LESSON MAKER PRO

Move It Right

Use rules to track points and test what stays the same.

HIGH SCHOOL · HSG-CO.A.2

CCSS.Math.Content.HSG-CO.A.2 "Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs..."

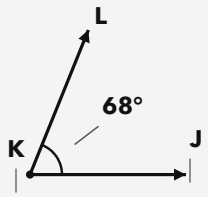
NAME _____ **DATE** _____

TRANSFORMATION FUNCTIONS

A transformation is a function: it takes an input point (x, y) and gives an output point. Translations, reflections, and rotations preserve distances and angle measures. A horizontal stretch changes x-coordinates and usually does not preserve both.

WORKED EXAMPLE

A rotation maps the angle shown to ∠J'K'L'. Find m∠J'K'L'.



1. Read the figure: m∠JKL = 68°.
2. A rotation preserves angle measure.
3. So m∠J'K'L' = 68°.

Answer: 68°

PRACTICE 4 problems

1 A translation follows (x, y) -> (x + 5, y - 4). Find the image of (-2, 3).

ANSWER _____

2 Reflect (4, -1) across the y-axis. Give the image point.

ANSWER _____

3 Rotate (2, -5) 90° counterclockwise about the origin. Give the image point.

ANSWER _____

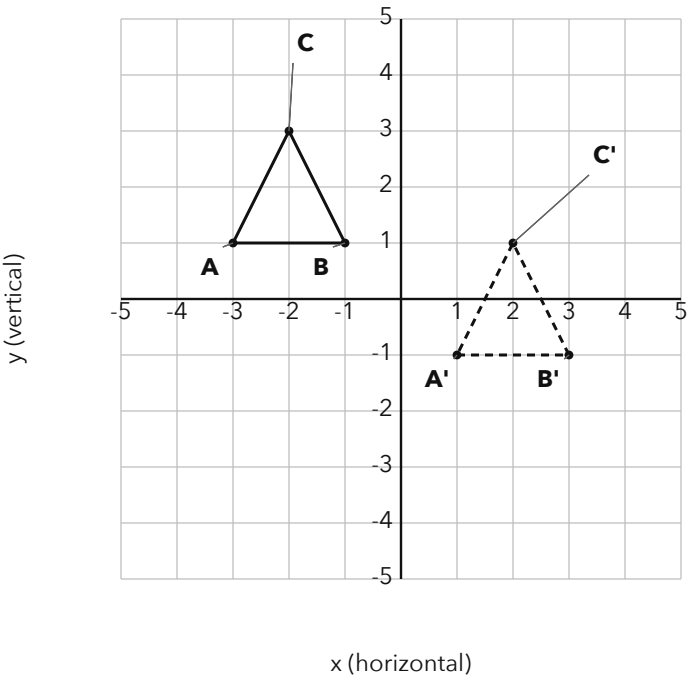
4 The rule (x, y) -> (3x, y) maps a figure to its image. Name the transformation. Does it preserve distance and angle?

ANSWER _____

_____

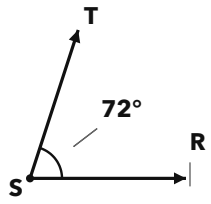
APPLY IT Show your work

1 The grid shows ABC with A(-3,1), B(-1,1), C(-2,3), and A'B'C' with A'(1,-1), B'(3,-1), C'(2,1). Write the translation rule. Does it preserve distance and angle?



ANSWER _____

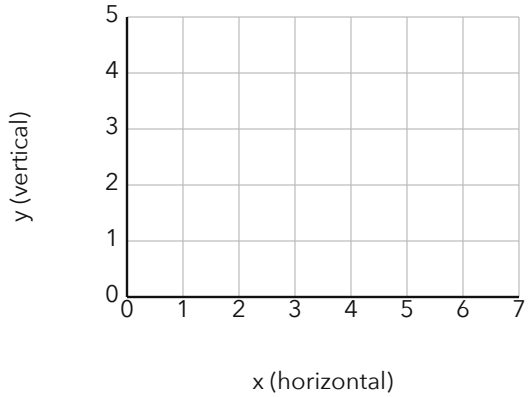
2 A designer rotates the hoodie-logo angle shown. What is the measure of its image? Does the rotation preserve angle measure?



ANSWER _____

CHALLENGE One step up

Triangle PQR has P(1, 1), Q(3, 1), and R(2, 4). A horizontal stretch by a factor of 2 maps it to P'Q'R'. Find all three image points. Then use side PQ to explain why this stretch is not a rigid motion. Draw both triangles on the blank grid and label their corresponding vertices.



WORK SPACE AND ANSWER

ANSWER KEY # Move It Right

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A translation follows (x, y) -> (x + 5, y - 4). Find the image of (-2, 3).	**(3, -1)**
2	Reflect (4, -1) across the y-axis. Give the image point.	**(-4, -1)**
3	Rotate (2, -5) 90° counterclockwise about the origin. Give the image point.	**(5, 2)**
4	The rule (x, y) -> (3x, y) maps a figure to its image. Name the transformation. Does it preserve distance and angle?	**Horizontal stretch by a factor of 3; no, it does not preserve distance and angle.**

PART 2 · APPLY IT

1. **(x, y) -> (x + 4, y - 2); yes, it preserves distance and angle.** Compare any matching pair of vertices: x increases by 4 and y decreases by 2. A translation is a rigid motion.
2. **72°; yes.** Read 72° from the figure. Rotations preserve angle measure.

CHALLENGE

P'(2, 1), Q'(6, 1), R'(4, 4). PQ = 2 units, but P'Q' = 4 units, so distance is not preserved and the stretch is not rigid.

Accept ordered pairs with equivalent spacing. For preservation questions, accept "rigid motion" for translations, reflections, and rotations, and require that a horizontal stretch be identified as non-rigid. For the challenge, check both actually plotted triangles and corresponding labels as well as the distance comparison.

Challenge solution: original PQR and horizontally stretched P'Q'R'; PQ=2, P'Q'=4.

