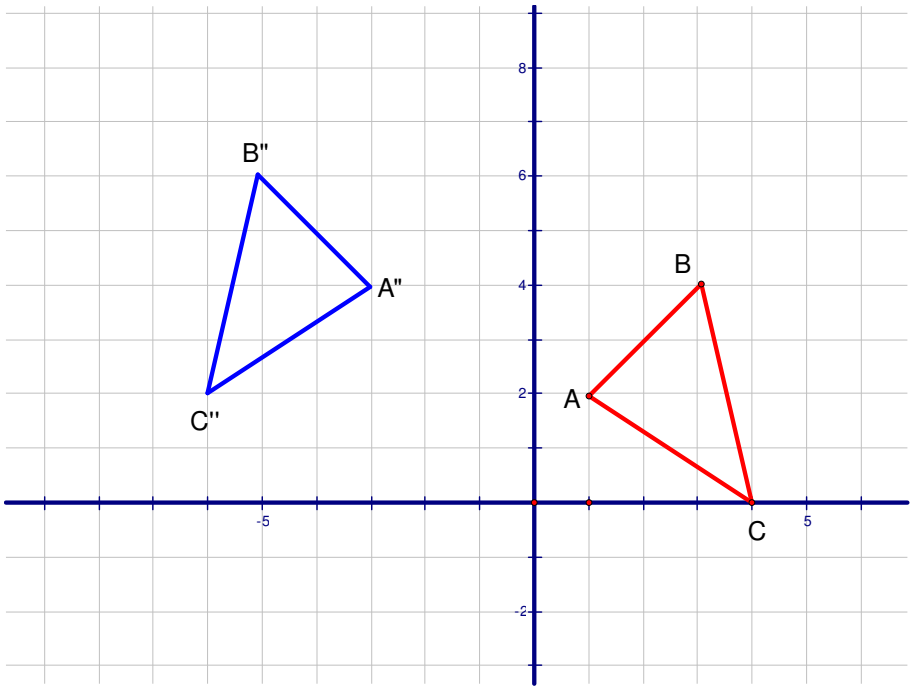


Example 2

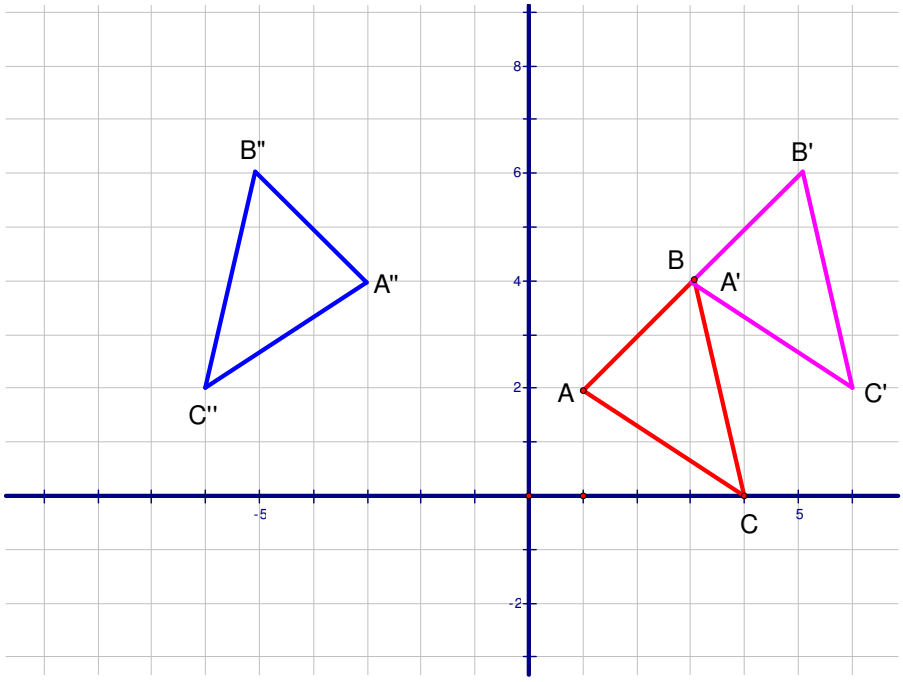
Find the image of ΔABC with vertices $A(1,2)$, $B(3,4)$, and $B(4,0)$ under the glide reflection that translates from (0,0) to (2,2) and reflects about the y-axis.



Translate ΔABC with the following vector $v = (2-0, 2-0) = (2,2)$



Reflect $\Delta A'B'C'$ about the y-axis

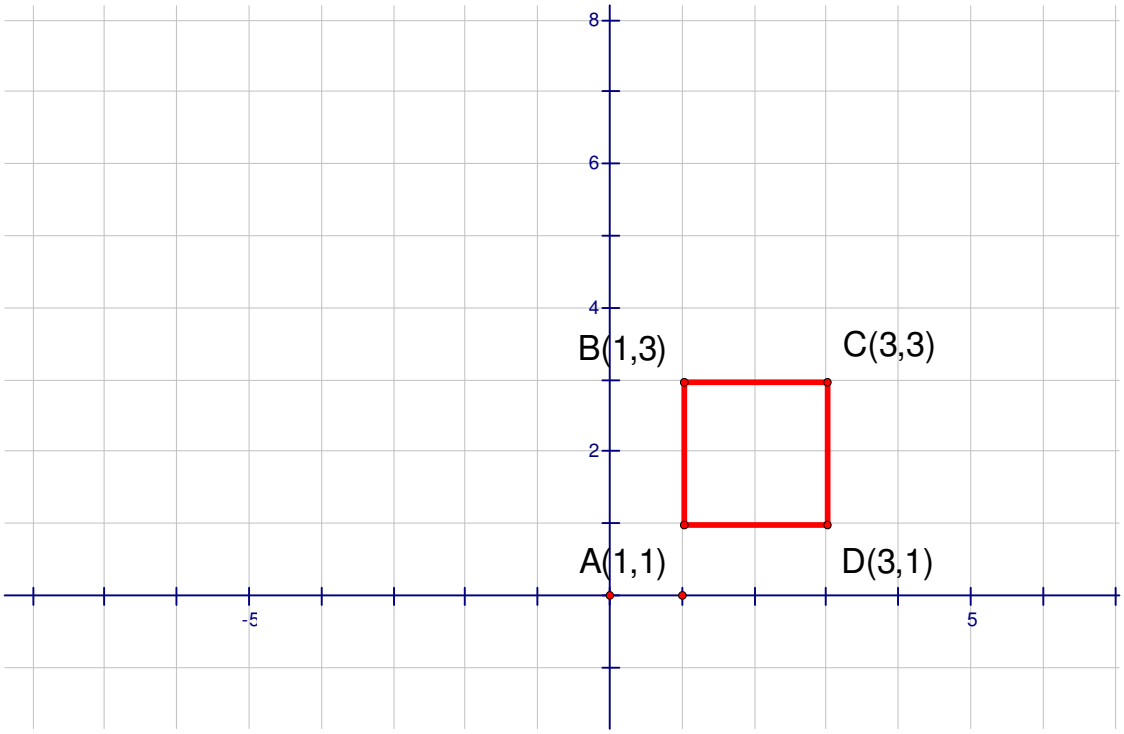


Properties of Glide Reflections

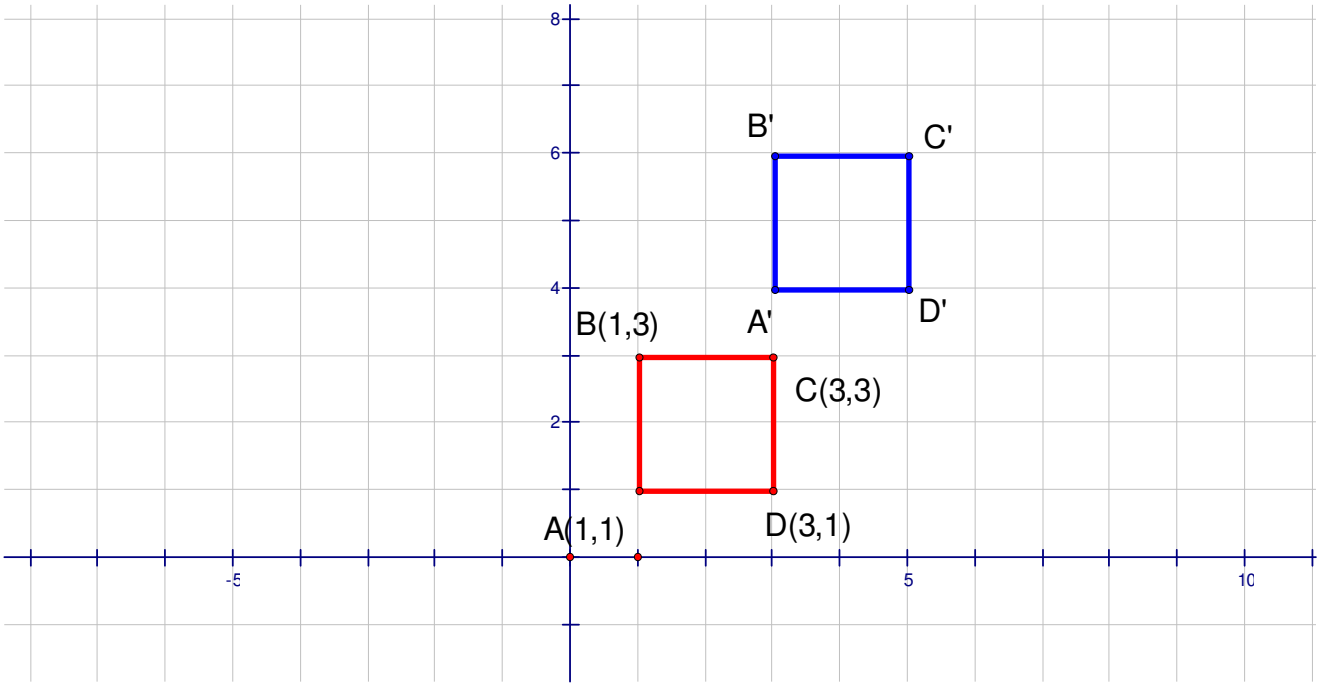
1) Glide Reflections take lines to lines, rays to rays, and line segments to line segments .
2) Glide Reflections preserve distance.
3) Glide Reflections preserve angle measure.
4) Glide Reflections preserve perpendicularity
5) Glide Reflections preserve parallelism.

Example 3

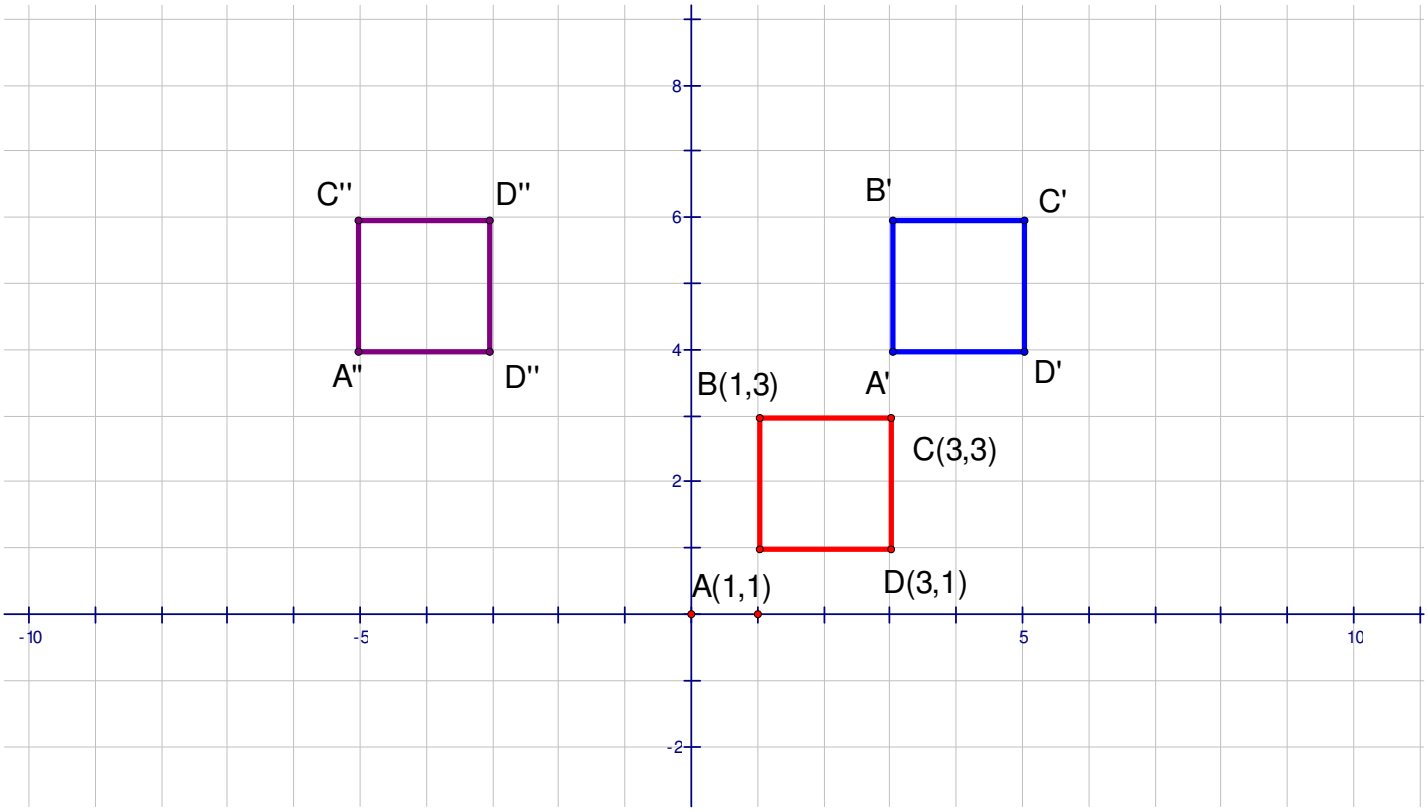
Given a square with vertices $A(1,1)$, $B(1,3)$, $C(3,3)$, and $D(3,1)$, find the image of the square under the glide reflection that translates from (0,0) to (2,3) and reflects about the y-axis.



Use the vector $v(2-0,3-0) = v(2,3)$



Reflect square A'B'C'D' about the y-axis.



A transformation that preserves distances is called an **isometry.**

Because Isometries preserve distance, they also preserve angle measure perpendicularity, and parallelism. Isometries also take lines to lines, rays to rays, and line segments to line segments.

Theorem 9.5 Congruent Triangles and Isometries

Two triangles are congruent if and only if there is an isometry that takes one triangle to the other triangle.

Theorem 9.6 Congruent Polygon and Isometries

Two polygons are congruent if and only if there is an isometry that takes one polygon to the other polygon.