LESSON MAKER PRO

Transform and Track

Use coordinates to compare images and pre-images.

GRADE 8 · TEKS 8.10.A

8.10.A "generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;"

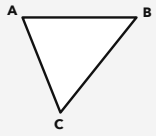
NAME _____ DATE _____

TRANSFORMATION PROPERTIES

Translations and rotations keep side lengths, angle measures, and orientation. Reflections keep lengths and angles but reverse orientation. A dilation multiplies all lengths by its scale factor, so it is congruent only when the scale factor is 1.

WORKED EXAMPLE

The triangle shown has A(11,12), B(14,12), and C(12,15). Rotate it 90° counterclockwise about the origin. Find A', B', and C'.



1. Use the rule (x,y) to (-y,x).
2. A(11,12) becomes A'(-12,11).
3. Apply the rule to B and C.

Answer: A'(-12,11), B'(-12,14), C'(-15,12)

PRACTICE 4 problems

1 Triangle DEF has D(6,-3), E(9,-3), and F(7,-6). Reflect it across the y-axis. Give the image coordinates and state whether orientation changes.

ANSWER _____

2 Triangle MNP has M(-4,7), N(-1,7), and P(-2,9). Translate it 5 units right and 8 units down. Is the image congruent to the pre-image?

ANSWER _____

3 Triangle QRS has Q(8,10), R(10,10), and S(8,13). Dilate it by a scale factor of 1/2 about the origin. Is the image congruent?

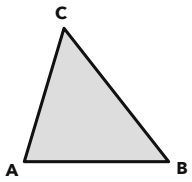
ANSWER _____

4 Triangle JKL has J(-7,6), K(-9,6), and L(-8,8). Rotate it 180° about the origin. State whether orientation and congruence are preserved.

ANSWER _____

APPLY IT Show your work

1 A gaming club uses the shown triangle as a logo. Its vertices are A(-2,3), B(-5,3), and C(-3,6). A screen effect reflects the logo across the y-axis. Find the new coordinates. Is the new logo congruent?



ANSWER _____

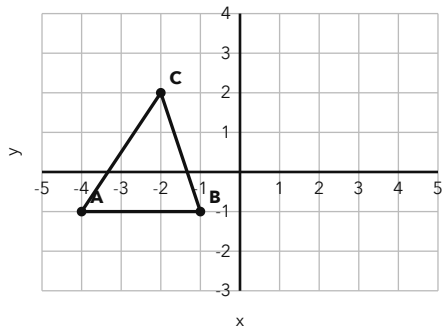
2 An animator enlarges a triangular sticker with vertices U(2,-4), V(4,-4), and W(2,-2). The dilation has scale factor 3/2 and center (0,0). Find U', V', and W'. State whether orientation is preserved.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The grid shows triangle ABC. Translate it 3 units right and 1 unit up, then reflect the result across the y-axis. Find A'', B'', and C''. Is the final image congruent to triangle ABC, and is its orientation the same or reversed?



WORK SPACE AND ANSWER

ANSWER KEY

Transform and Track

GRADE 8 · TEKS 8.10.A

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Triangle DEF has D(6,-3), E(9,-3), and F(7,-6). Reflect it across the y-axis. Give the image coordinates and state whether orientation changes.	**D'(-6,-3), E'(-9,-3), F'(-7,-6); orientation reverses.**
2	Triangle MNP has M(-4,7), N(-1,7), and P(-2,9). Translate it 5 units right and 8 units down. Is the image congruent to the pre-image?	**M'(1,-1), N'(4,-1), P'(3,1); yes, the image is congruent.**
3	Triangle QRS has Q(8,10), R(10,10), and S(8,13). Dilate it by a scale factor of 1/2 about the origin. Is the image congruent?	**Q'(4,5), R'(5,5), S'(4,13/2); no, it is not congruent.**
4	Triangle JKL has J(-7,6), K(-9,6), and L(-8,8). Rotate it 180° about the origin. State whether orientation and congruence are preserved.	**J'(7,-6), K'(9,-6), L'(8,-8); orientation and congruence are preserved.**

PART 2 · APPLY IT

1. **A'(2,3), B'(5,3), C'(3,6); yes, it is congruent.** Change each x-coordinate to its opposite. A reflection preserves lengths and angle measures.
2. **U'(3,-6), V'(6,-6), W'(3,-3); orientation is preserved.** Multiply every coordinate by 3/2. A positive dilation keeps orientation, but the image is not congruent because the scale factor is not 1.

CHALLENGE

A''(1,0), B''(-2,0), C''(-1,3); the final image is congruent, and its orientation is reversed.

Accept coordinates written as ordered pairs in any clear equivalent format. For orientation, accept "reversed" or "changes" for a reflection, and "preserved" or "same" for translations, rotations, and positive dilations.