LESSON MAKER PRO

Transform It Right

Use rules, coordinates, and scale factors to track a shape.

GRADE 8 · TEKS 8.10

8.10 "Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to: generalize the properties of orientation and congruence of rotations, reflections..."

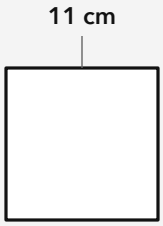
NAME _____ DATE _____

COORDINATE MOVE RULES

A translation follows (x, y) -> (x + a, y + b). Reflections use (x, y) -> (x, -y) over the x-axis and (x, y) -> (-x, y) over the y-axis, while rotations about the origin use 90° CCW: (-y, x), 180°: (-x, -y), 270° CCW: (y, -x), and 360°: (x, y). Translations, rotations, and reflections preserve congruence, but a dilation multiplies lengths by k and area by k^2, so it is congruent only when k = 1.

WORKED EXAMPLE

A stage crew enlarges the square sign in the figure by a scale factor of 7. Find the image side length and area.



1. Multiply the side length: 11 x 7 = 77 cm.
2. Find the original area: 11 x 11 = 121 cm^2.
3. Multiply area by 7^2: 121 x 49 = 5929 cm^2.

Answer: Image side length: 77 cm; image area: 5929 cm^2.

PRACTICE 4 problems

1 A game designer moves a character marker at (2, -1) using (x, y) -> (x + 5, y - 6). What is the new coordinate?

ANSWER _____

2 A skateboard company reflects a logo point at (-5, 8) over the x-axis. What is the image coordinate?

ANSWER _____

3 A drone-camera app rotates a triangular sticker 90° counterclockwise about the origin. One vertex is at (1, -9). What is its image coordinate, and does the rotation preserve congruence?

ANSWER _____

_____

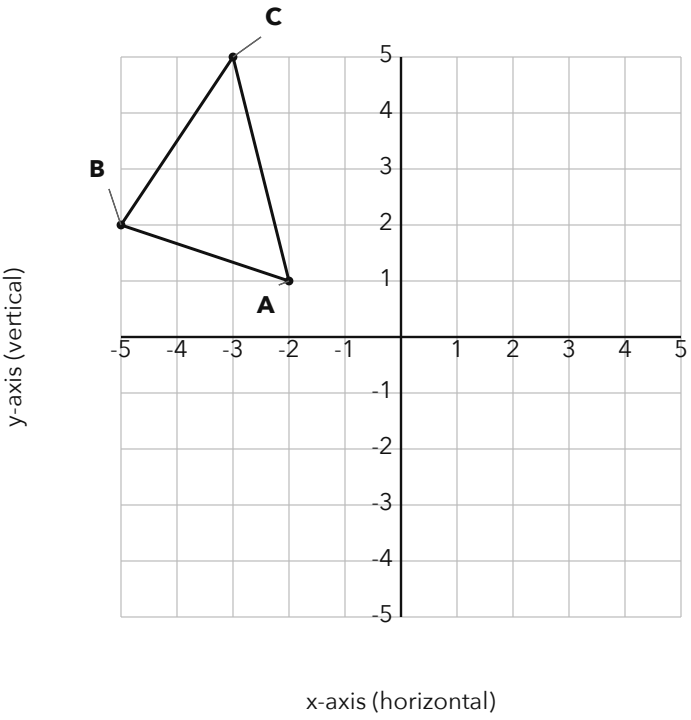
4 A band shrinks an 18 cm by 10 cm poster by a scale factor of 1/2. What are the image dimensions, and is the image congruent to the original?

ANSWER _____

_____

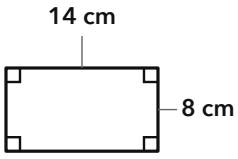
APPLY IT Show your work

1 A game artist reflects the solid triangle in the grid over the y-axis. List A', B', and C'. State what happens to orientation and congruence.



ANSWER _____

2 The rectangle in the figure is a club banner. A printer makes a scale-factor 1/2 copy. Find the new perimeter and area. State the multiplier for each measurement.



ANSWER _____

CHALLENGE One step up

A dance-animation team translates triangle P(1, 2), Q(5, 2), R(2, 6) using (x, y) -> (x - 2, y + 4), then rotates it 90° counterclockwise about the origin. Write one rule for both moves, list the final vertices, and explain congruence and orientation.

WORK SPACE AND ANSWER

ANSWER KEY # Transform It Right

GRADE 8 · TEKS 8.10

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A game designer moves a character marker at (2, -1) using (x, y) -> (x + 5, y - 6). What is the new coordinate?	**(7, -7)**
2	A skateboard company reflects a logo point at (-5, 8) over the x-axis. What is the image coordinate?	**(-5, -8)**
3	A drone-camera app rotates a triangular sticker 90° counterclockwise about the origin. One vertex is at (1, -9). What is its image coordinate, and does the rotation preserve congruence?	**(9, 1); yes, a rotation preserves congruence.**
4	A band shrinks an 18 cm by 10 cm poster by a scale factor of 1/2. What are the image dimensions, and is the image congruent to the original?	**9 cm by 5 cm; no, the scale factor is not 1.**

PART 2 · APPLY IT

1. **A'(2, 1), B'(5, 2), C'(3, 5); orientation reverses, and congruence is preserved.** Change each x-coordinate to its opposite and keep each y-coordinate. A reflection preserves lengths and angles but reverses orientation.
2. **Perimeter: 22 cm; area: 28 cm^2. Perimeter is multiplied by 1/2, and area is multiplied by 1/4.** The copy measures 7 cm by 4 cm. Its perimeter is 2(7 + 4), and its area is 7 x 4.

CHALLENGE

Rule: (x, y) -> (-y - 4, x - 2). P''(-6, -1), Q''(-6, 3), R''(-10, 0). The image is congruent, and orientation is preserved because both a translation and a rotation preserve them.

Accept equivalent coordinate notation and equivalent descriptions of the combined rule. For area, require square units and the k^2 area multiplier.