

# UNIT 1: Transformations and Proof Responses

## INTRO TO TRANSFORMATIONS

**Transformation** of a geometric figure: change in its position, shape, or size

**Preimage** - original figure

**Image** - new or resulting figure

**Isometry** - transformation in which preimage and image are the same size and shape (also called: rigid motion/transformation)  
(produces a congruent figure)

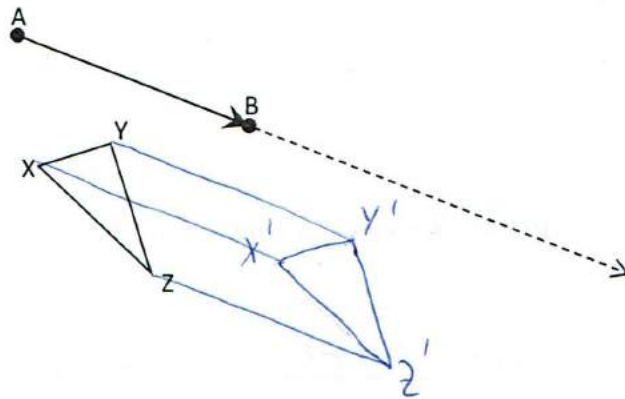
Examples - translation, reflection, and rotation

**Translation** - an isometry that maps all points the same distance in the same direction.

### Activity 1: Patty Paper Translation

The translation  $T$  is defined by  $T(A) = B$  ... meaning that it slides the figure the distance  $AB$  in the direction that  $\overrightarrow{AB}$  goes.

- 1) Place the patty paper over this page. Trace the triangle and points A and B.
- 2) Slide the patty paper along  $\overrightarrow{AB}$  so that the A on the patty paper is on top of B on this sheet and B on the patty paper is still on  $\overrightarrow{AB}$  on this sheet.
- 3) The position of the triangle on your patty paper now corresponds to the image of  $\triangle XYZ$  under the translation,  $T$ . If you press down hard with a sharp pencil, the image of the triangle can be seen on this page when you remove the patty paper.



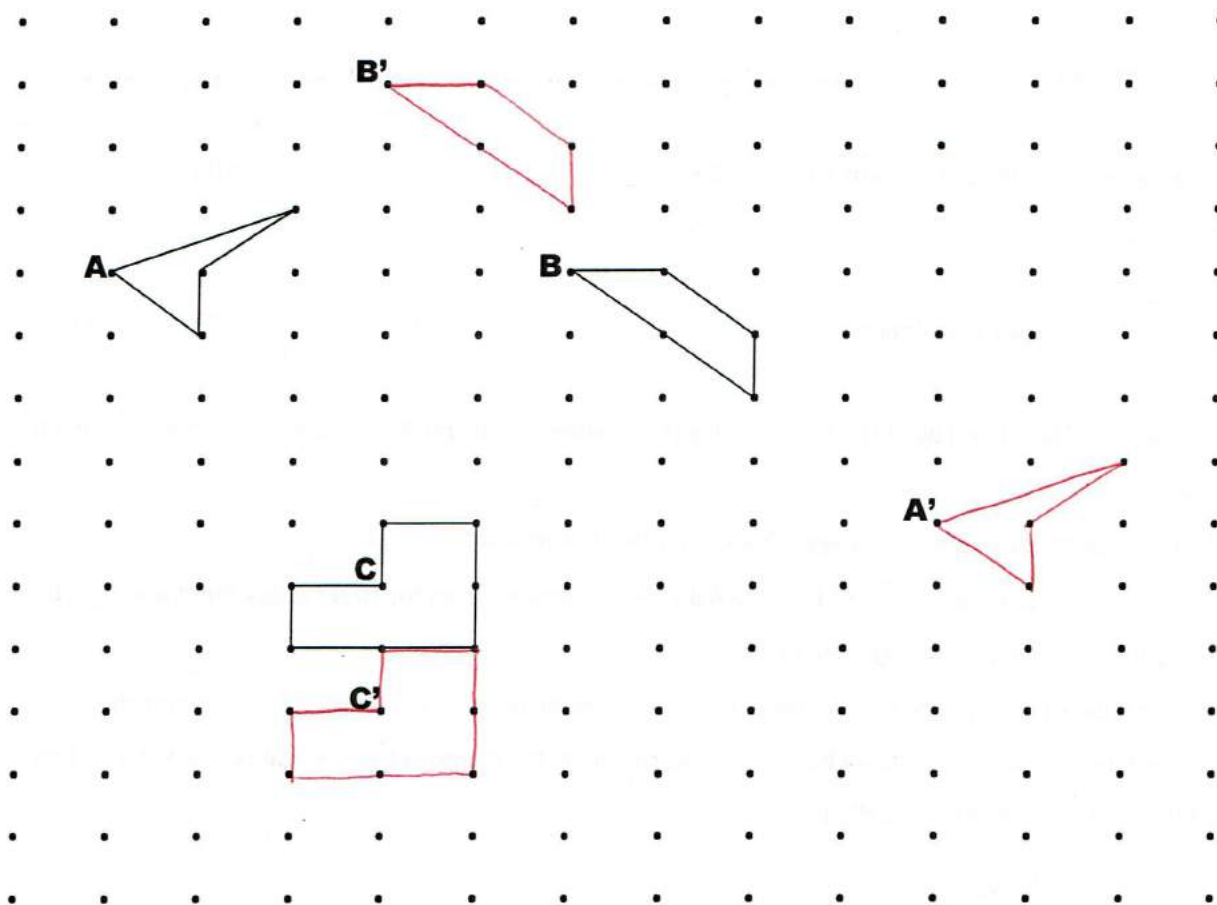
### Activity 2: Dot Paper Translations

- Use the dots to help you draw the image of the first figure so that A maps to A'.
- Use the dots to help you draw the image of the second figure so that B maps to B'.
- Use the dots to help you draw the image of the third figure so that C maps to C'.
- Complete each of the following translation rules using your mappings from 1 – 3 above.

a) For A, the translation rule is:  $T:(x, y) \rightarrow (\underline{x+9}, \underline{y-4})$

b) For B, the translation rule is:  $T:(x, y) \rightarrow (\underline{x-2}, \underline{y+3})$

c) For C, the translation rule is:  $T:(x, y) \rightarrow (\underline{x}, \underline{y-2})$



**Checkpoint: Complete the following:**

$\triangle GEO$  has coordinates  $G(-2, 5)$ ,  $E(-4, 1)$ ,  $O(0, -2)$  A translation maps  $G$  to  $G'(3, 1)$ .

1. Find the coordinates of:

a)  $E' (\underline{1}, \underline{-3})$

b)  $O' (\underline{5}, \underline{-6})$

2. The translation rule is:  $T:(x, y) \rightarrow (\underline{x+5}, \underline{y-4})$

READY, SET, GO! Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

**READY**

Topic: Pythagorean Theorem

For each of the following right triangles determine the measure of the missing side. Leave the measures in exact form if irrational.

1.  $x^2 = 3^2 + 4^2$   
 $x^2 = 9 + 16$   
 $x^2 = 25$       $x = 5$

2.  $x^2 = 12^2 + 5^2$   
 $x^2 = 144 + 25$   
 $x^2 = 169$   
 $x = 13$

3.  $4^2 = 1^2 + x^2$   
 $16 = 1 + x^2$   
 $x^2 = 15$   
 $x = \sqrt{15}$

4.  $(\sqrt{10})^2 = 3^2 + x^2$   
 $10 = 9 + x^2$   
 $x = 1$

5.  $(\sqrt{17})^2 = 4^2 + x^2$   
 $17 = 16 + x^2$   
 $x^2 = 1$   
 $x = 1$

6.  $(\sqrt{13})^2 = 2^2 + x^2$   
 $13 = 4 + x^2$   
 $x^2 = 9$   
 $x = 3$