

Moving Shapes with Translations, Reflections, Rotations

Grade 8 math · Test Answer Key · Standards: 8.G.A.1, 8.G.A.3

Award points as shown in each scoring note. Accept a correct answer with a different but valid method, and give part credit for correct work that carries an earlier error forward consistently.

Standards: 8.G.A.1, 8.G.A.3 · **Level:** Grade 8

Question 1 Points on the plane (2 points)

(a) $(-3 + 6, 5 - 8) = (3, -3)$

(b) $(-3, 5) \rightarrow (-3, -5)$

Scoring: 1 point per part.

Question 2 Rotations of a point (3 points)

(a) $(-y, x) = (6, 4)$

(b) $(-x, -y) = (-4, 6)$

(c) $(y, -x) = (-6, -4)$

Scoring: 1 point per image.

Question 3 Identify the motion (3 points)

(a) A(1, 2) maps to A'(-2, 1) and B(5, 2) to B'(-2, 5): a **rotation of 90° counterclockwise about the origin**.

(b) $(x, y) \rightarrow (-y, x)$. Check with C(1, 4) $\rightarrow$ (-4, 1).

(c) Any two of: side lengths, angle measures, area, parallel sides. For example, AB = 4 and A'B' = 4; the right angle at A stays a right angle at A'.

Scoring: 1 point per part.

Question 4 Rigid motion properties (2 points)

(a) Rotations preserve lengths and angles. Since $6^2 + 8^2 = 10^2$, the largest angle is 90° . **Sides 6 in., 8 in., 10 in.; largest angle 90°**

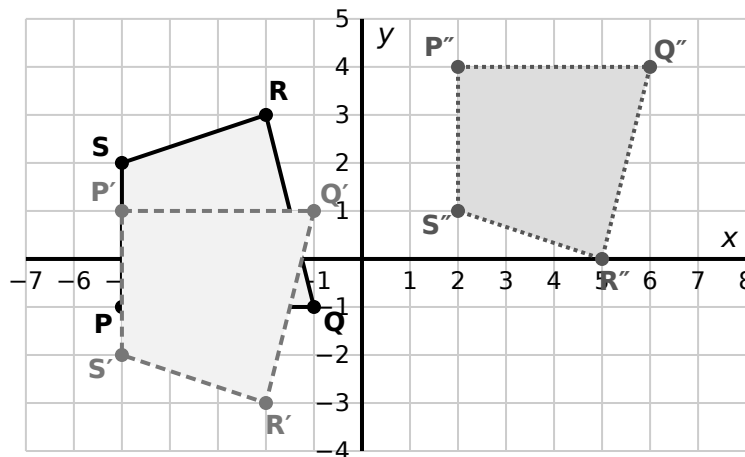
(b) **Yes:** a rotation is a rigid motion, so the image has the same size and shape.

Scoring: 1 point per part.

Question 5 Two moves on a quadrilateral (3 points)

(a) Change the sign of each y : $P'(-5, 1)$, $Q'(-1, 1)$, $R'(-2, -3)$, $S'(-5, -2)$.

(b) Add 7 to x and 3 to y : $P''(2, 4)$, $Q''(6, 4)$, $R''(5, 0)$, $S''(2, 1)$.



Solid: PQRS. Long dashes: after the reflection. Short dashes: final image.

Scoring: 1 point for part (a). Part (b): 1 point for using the translation rule correctly, 1 point for all four correct vertices.

Question 6 Find the rule (2 points)

Both coordinates change sign, so the rule is $(x, y) \rightarrow (-x, -y)$.

Rotation of 180° about the origin; $(x, y) \rightarrow (-x, -y)$

Scoring: 1 point for the name, 1 point for the rule.

Question 7 Does order matter? (2 points)

Program A: $(-2, 5) \rightarrow (-5, -2) \rightarrow (-1, -2)$.

Program B: $(-2, 5) \rightarrow (2, 5) \rightarrow (-5, 2)$.

A ends at $(-1, -2)$; B ends at $(-5, 2)$

Scoring: 1 point per program.

Question 8 Robotics mat (3 points)

(a) $(-5, 3) \rightarrow (5, 3) \rightarrow (-5, -3) \rightarrow (-5 + 4, -3 - 6) = (-1, -9)$

(b) After two steps $(-5, 3)$ lands on $(-5, -3)$: **a reflection across the x-axis.**

Scoring: part (a) 1 point for the two reflections and rotation, 1 point for the translation; part (b) 1 point.