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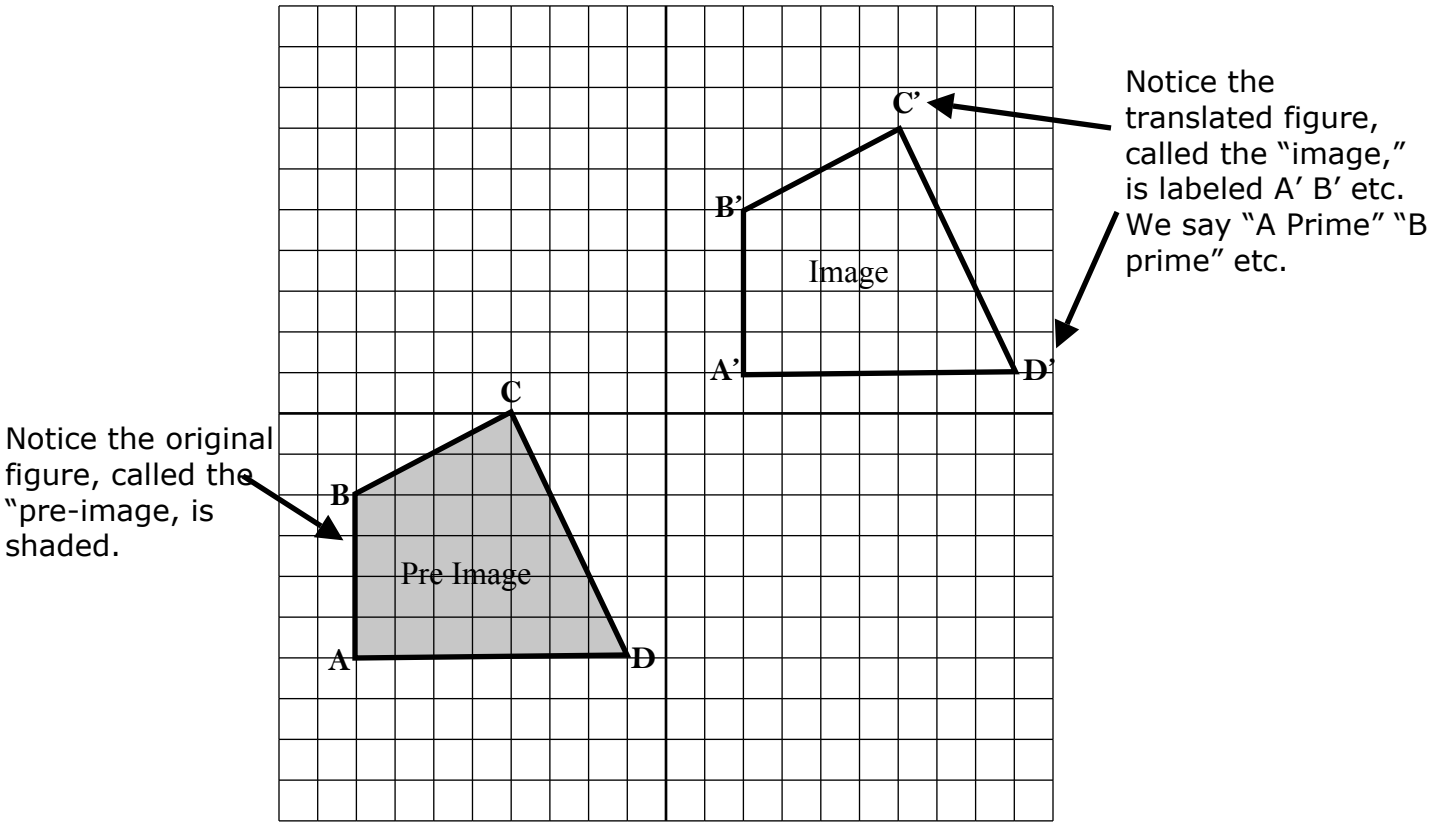
Isometric Transformations: Translations

Translation: A translation is a transformation consisting of a constant offset with no rotation or distortion.

In other words, a translation is a transformation in which a geometric figure is "moved" so that it is not turned or changed in any way. Look at the example below…



Here is some of the language of transformations. Complete each sentence below.

1. A is taken to _____.

2. $\overline{CD}$ is taken to _____.

3. B maps to _____.

4. ∠BCD maps to _____.

5. C' is the image of _____.

6. Figure A'B'C'D' is the image of

_____.

7. A translation results in an isometric transformation. Therefore, the image figure is exactly the same size and shape as the pre-image. Does the image of ABCD appear to be the same size and shape as its pre-image?

_____.

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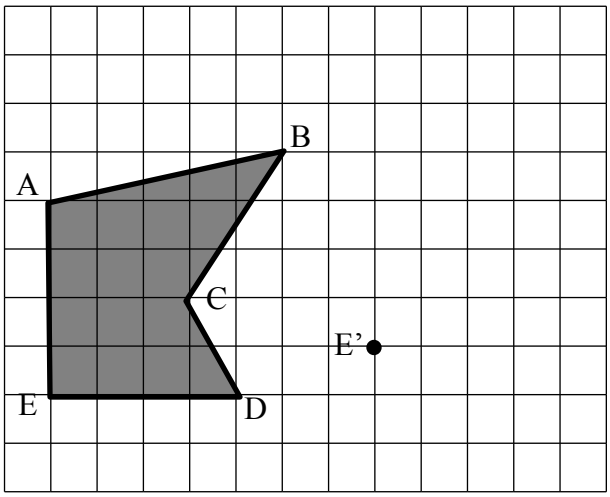
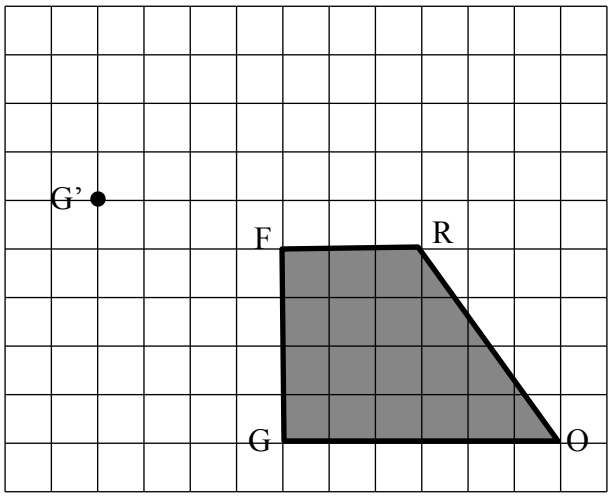
Directions: Perform each translation. You may use patty paper, geometry software, or any other tools or method that seems appropriate to help you.

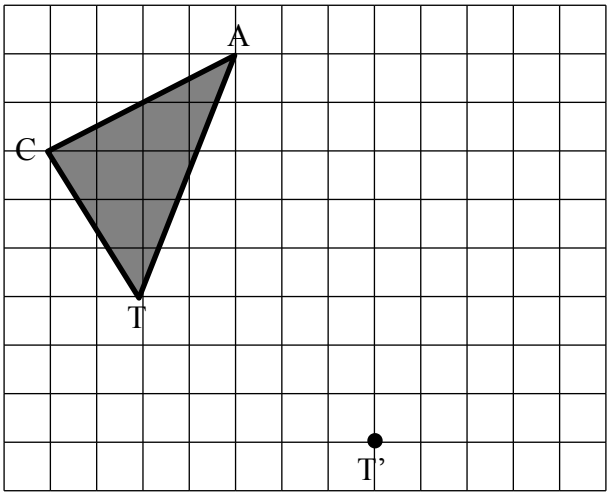
1. Translate ABCDE → A'B'C'D'E'



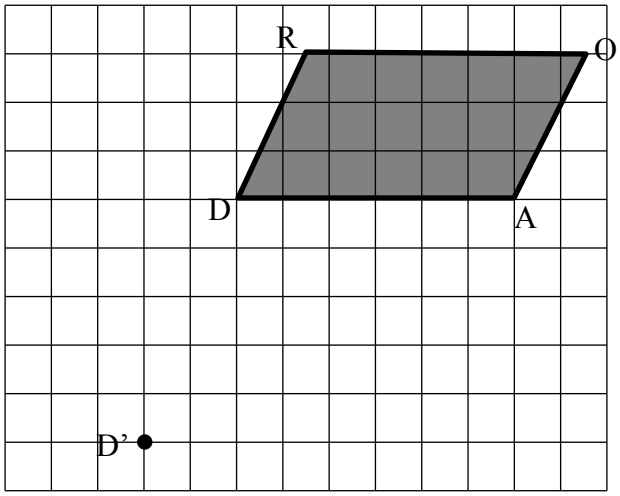
2. Translate FROG → F'R'O'G'



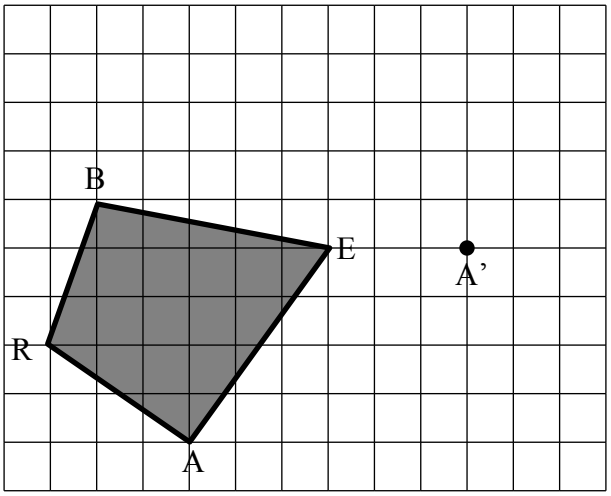
3. Translate CAT → C'A'T'



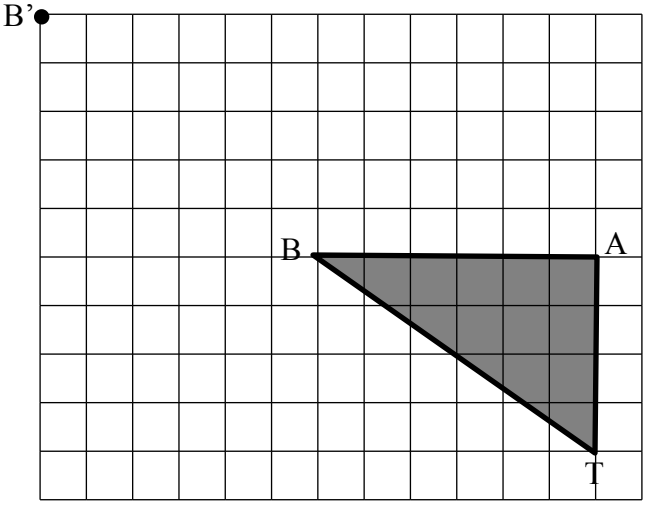
4. Translate ROAD → R'O'A'D'



5. Translate BEAR → B'E'A'R'



6. Translate BAT → B'A'T'



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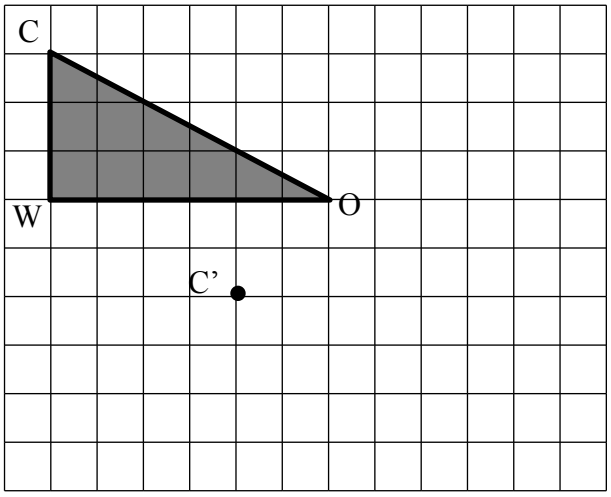
7. In a translation, segments are taken to segments of the same measure. Verify this statement by answering the following questions.

A. Translate COW → C'O'W'



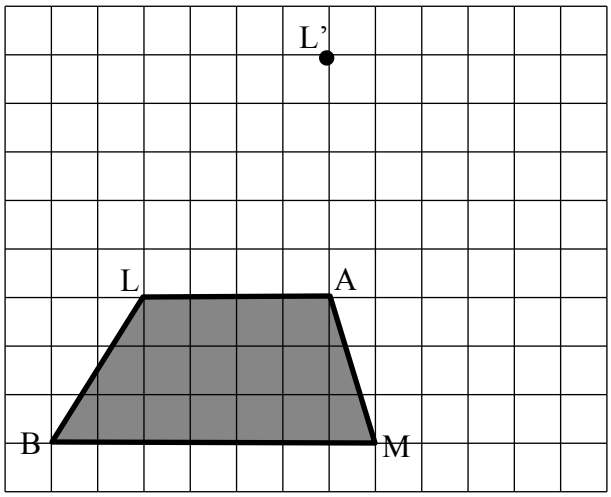
B. Find the lengths of the all three sides in COW .

C. Find the lengths of the all three sides in C'O'W'.

C. Are the lengths of the segments in the original figure the same length as their images in the reflection? Explain using proper notation and complete sentences.

8. In a translation parallel lines are taken to parallel lines. Verify this statement by answering the following questions

A. Translate LAMB → L'A'M'B'



B. Identify any parallel lines in LAMB.

C. Identify any parallel lines in L'A'M'B'

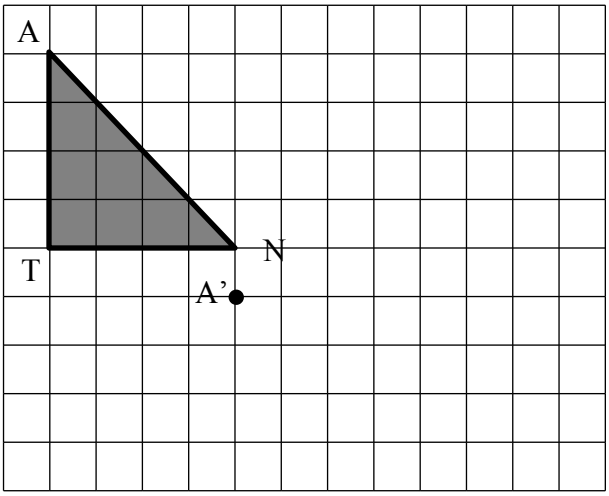
D. Do the parallel lines in the original figure map to the parallel lines in the image? In other words, are the same lines parallel in the original and its image? Write your answer using correct notation and complete sentences.

Name:_____ Date:_____ Period:_____ Score:_____

Directions: Perform each translation and answer the questions. You may use patty paper, Geometry software, or any other tools or method that seems appropriate to help you.

9. In a translation, angles are taken to angles of the same measure. Verify that this is true.

A. Translate ANT → A'N'T'



B. What is the measurement of the three angles in ANT?

$|\angle A|$= _____ $|\angle N|$= _____ $|\angle T|$= _____

C. What is the measurement of the three angles in A'N'T'

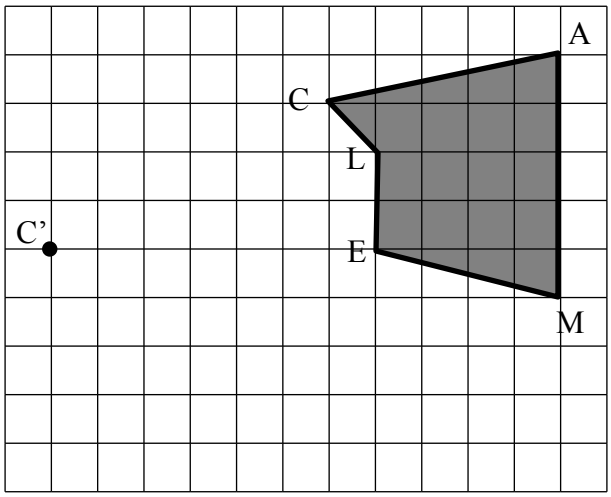
$|\angle A'|$= _____ $|\angle N'|$= _____ $|\angle T'|$= _____

D. How did you get those measurements?

D. Use correct geometric notation to indicate that each angle and its image are the same measure.

10. In a translation, figures are taken to congruent figures. That is to say in a translation a figure and it's image are the same size and shape. Use your answers from the previous three questions to verify this.

A. Translate CAMEL → C'A'M'E'L'



B. Are segments in CAMEL and their images in C'A'M'E'L' the same length? How do you know?

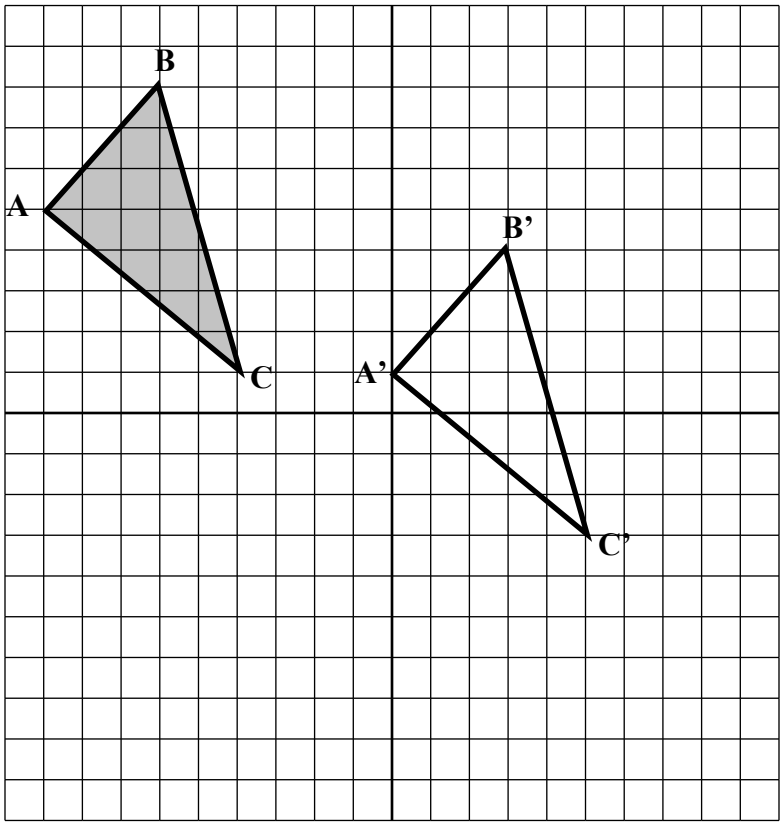
C. Are the angles in CAMEL and their images in C'A'M'E'L' the same measurement? How do you know?

D. Are the images of the the parallel lines in CAMEL still parallel in C'A'M'E'L? How do you know?

E. Are CAMEL and its image C'A'M'E'L congruent?

Translations as Functions

A translation can be expressed by a function. Look at the triangle below. It has been translated according to the following function: (x,y) → (x+9,y-4). That is to say, that each point of the triangle has been translated 9 in the x direction (to the right), and -4 in in the y direction (down).

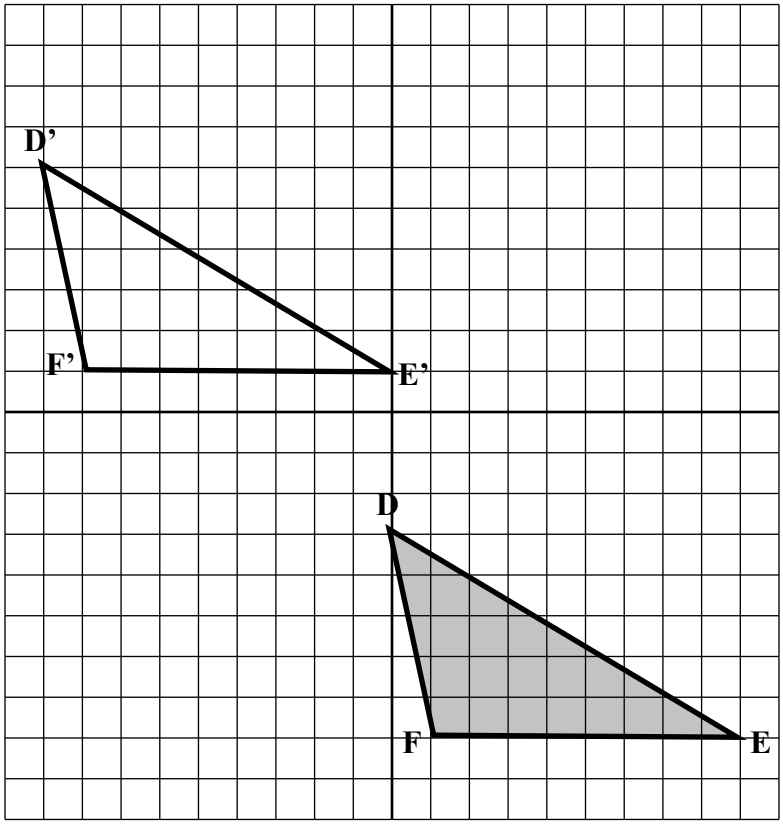


Point A is at (-9,5) so using our function (-9,5) → (-9+9, 5-4) means that A' is at (0,1).

Point B is at (-6,8) so using our function (-6,8) → (-6+9, 8-4) means that B' is at (3,4).

Point C is at (-4,1) so using our function (-4,1) → (-6+9, 8-4) means that B' is at (3,4).

All the points that make up the line segments in the figures are also translated according to the rule.



1. Write a function that will map ΔDEF to ΔD'E'F'

_____

How is this function similar to the one above?

_____

_____

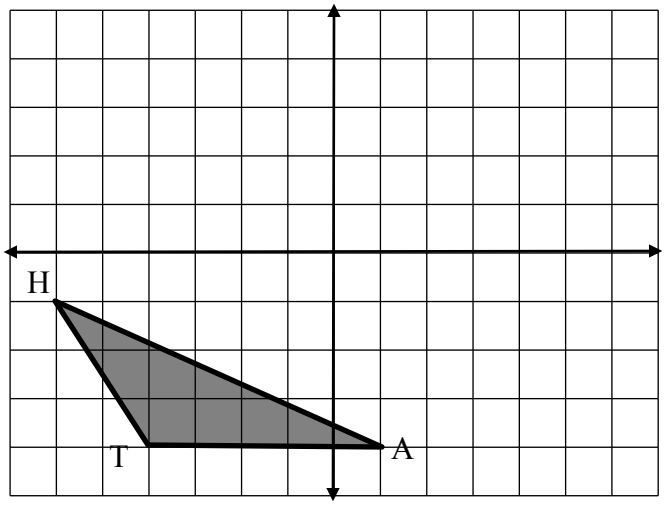
_____

_____

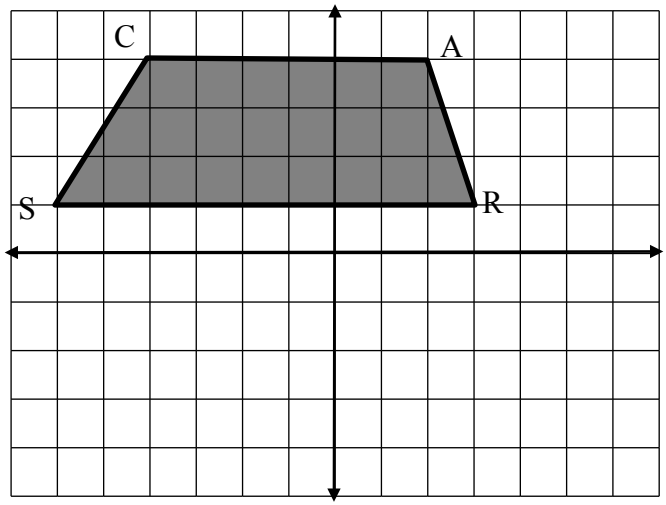
Name:_____ Date:_____ Period:_____ Score:_____

Directions: Use patty paper, Geometry Software, or any other method available to you, to translate each figure using the given function.

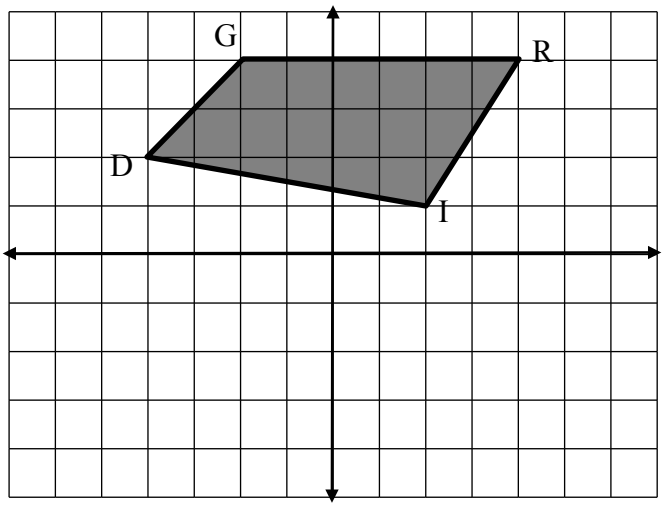
1. Use (x,y) → (x+5, y+3)



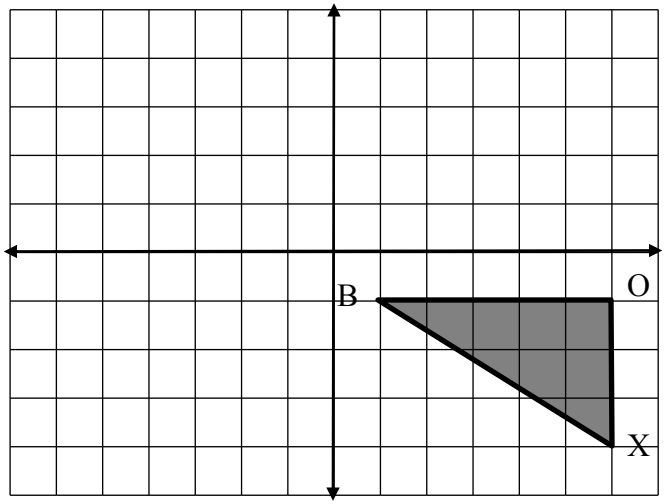
2. Use (x,y) → (x-3, y+5)



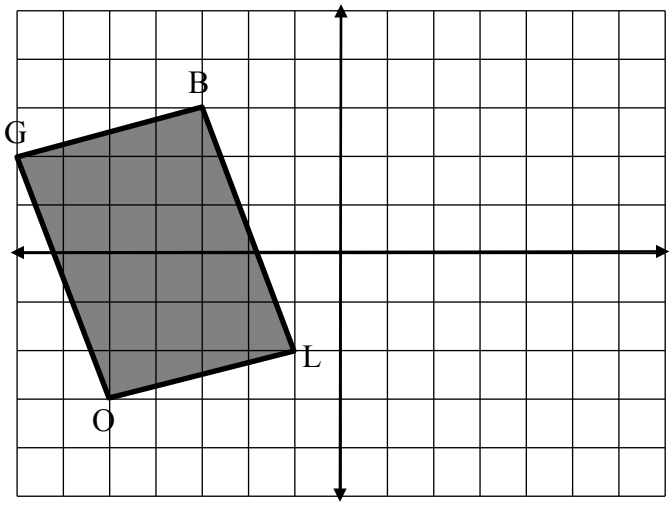
3. Use (x,y) → (x-2, y-5)



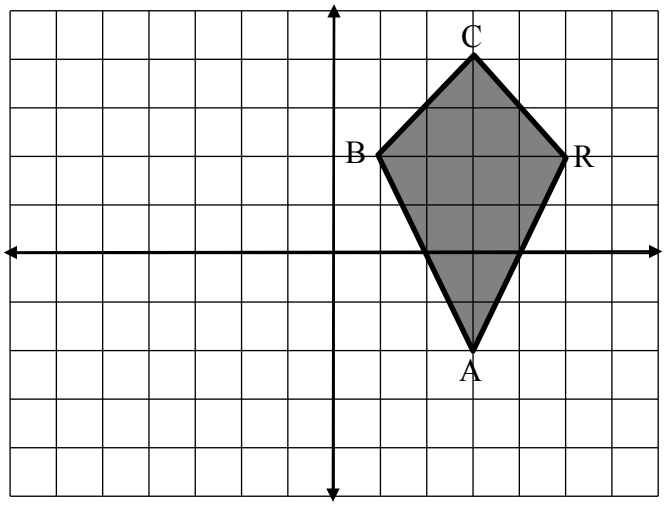
4. Use (x,y) → (x-7, y+4)



5. Use (x,y) → (x+8, y)



6. Use (x,y) → (x+7, y+1)

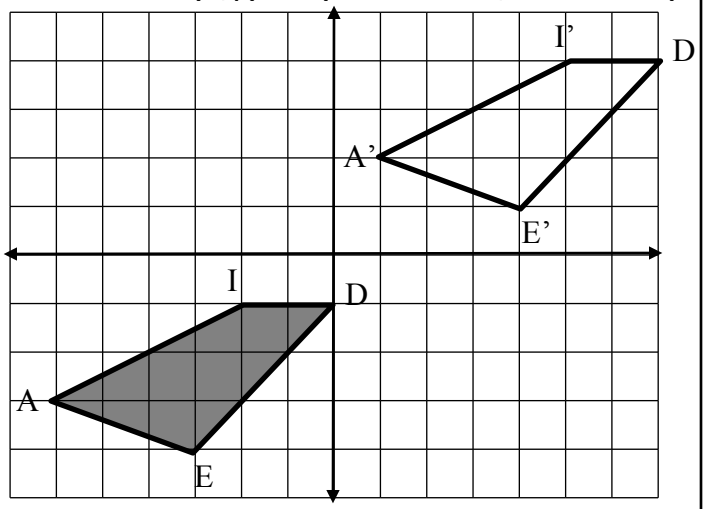


Name:_____ Date:_____ Period:_____ Score:_____

Directions: Write a geometric function that describes each translation.

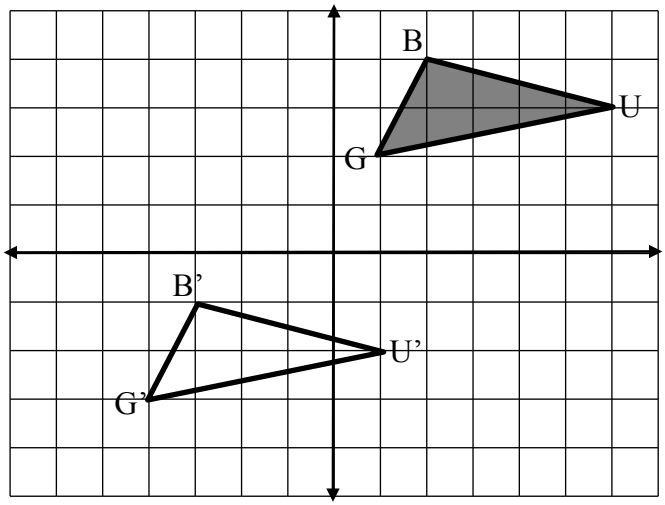
7.

Function: (x,y) → (_____, _____)



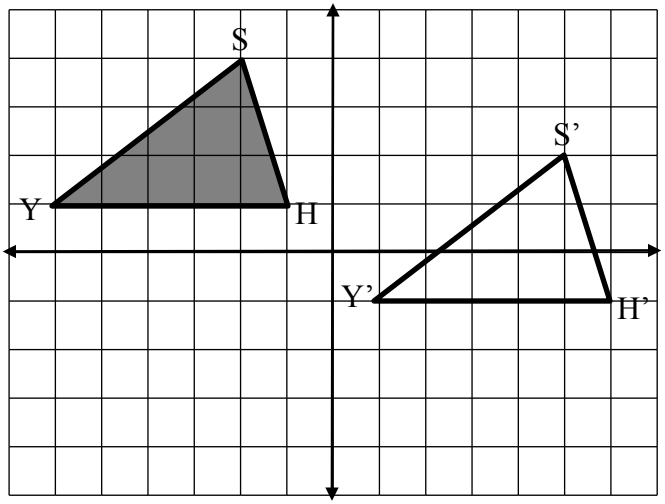
8.

Function (x,y) → (_____, _____)



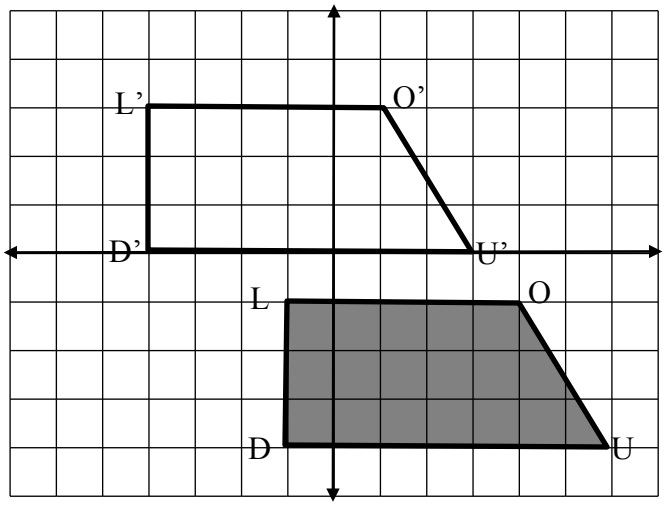
9.

Function: _____



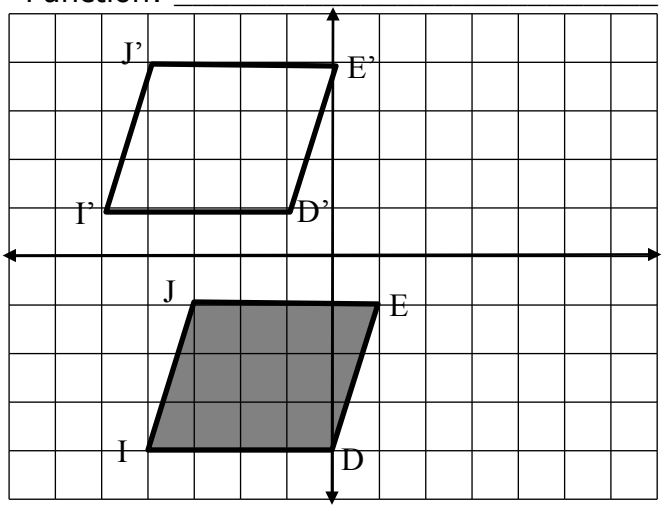
10.

Function: _____



11.

Function: _____



12.

Function: _____