Similarity Transformations

Name Key

Vocabulary

Transformation - a rule that maps a preimage onto an image.

Examples: translation, reflection, rotation, dilation

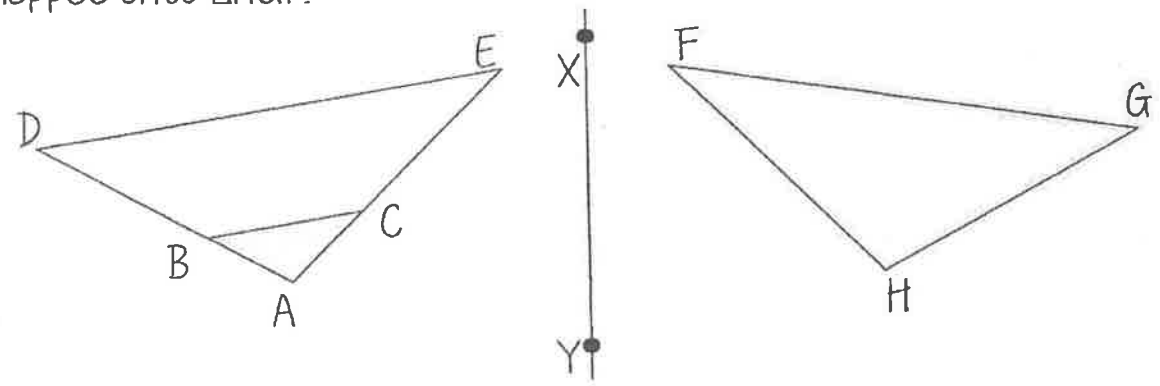
Rigid Motion Transformation - maps a preimage onto a congruent image.

Similarity Transformation - maps a preimage onto a similar shaped image

Similar Polygons - polygons with the same shape, but different sizes

Exercises:

1) In the figure below, $\triangle ABC$ is dilated, centered at point A with a scale factor of 3. Its image, $\triangle ADE$, is then reflected over $\overleftrightarrow{XY}$ and mapped onto $\triangle HGF$.

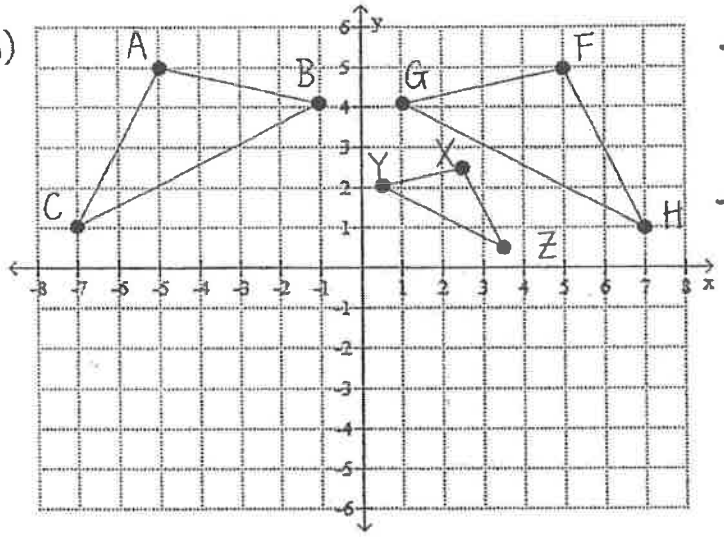


Is $\triangle ABC$ similar to $\triangle HGF$? Explain your how you know.

Yes $\triangle ABC \sim \triangle HGF$. Dilations and reflections both preserve angle measure, so by AA~, $\triangle ABC \sim \triangle ADE \sim \triangle HGF$.

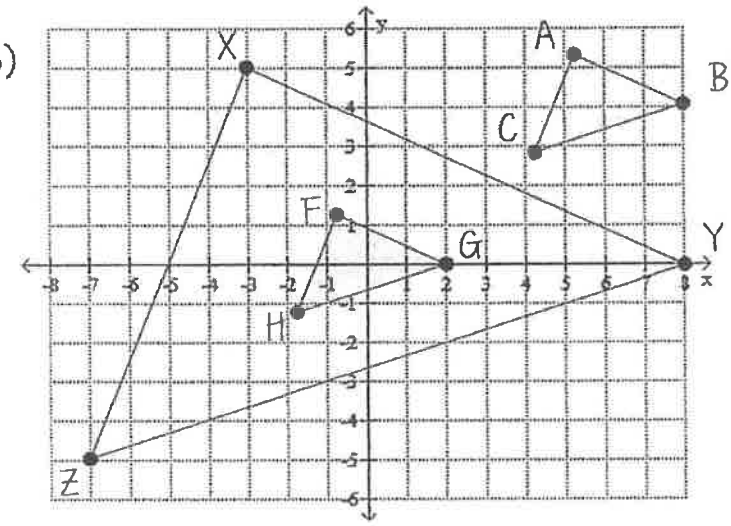
2) For each set of figures below, list the sequence of similarity transformations that maps $\triangle ABC$ onto $\triangle XYZ$. Be specific.

a)



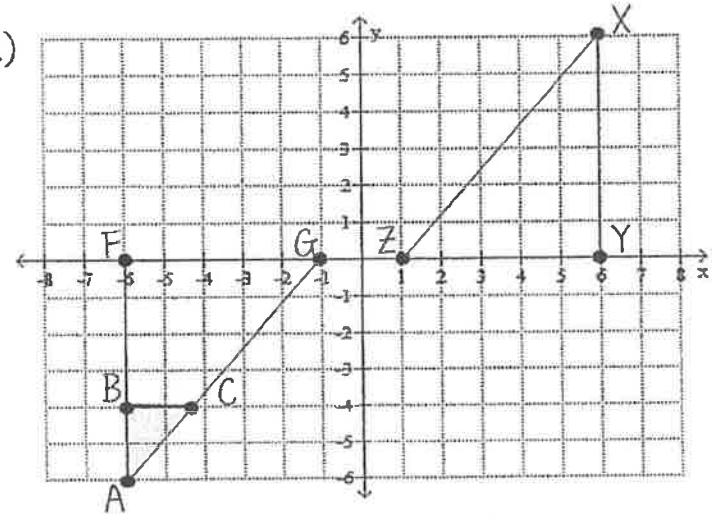
- Reflect $\triangle ABC$ over the y-axis onto $\triangle FGH$.
- Dilate $\triangle FGH$ with the origin as the center and scale Factor of $\frac{1}{2}$ onto $\triangle XYZ$.

b)



- Translate $\triangle ABC$ 6 units left and 4 units down onto $\triangle FGH$.
- Dilate $\triangle FGH$ with the origin as the center and scale Factor of 4 onto $\triangle XYZ$.

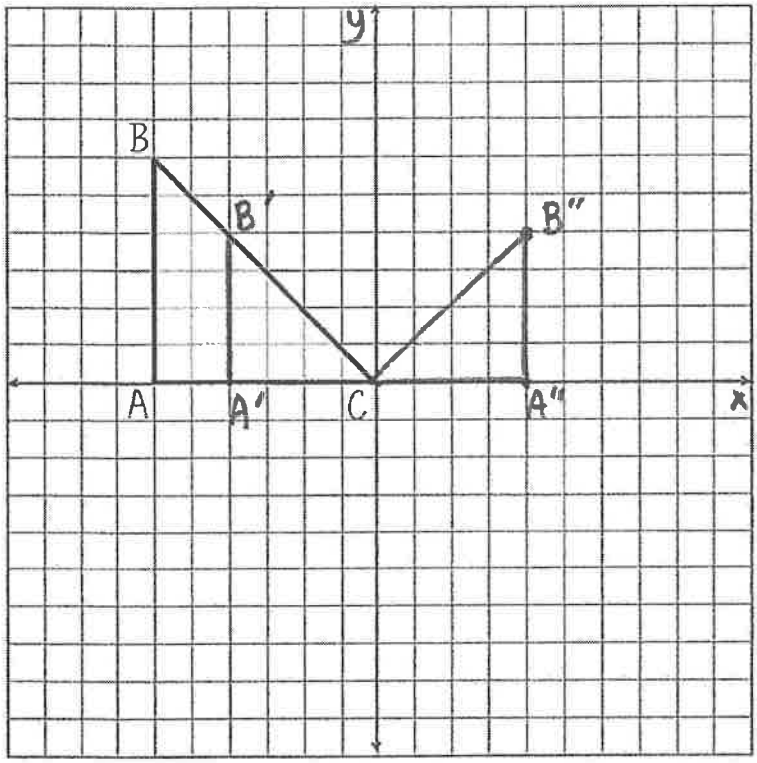
c)



- Dilate $\triangle ABC$ with center at point A and scale Factor of 3 onto $\triangle AFG$.
- Rotate $\triangle AFG$ around the origin by 180°.

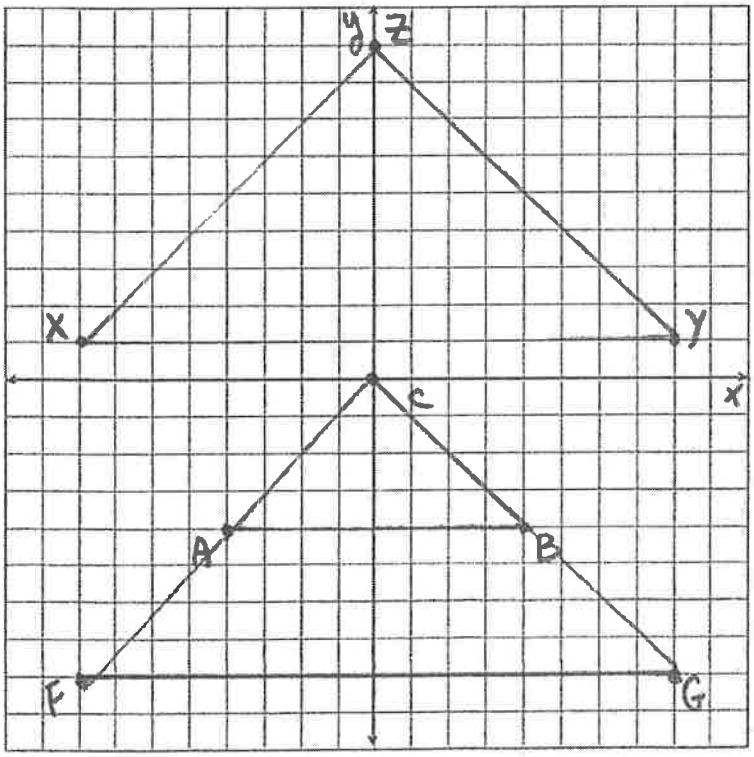
SAMPLE ANSWERS:

3) Given $\triangle ABC$ below, use similarity transformations to create a triangle similar to $\triangle ABC$. Describe your sequence of similarity transformations.



- Dilate $\triangle ABC$ centered at the origin and scale factor of $\frac{2}{3}$ onto $\triangle A'B'C$.
- Reflect $\triangle A'B'C$ over the y-axis onto $\triangle A''B''C$.

4) Create your own set of triangles and sequence of similarity transformations that maps $\triangle ABC$ onto $\triangle XYZ$. Describe your sequence of similarity transformations.



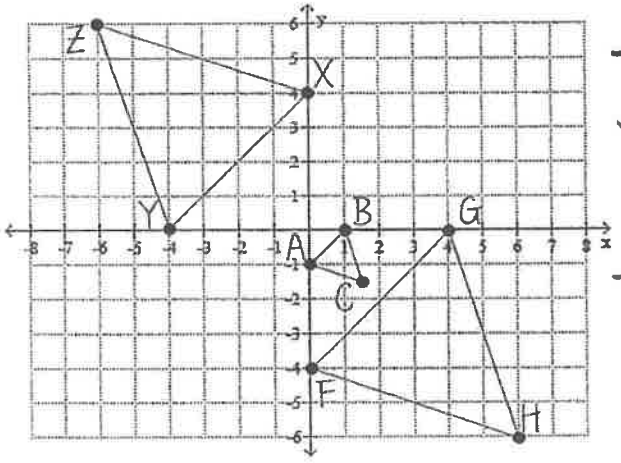
- Dilate $\triangle ABC$ centered at the origin with scale factor of 2 onto $\triangle FGC$.
- Translate $\triangle FGC$ 9 unit up onto $\triangle XYZ$.

Similarity Transformations PRACTICE Name Key

1) Explain the difference between a similarity transformation and a rigid motion transformation.

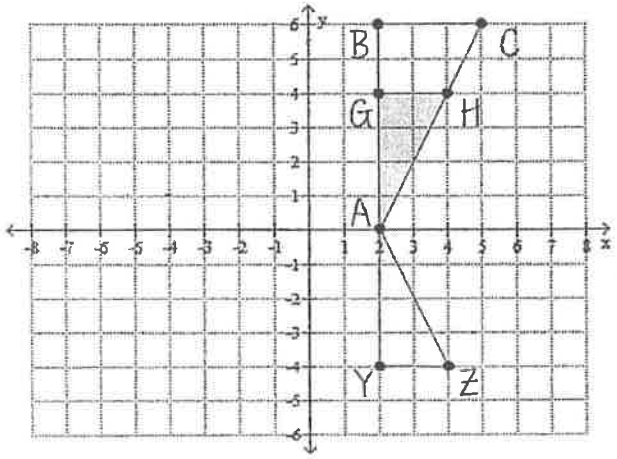
Rigid Motion transformations preserve size and shape.
Similarity transformations only preserve shape.

2) For each set of figures below, list the sequence of similarity transformations that maps $\triangle ABC$ onto $\triangle XYZ$.



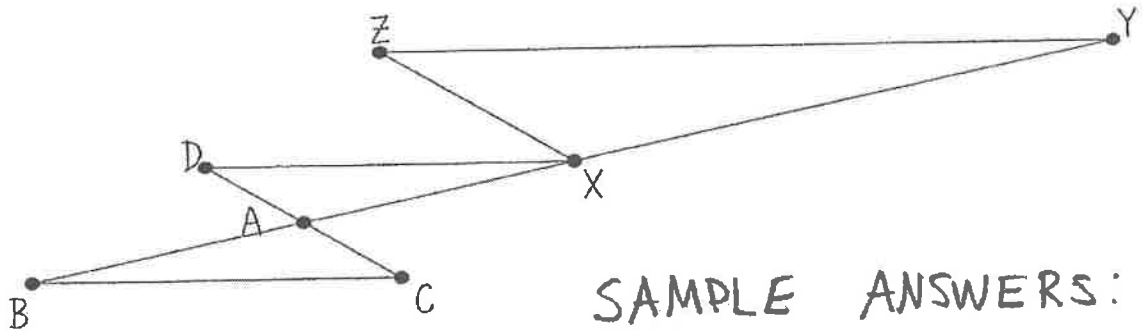
- Dilate $\triangle ABC$ centered at the origin with scale factor of 4 onto $\triangle FGH$.
- Rotate $\triangle FGH$ about the origin by 180° onto $\triangle XYZ$.

3) For each set of figures below, list the sequence of similarity transformations that maps $\triangle ABC$ onto $\triangle AYZ$.



- Dilate $\triangle ABC$ centered at point A with scale factor of $\frac{2}{3}$ onto $\triangle AGH$.
- Reflect $\triangle AGH$ over the x-axis onto $\triangle AYZ$.

4) In the figure below, $\triangle ABC$ is rotated 180° about point A. Its image, $\triangle AXD$, is then dilated with center B and scale factor 2.

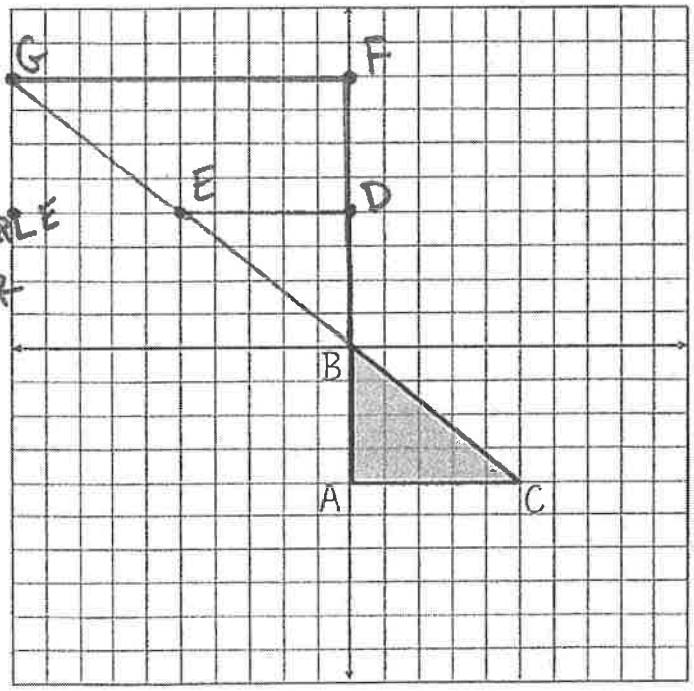


SAMPLE ANSWERS:

Given the information above, list 5 different facts about the figure.

- $\triangle ABC \cong \triangle AXD$
- $\triangle AXD \sim \triangle XYZ$
- $\angle C \cong \angle D$
- $2BC = YZ$
- $\overline{BC} \parallel \overline{XD}$

5) Given $\triangle ABC$ below, use similarity transformations to create a similar triangle. Explain how you know the image is similar.



SAMPLE ANSWER

- Rotate $\triangle ABC$ about the origin 180° onto $\triangle DBE$.
- Dilate $\triangle DBE$ centered at the origin with a scale factor of 2 onto $\triangle FBG$.