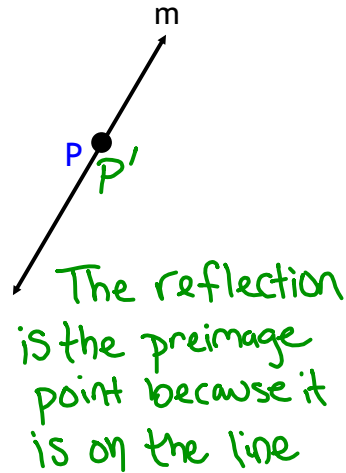
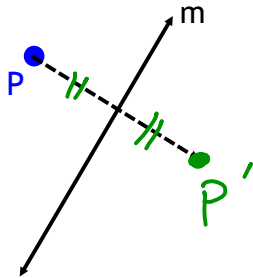


Sketch  $P'$ , the reflection of  $P$  over line  $m$ .



Section 9.3: Perform Reflections

EQ: How do you reflect a figure over (in) the line?

line of reflection

The "mirror" line what you flip over

reflection

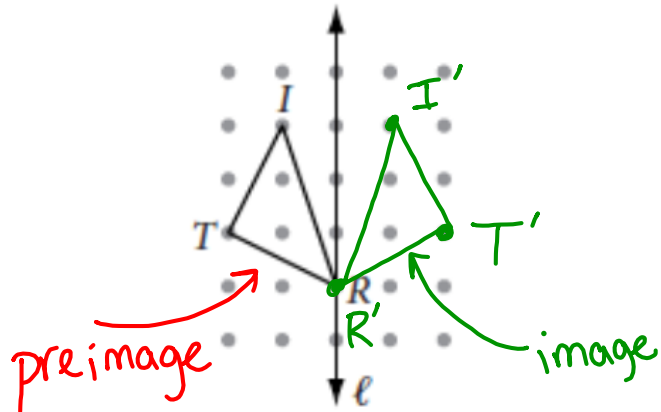
A mirror-like transformation

Theorem 9.2: Reflection Theorem

A Reflection is an Isometry.

→ same shape and size

A1. Create the marked sketch of the reflection of the preimage  $\triangle RTI$  over line  $l$ .

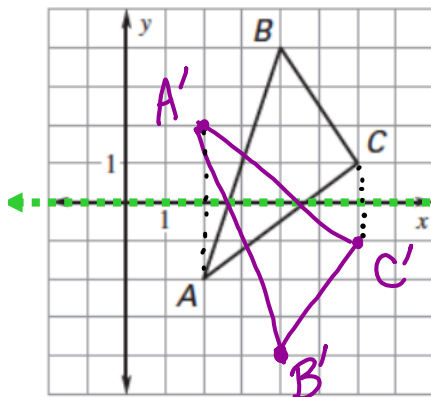


**Coordinate Rules for Reflections**

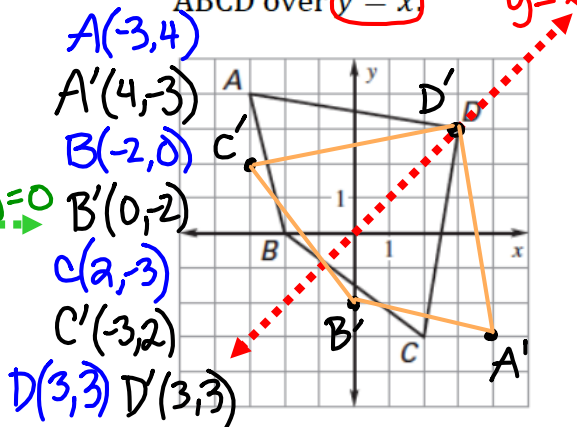
\*  $y = \#$  Horiz  $\leftrightarrow$   $x = \#$  vert.  $\updownarrow$

- If  $(a, b)$  is reflected in the  $x$ -axis, its image is the point  $(a, -b)$ .  $\hookrightarrow y=0$
- If  $(a, b)$  is reflected in the  $y$ -axis, its image is the point  $(-a, b)$ .  $\hookrightarrow x=0$
- If  $(a, b)$  is reflected in the line  $y = x$ , its image is the point  $(b, a)$ .  $\leftarrow$  contain  $(0,0)$   $\rightarrow$  up right
- If  $(a, b)$  is reflected in the line  $y = -x$ , its image is the point  $(-b, -a)$ .  $\hookrightarrow$  down right

A2. Graph the reflection of  $\triangle ABC$  in  $y = 0$ .  $\rightarrow$   $x$ -axis



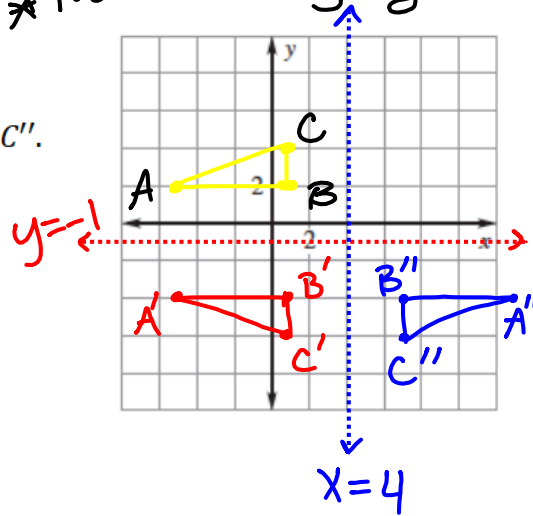
A3. Graph the reflection of  $ABCD$  over  $(y = x)$



A4. Graph  $\triangle ABC$ . Reflect  $\triangle ABC$  over  $y = -1$  for  $\triangle A'B'C'$ . Then reflect  $\triangle A'B'C'$  in  $x = 4$  for  $\triangle A''B''C''$ .

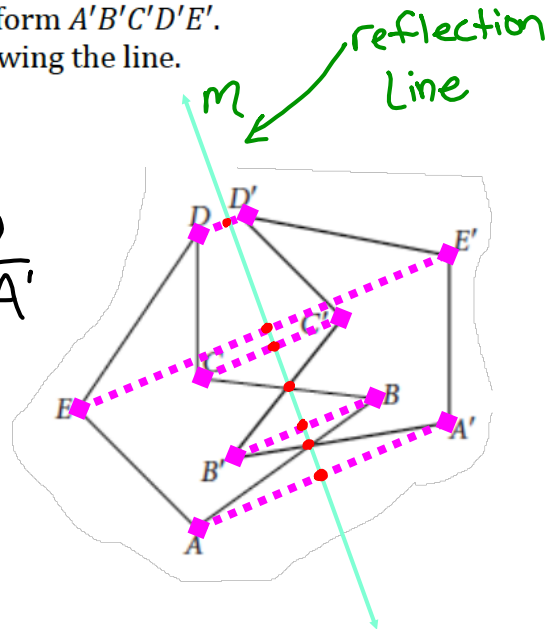
$A(-5, 2)$   $B(1, 2)$   $C(1, 4)$

\* Note: counting by 2's



A5. Carefully draw line  $m$ , the line that preimage  $ABCDE$  is reflected over to form  $A'B'C'D'E'$ . Explain your method to drawing the line.

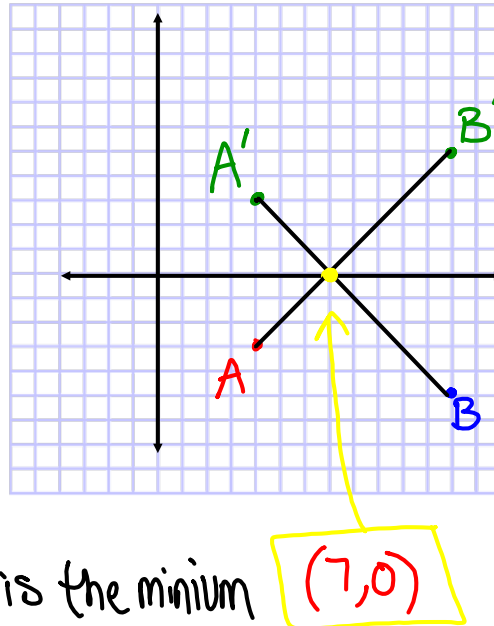
Draw  $\overline{DD'}$ ,  $\overline{EE'}$ ,  
 $\overline{CC'}$ ,  $\overline{BB'}$ , and  $\overline{AA'}$   
 then **bisect**  
 each segment



**MINIMUM DISTANCE** Find point  $C$  on the  $x$ -axis so  $AC + BC$  is a minimum.

$A(4, -3)$ ,  $B(12, -5)$

- 1) Plot pt.  $A$  and  $B$
- 2) Reflect either  
 $A$  or  $B$  over  $x$ -axis
- 3) Draw line  $AB'$   
or line  $BA'$
- 4) Where  $\overleftrightarrow{AB'}$  or  $\overleftrightarrow{BA'}$   
intersect the  $x$ -axis is the minimum

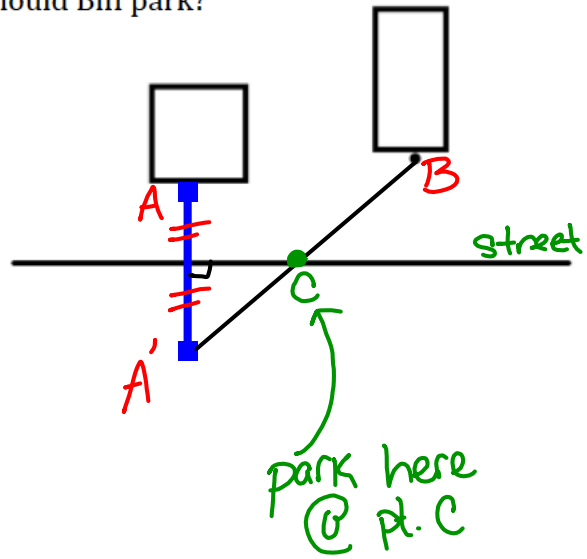


**PARKING** You are going to buy books. Your friend is going to buy CDs. Where should you park to minimize the distance you both will walk?

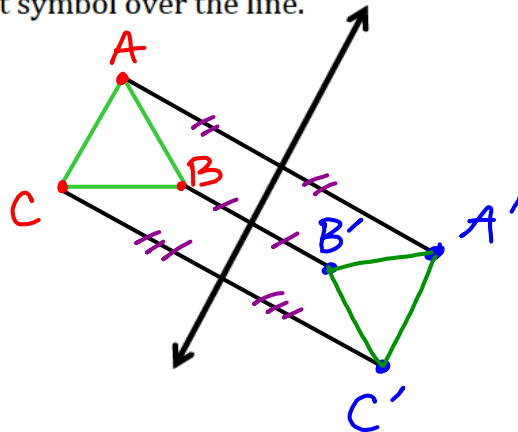


- ① Reflect  $B$  to  $B'$  over line
- ② Draw line from  $B'$  to  $A$
- ③ park car @ intersection

A6. When delivering pizza, Biff needs to park on the street (segment) to minimize the distance to walk to each door (dot). Where should Biff park?

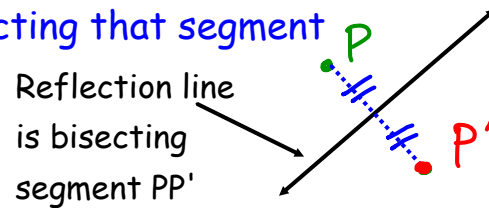


A7. Sketch your favorite math symbol on one side of the line. Then reflect that symbol over the line.



## Summary:

To reflect a figure draw a  $\perp$  segment from a pt. on the preimage through the line of reflection, such that the line of reflection is bisecting that segment



To reflect a figure over the  $y=x$  line take the original coordinate  $(x, y)$  [the preimage] and interchange the  $x$  and  $y$ -value.

Start with  $(x, y)$  change to  $(y, x)$