

7-2

Similarity
Transformations

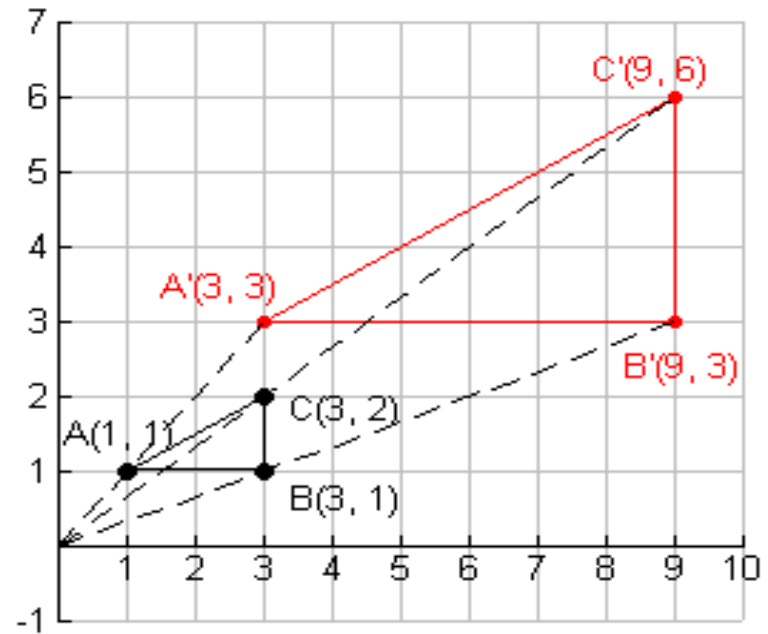
OBJECTIVE

- ❖ To apply dilations in the coordinate plane
- ❖ To use transformations to show similarity

Example 1: Drawing and Describing Dilations

A. Apply the dilation D to the polygon with the given vertices. Describe the dilation.

$$D: (x, y) \rightarrow (3x, 3y)$$
$$A(1, 1), B(3, 1), C(3, 2)$$
$$A'(3, 3), B'(9, 3), C'(9, 6)$$



dilation with center $(0, 0)$ and scale factor 3

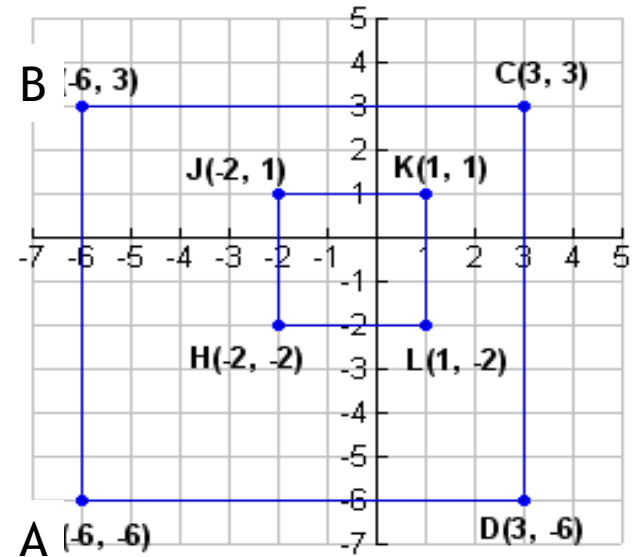
Example 2 : Determining Whether Polygons are Similar

Determine whether the polygons with the given vertices are similar.

A. $A(-6, -6)$, $B(-6, 3)$, $C(3, 3)$,
 $D(3, -6)$ and $H(-2, -2)$,
 $J(-2, 1)$, $K(1, 1)$, $L(1, -2)$

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

$$A(-6, -6) \rightarrow H(-2, -2)$$



Yes; ABCD maps to HJKL by a dilation:

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

Example 2: Continued

D. $F(3, 3)$, $G(3, 6)$, $H(9, 3)$,
 $J(9, -3)$ and $S(-1, 1)$,
 $T(-1, 2)$, $U(-3, 1)$, $V(-3, -1)$.

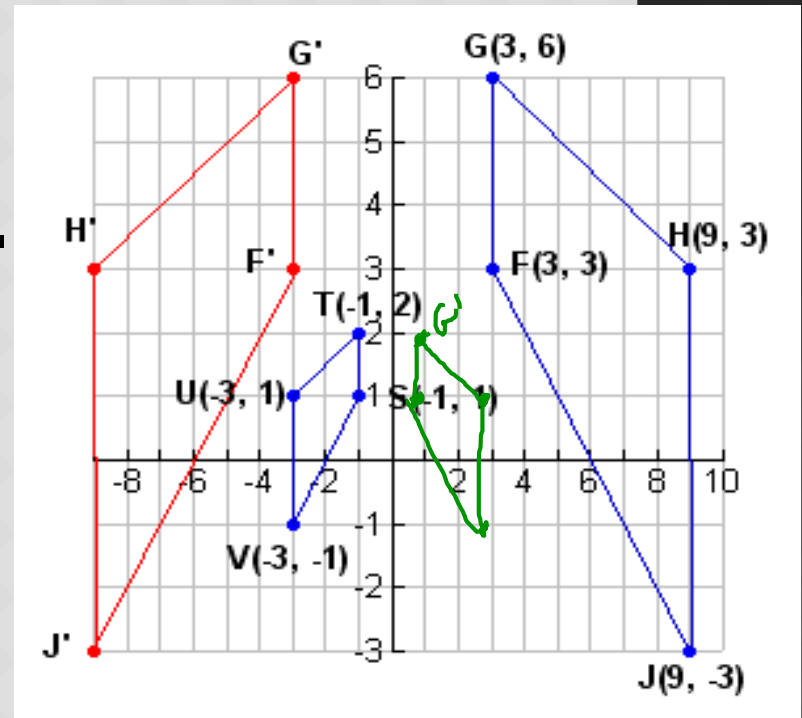
$$(x, y) \rightarrow (-x, y) \rightarrow \left(\frac{1}{3}x, \frac{1}{3}y\right)$$

$$G(3, 6) \rightarrow G'(-3, 6) \rightarrow T(-1, 2)$$

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

$$G(3, 6) \xrightarrow{G'} (1, 2) \rightarrow T(-1, 2)$$

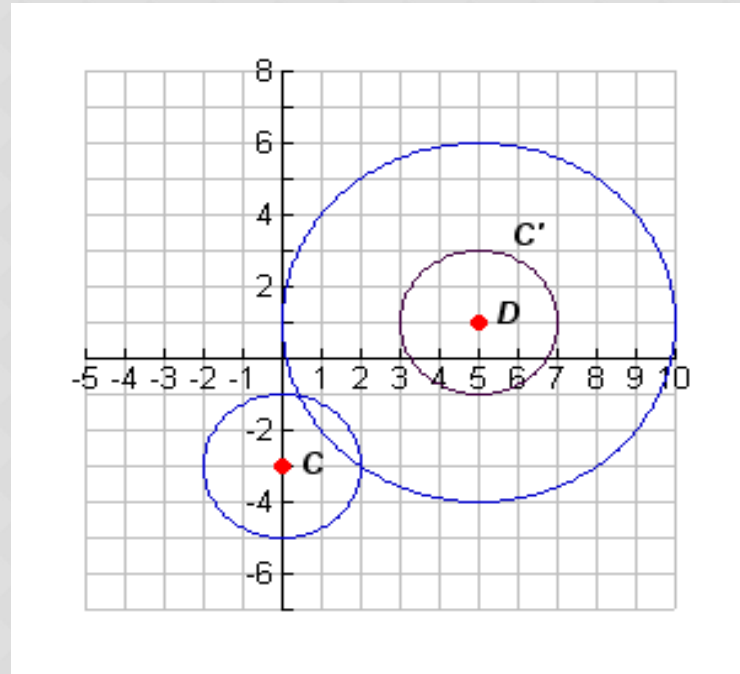
2nd
option



Yes; $FGHI$ maps to $F'G'H'J'$ by a reflection :
 $(x, y) \rightarrow (-x, y)$. Then $F'G'H'J'$ maps to $STUV$ by a
dilation:

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

Example 3:



Circle C can be mapped to circle C' by a translation: $(x, y) \rightarrow (x + 5, y + 4)$. Circle C' and circle D both have center $(5, 1)$. Then circle C' can be mapped to circle D by a dilation with center $(5, 1)$ and scale factor 2.5. So circle C and circle D are similar.

HOMework

Pages 477 - 479

14 - 26 even