

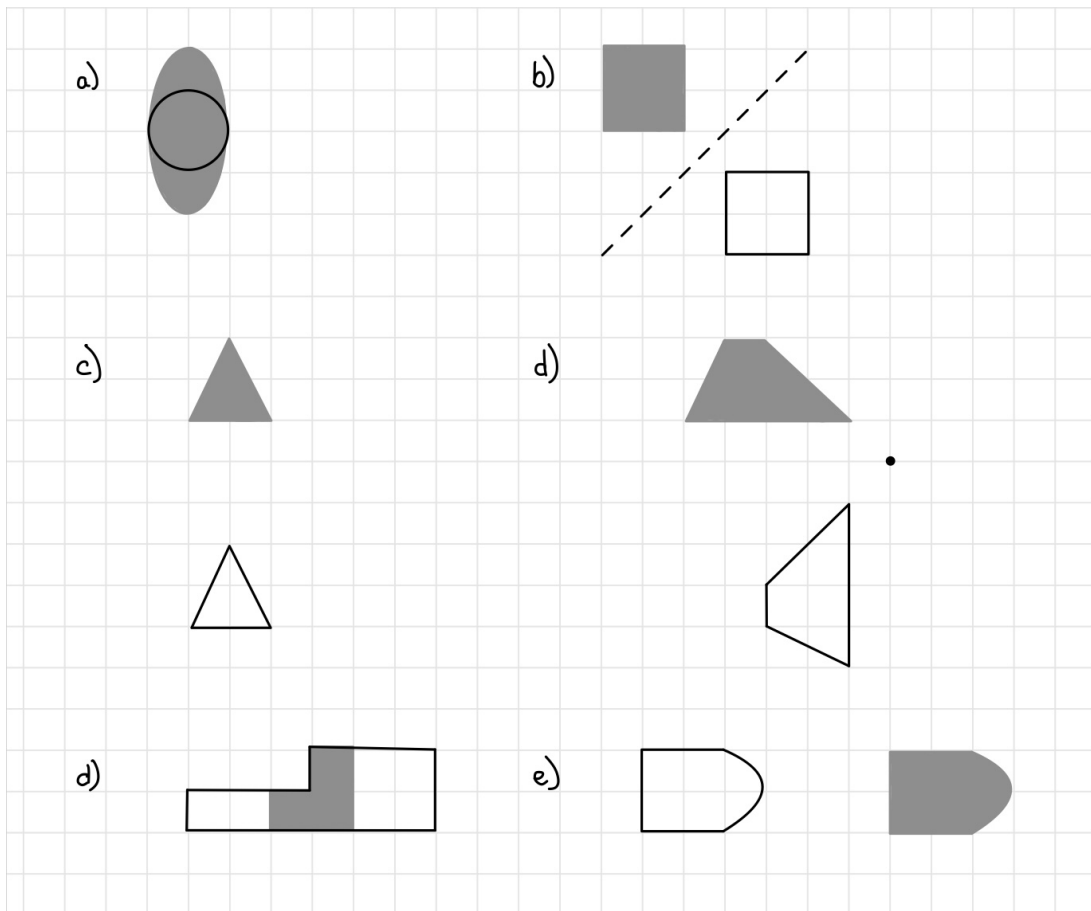


Grade 6 Math Circles

March 7/8/9, 2023

Transformations - Problem Set

1. Determine which transformation was performed on each object and image below. Be specific (ex. instead of saying translation, say translation 3 units up).



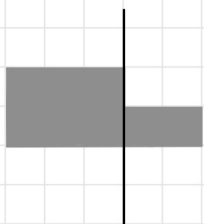


2. Perform the given transformations for each of the objects below.

a) Rotation 180° about the given point



b) Reflection over the given mirror line



c) Translation 3 units down and 6 units right



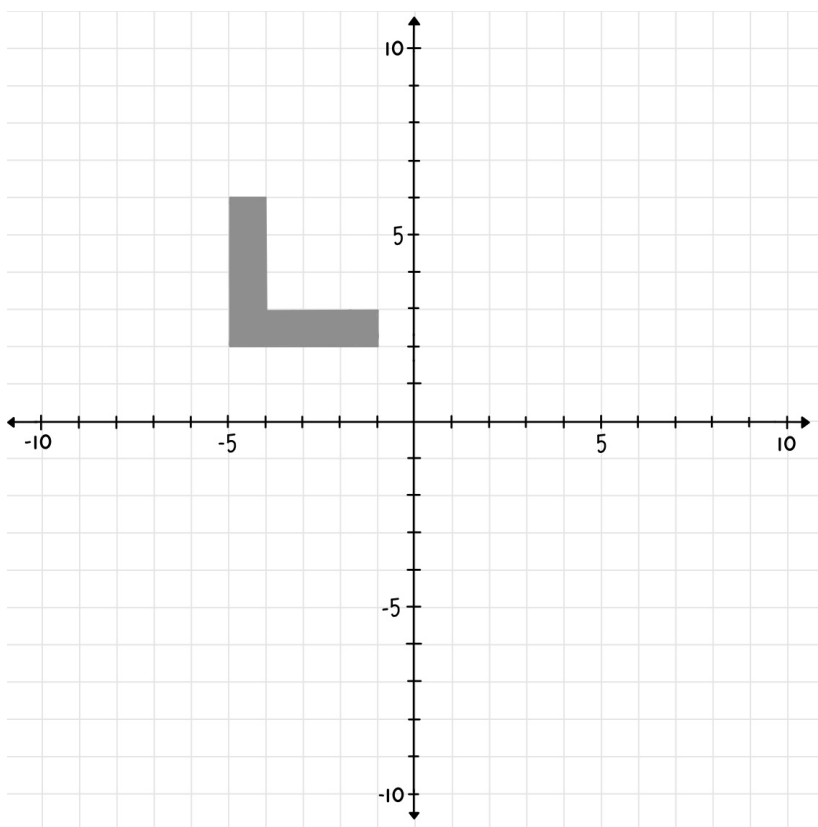


3. Given the coordinates of the shapes' vertices, sketch the object, perform the transformation on the object, and sketch the image.

- a) $(-1, 0), (2, 0), (1, 3)$. 270° rotation CCW about the origin.
- b) $(0, 3), (0, 5), (10, 3), (10, 5)$. Horizontal compression by a factor of 4.
- c) $(-1, -1), (-2, -3), (4, -1), (3, -3)$. Reflection over the y -axis.
- d) $(4, 2), (4, -1), (-2, 2), (-2, -1)$. Vertical stretch by a factor of 2.

4. Perform all of the following transformations on the given shape in order.

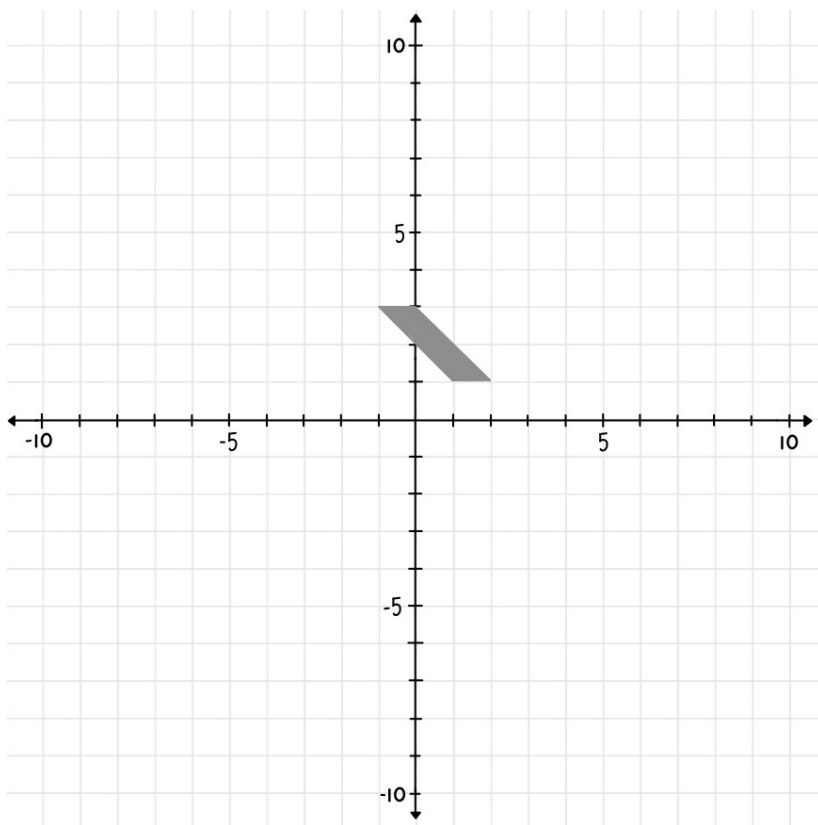
- (a) Translation 3 units down
- (b) 180° rotation about the origin
- (c) Translation 2 units right
- (d) Reflection over x -axis
- (e) Vertical compression by a factor of 2





5. Perform all of the following transformations on the given shape in order.

- (a) Horizontal stretch by a factor of 4
- (b) 270° rotation CCW about the origin
- (c) Reflection over the y -axis
- (d) Translation 3 units left
- (e) Translation 2 units up





6. **Challenge:** Determine which transformations were applied to the object to get the given image.

