

Translations, Reflections and Rotations Explained

Grade 10 – Geometry math · Test · Standards: G-CO.A.2, G-CO.A.3, G-CO.A.4, G-CO.A.5

Name: _____ Date: _____ Class: _____

Eight questions, 20 points, 45 minutes. Show the rule you apply to each point. Graph paper is not required, and figures are drawn to scale only where coordinates are labeled.

Standards: G-CO.A.2, G-CO.A.3, G-CO.A.4, G-CO.A.5 · **Level:** Grade 10 Geometry

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Images of a point (2 points)

Find the image of $(-6, 2)$ under each transformation.

- Translation by $\langle 4, -7 \rangle$ (1 point)
- Reflection over the y -axis (1 point)

Question 2 Half-turn of a triangle (3 points)

Triangle DEF has $D(-5, 1)$, $E(-1, 1)$ and $F(-2, 4)$. Rotate it 180° about the origin and give the image vertices.

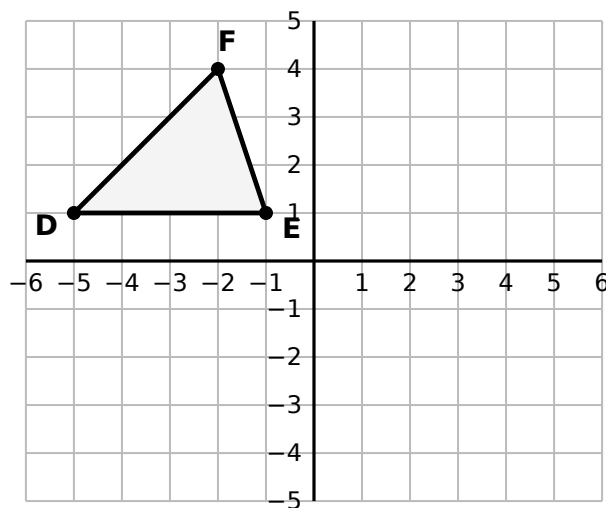


Figure for Question 2.

Question 3 Reflect over $y = x$ (3 points)

Reflect $G(2, -3)$, $H(5, 0)$ and $K(-4, -1)$ over the line $y = x$.

Question 4 Rigid or not (2 points)

Decide whether each rule is a rigid transformation and justify with a segment.

- a. $(x, y) \rightarrow (x - 6, y + 5)$ (1 point)
- b. $(x, y) \rightarrow (x/3, y/3)$ (1 point)

Question 5 Rotation about a center (3 points)

Rotate $A(6, 2)$ by 90° counterclockwise about the center $(1, -1)$. Show the steps and find A' .

Question 6 Symmetry of polygons (3 points)

Answer each part.

- a. How many lines of symmetry does a regular 15-gon have? (1 point)
- b. What is the smallest positive angle of rotational symmetry of that polygon? (1 point)
- c. How many lines of symmetry does a rhombus that is not a square have? (1 point)

Question 7 Order of motions (2 points)

Point $A(4, -1)$ is reflected over the x -axis and then translated by $(-3, 7)$. Find the final point. What is the result when the translation is done first?

Question 8 Name the transformation (2 points)

Triangle JKL with $J(-3, 2)$, $K(-3, 6)$ and $L(-1, 6)$ is mapped onto $J'(3, 2)$, $K'(3, 6)$ and $L'(1, 6)$. Name the single transformation that does this.

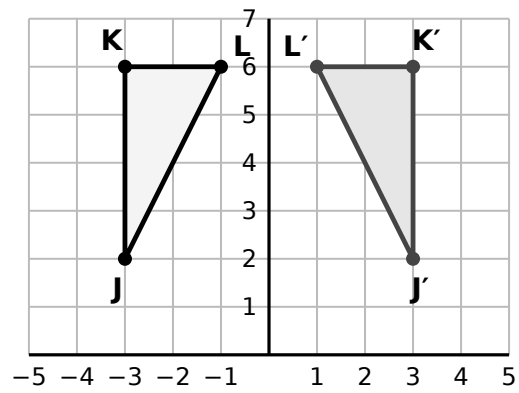


Figure for Question 8.