Date: 12/2/20

Lesson 4.6 - Multiple Transformations Including Dilations in the coordinate plane.

Learning Intent (Target): *Today I will* be able to graph polygons in the coordinate plane using multiple transformations, including dilations.

Success Criteria: *I'll know I'll have it when* I can accuratley graph multiple transformations with dilations that include translations, reflections, and rotations.

Accountable Team Task: *Therefore, I can* practice using interactive flip charts for notes & invstigations using gizmos to graph multiple transformations.

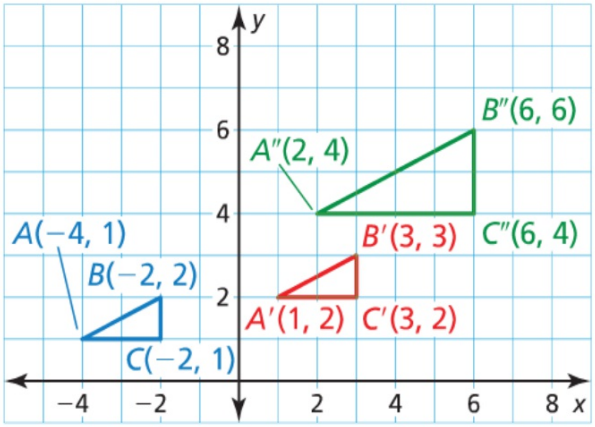
Graph $\triangle ABC$ with vertices $A(-4, 1)$, $B(-2, 2)$, and $C(-2, 1)$ and its image after the similarity transformation.

Translation: $(x, y) \rightarrow (x + 5, y + 1)$

Dilation: $(x, y) \rightarrow (2x, 2y)$

SOLUTION

Step 1 Graph $\triangle ABC$.



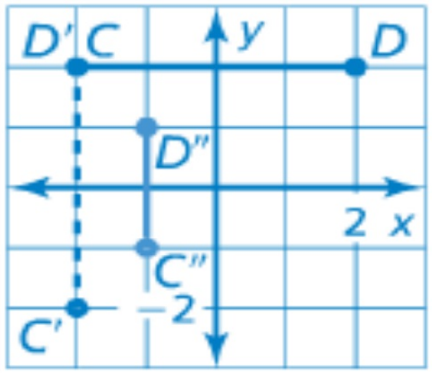
Step 2 Translate $\triangle ABC$ 5 units right and 1 unit up. $\triangle A'B'C'$ has vertices $A'(1, 2)$, $B'(3, 3)$, and $C'(3, 2)$.

Step 3 Dilate $\triangle A'B'C'$ using a scale factor of 2. $\triangle A''B''C''$ has endpoints $A''(2, 4)$, $B''(6, 6)$, and $C''(6, 4)$.

1. Graph $\overline{CD}$ with endpoints *C*(−2, 2) and *D*(2, 2) and its image after the similarity transformation.

Rotation: 90° about the origin

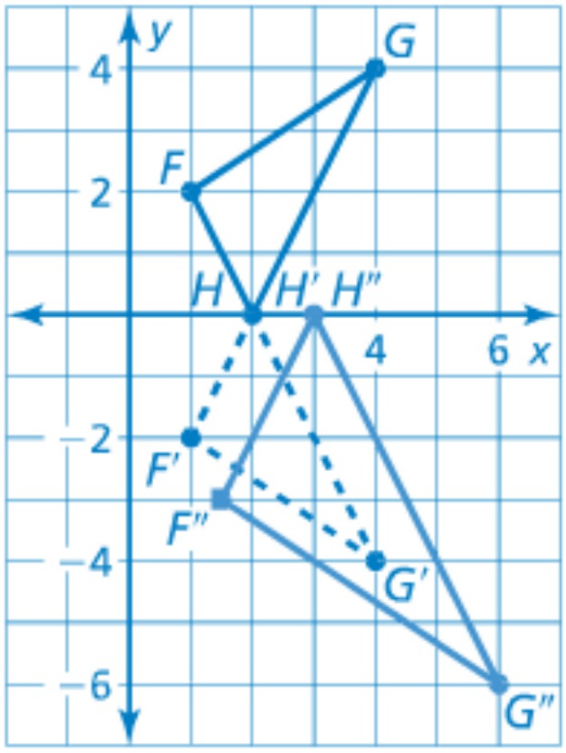
Dilation: $(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$



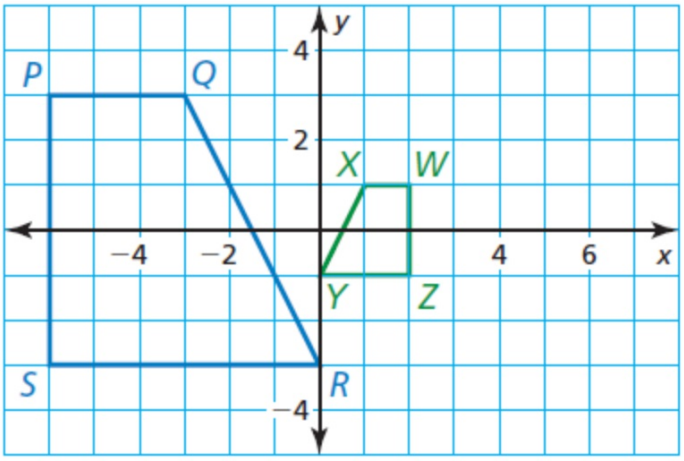
2. Graph $\triangle FGH$ with vertices F (1, 2), G(4, 4), and H (2, 0) and its image after the similarity transformation.

Reflection: in the x-axis

Dilation: $(x, y) \rightarrow (1.5x, 1.5y)$

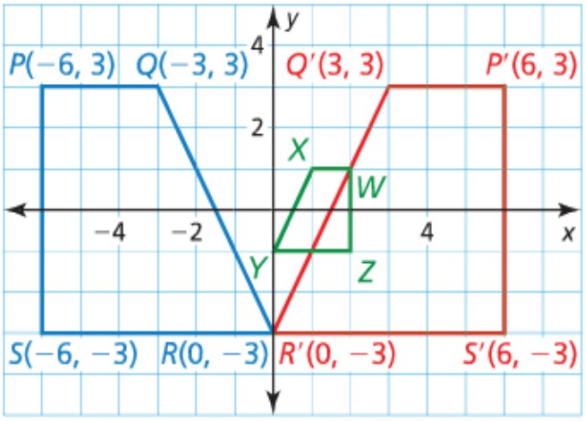


Describe a similarity transformation that maps trapezoid $PQRS$ to trapezoid $WXYZ$.



SOLUTION

$\overline{QR}$ falls from left to right, and $\overline{XY}$ rises from left to right. If you reflect trapezoid $PQRS$ in the y-axis as shown, then the image, trapezoid $P'Q'R'S'$, will have the same orientation as trapezoid $WXYZ$.



Trapezoid $WXYZ$ appears to be about one-third as large as trapezoid $P'Q'R'S'$. Dilate trapezoid $P'Q'R'S'$ using a scale factor of $\frac{1}{3}$.

$$(x, y) \rightarrow \left(\tfrac{1}{3}x, \tfrac{1}{3}y\right)$$

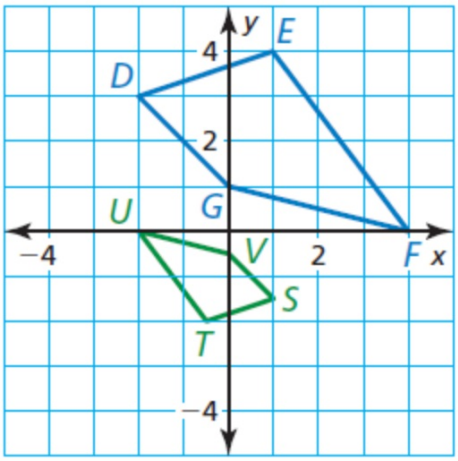
$$P'(6, 3) \rightarrow P''(2, 1)$$

$$Q'(3, 3) \rightarrow Q''(1, 1)$$

$$R'(0, -3) \rightarrow R''(0, -1)$$

$$S'(6, -3) \rightarrow S''(2, -1)$$

4. Describe a similarity transformation that maps quadrilateral *DEFG* to quadrilateral *STUV*.



Sample answer: dilation with a scale factor of $\frac{1}{2}$ followed by a 180° rotation about the origin