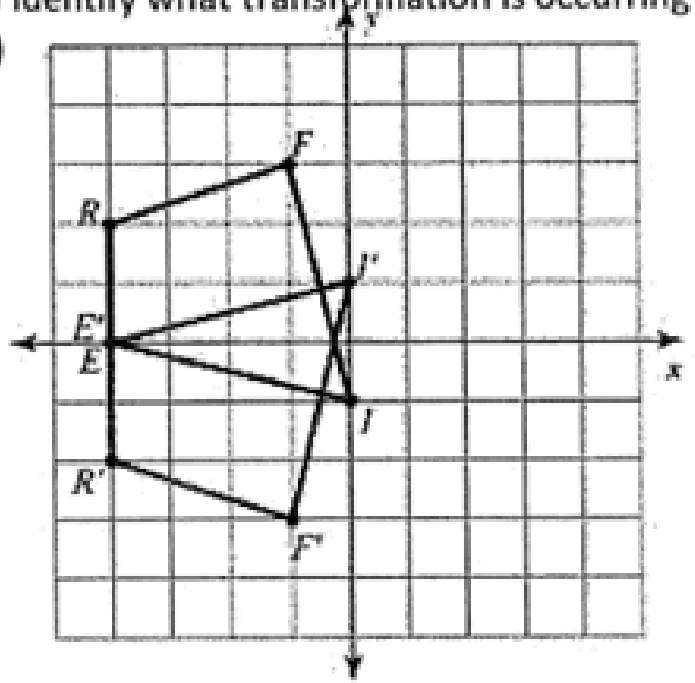
Get out your homework and have it ready to check. Quiz on Friday!

Classwork - Transformations and Congruence

1) Identify what transformation is occurring and then fully describe it.

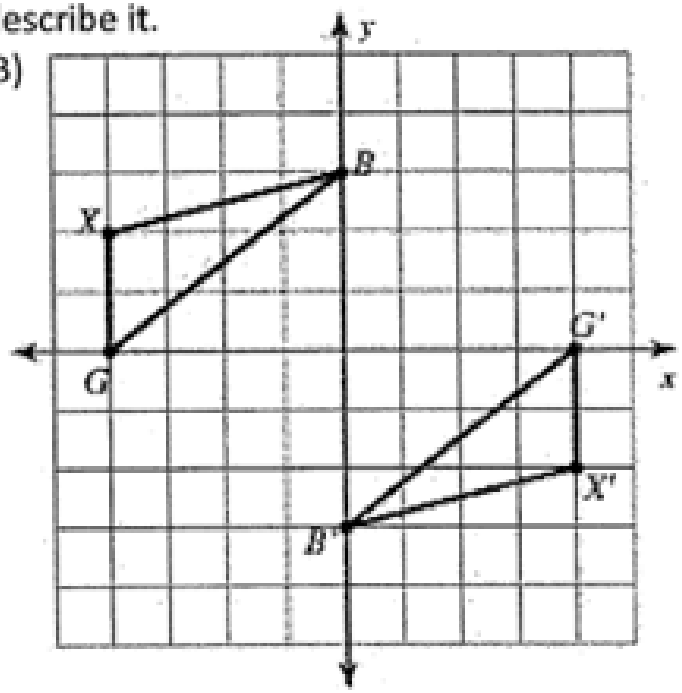
A)



Transformation: Reflection

Rule → Reflected over the x-axis

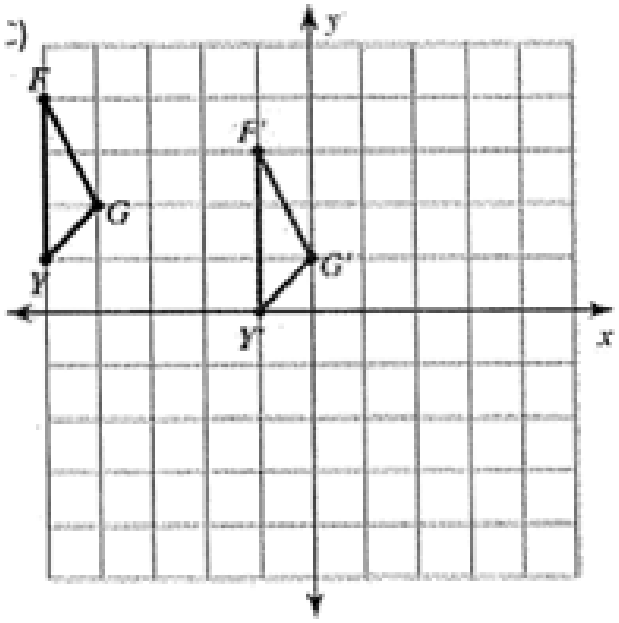
B)



Transformation: Rotation

Rule → Rotated 180° clockwise

C)

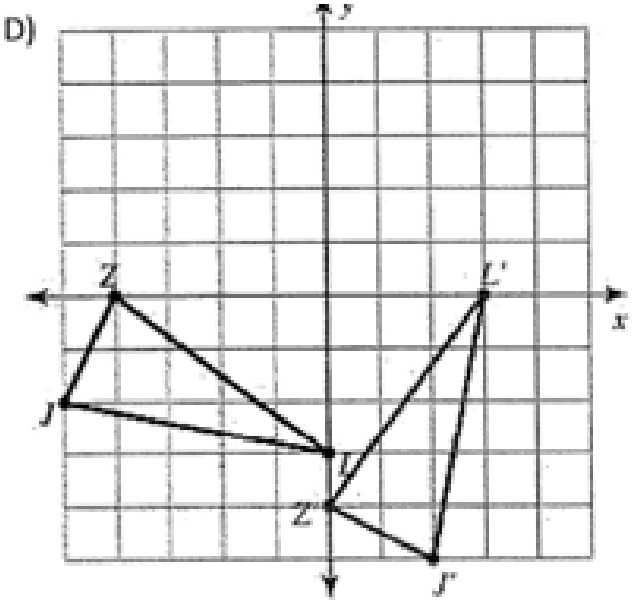


Transformation: Translation

Rule → $(x, y) \rightarrow (x+4, y-1)$

Right 4, down 1

D)



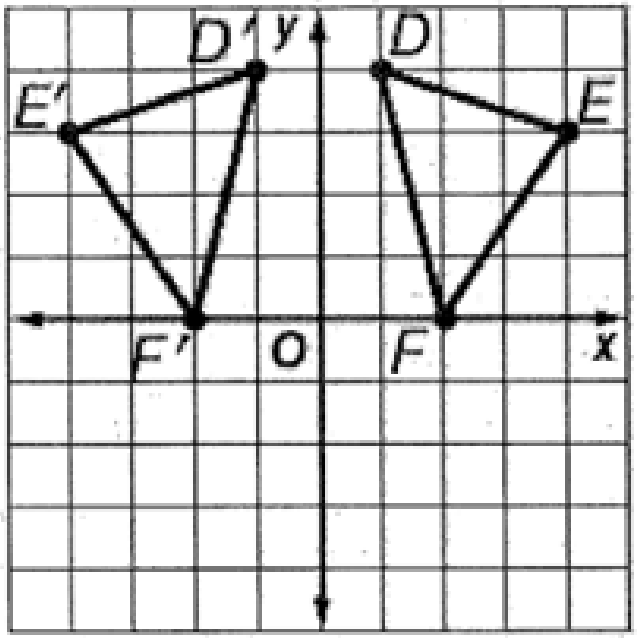
Transformation: Rotation

Rule → Rotated 270° clockwise

OR

Rotated 90° counterclockwise

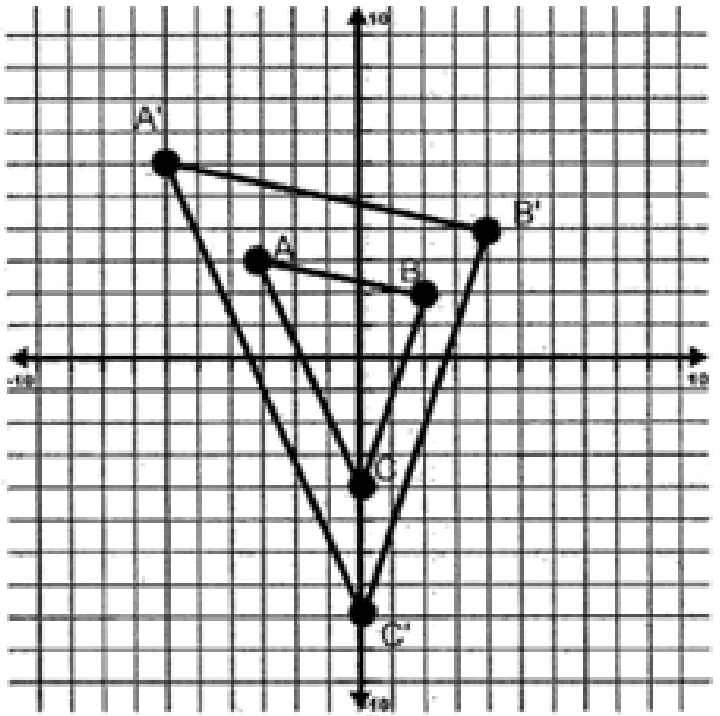
C)



Transformation: Reflection

Rule → Reflected over the y-axis

D)



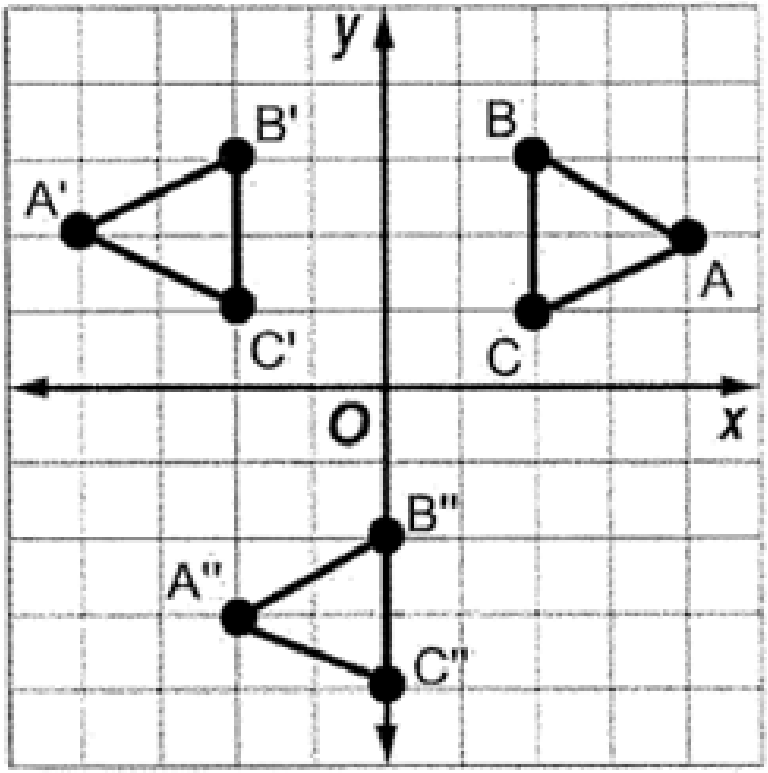
Transformation: Dilation

Rule → Dilation with scale factor of 2

B(2,2) → B'(4,4)

2) Identify what two transformations are occurring and then fully describe them.

A)



1st Transformation: Reflection

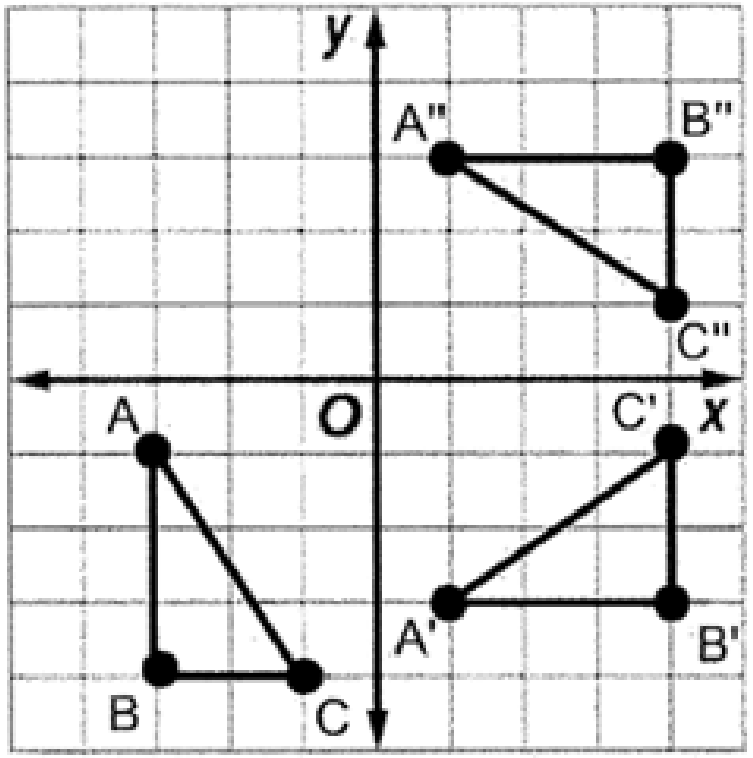
Rule → Reflected over y-axis

2nd Transformation: Translation

Rule → $(x, y) \rightarrow (x+2, y-5)$

Translated 2 right, down 5

B)



1st Transformation: Rotation

Rule → Rotated 270° clockwise

OR

Rotated 90° counterclockwise

2nd Transformation: Reflection

Rule → Reflected over the x-axis

Real-World Link

Braille The letter R in the Braille alphabet consists of four large dots and 2 smaller dots in the pattern shown. Circle the letter with the same shape as the letter R.

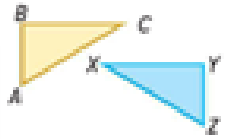
Identify Congruence

On the previous page, you matched Figure *A* to Figure *B* by a translation and a reflection. Two figures are congruent if the second can be obtained from the first by a series of rotations, reflections, and/or translations.

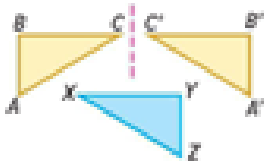
Examples

Determine if the two figures are congruent by using transformations. Explain your reasoning.

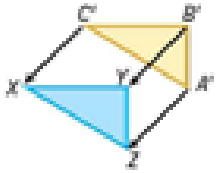
1.



Step 1 Reflect $\triangle ABC$ over a vertical line. Label the vertices of the image A', B', and C'.

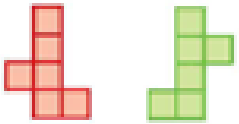


Step 2 Translate $\triangle A'B'C'$ until all sides and angles match $\triangle XYZ$.

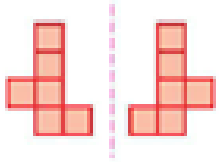


So, the two triangles are congruent because a reflection followed by a translation will map $\triangle ABC$ onto $\triangle ZYX$.

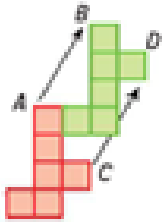
2.



Reflect the red figure over a vertical line.

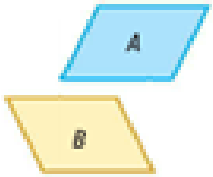


Even if the reflected figure is translated up and over, it will not match the green figure exactly. The two figures are not congruent.

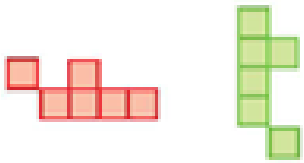


Got it? **Do these problems to find out.**

a.



b.

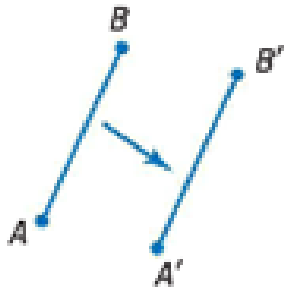
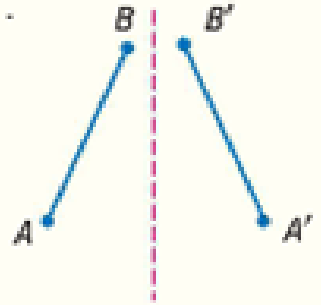
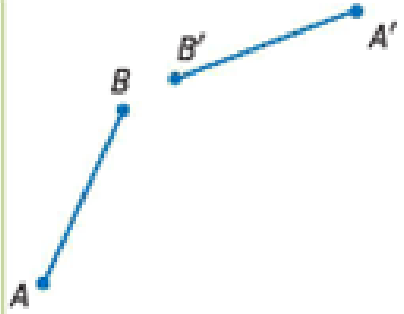


A) Congruent, because figure A reflected over a vertical line and then translated to match figure B.

B) Not Congruent, there are no transformations that will match the two figures.

Determine the Transformations

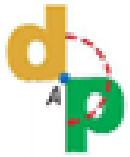
If you have two congruent figures, you can determine the transformation, or series of transformations, that maps one figure onto the other by analyzing the orientation or relative position of the figures.

Translation	Reflection	Rotation
• length is the same • orientation is the same	• length is the same • orientation is reversed	• length is the same • orientation is changed
		

Example

3. **Ms. Martinez created the logo shown. What transformations did she use if the letter "d" is the preimage and the letter "p" is the image? Are the two figures congruent?**

Step 1 Start with the preimage. Rotations or reflections change orientation. Rotate the letter "d" 180° about point *A*.



Step 2 Translate the new image up.

Ms. Martinez used a rotation and translation to create the logo. The letters are congruent because images produced by a rotation and translation have the same shape and size.

Got it? **Do this problem to find out.**

c. What transformations could be used if the letter "W" is the preimage and the letter "M" is the image in the logo shown? Are the two figures congruent? Explain.

c) They are congruent, the letter W is rotated 180° counter clockwise and then translated to exactly match letter M.