



## Vocabulary

### Review

- Underline the correct word to complete the sentence.

A *transformation* of a geometric figure is a change in the position, shape, or color / size of the figure.

- Cross out the word that does NOT describe a *transformation*.

erase      flip      rotate      slide      turn

### Vocabulary Builder

**isometry** (noun) eye SAHM uh tree

**Definition:** An **isometry** is a transformation in which the preimage and the image of a geometric figure are congruent.

**Example:**



Preimage



Image

**Non-Example:**



Preimage



Image

### Use Your Vocabulary

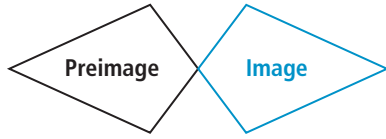
Complete each statement with *congruent*, *image* or *preimage*.

- In an *isometry* of a triangle, each side of the ? is congruent to each side of the preimage. \_\_\_\_\_
- In an *isometry* of a trapezoid, each angle of the image is congruent to each angle of the ?. \_\_\_\_\_
- An *isometry* maps a preimage onto a(n) ? image. \_\_\_\_\_



### Problem 1 Identifying an Isometry

**Got It?** Does the transformation below appear to be an isometry? Explain.



6. Name the polygon that is the preimage.

7. Name the polygon that is the image.

8. Do the preimage and image appear congruent?

Yes / No

9. Does the transformation appear to be an isometry? Explain.

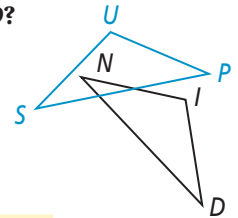


### Problem 2 Naming Images and Corresponding Parts

**Got It?** In the diagram,  $\triangle NID \rightarrow \triangle SUP$ . What are the images of  $\angle I$  and point  $D$ ?

10. The arrow ( $\rightarrow$ ) shows that  $\triangle$   is the image of  $\triangle NID$ ,

so  $\triangle NID \cong \triangle$  .



11. Describe how to list corresponding parts of the preimage and image.

12. Circle the image of  $\angle I$ .

$\angle I$

$\angle S$

$\angle P$

$\angle U$

13. Circle the image of point  $D$ .

$I$

$S$

$P$

$U$

Take note

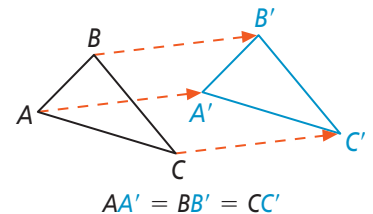
### Key Concept Translation

A **translation** is a transformation that maps all points of a figure the same distance in the same direction.

A translation is an isometry. Prime notation ( $'$ ) identifies image points.

14. If  $\square PQRS$  is translated right 2 units, then every point on

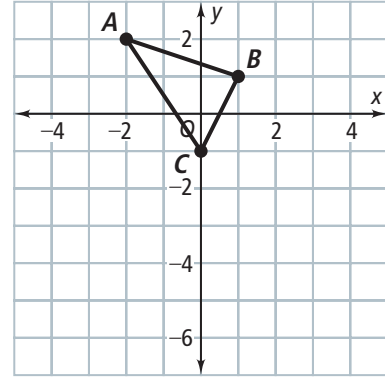
$\square P'Q'R'S'$  is  units to the right of its preimage point.





### Problem 3 Finding the Image of a Translation

**Got It?** What are the images of the vertices of  $\triangle ABC$  for the translation  $(x, y) \rightarrow (x + 1, y - 4)$ ? Graph the image of  $\triangle ABC$ .



15. Identify the coordinates of each vertex.

A(  ,  )

B(  ,  )

C(  ,  )

16. Use the translation rule  $(x, y) \rightarrow (x + 1, y - 4)$  to find  $A'$ ,  $B'$ , and  $C'$ .

$A'( \text{  } + 1, \text{  } - 4 ) = A'( \text{  }, \text{  } )$

$B'( \text{  } + 1, \text{  } - 4 ) = B'( \text{  }, \text{  } )$

$C'( \text{  } + 1, \text{  } - 4 ) = C'( \text{  }, \text{  } )$

17. Circle how each point is translated.

1 unit to the right and 4 units up

1 unit to the right and 4 units down

1 unit to the left and 4 units up

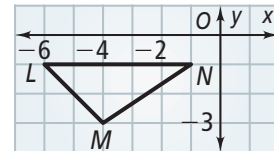
1 unit to the left and 4 units down

18. Graph the image of  $\triangle ABC$  on the coordinate plane above.



### Problem 4 Writing a Rule to Describe a Translation

**Got It?** The translation image of  $\triangle LMN$  is  $\triangle L'M'N'$  with  $L'(1, -2)$ ,  $M'(3, -4)$ , and  $N'(6, -2)$ . What is a rule that describes the translation?



19. Circle the coordinates of point  $L$ .

(6, -1)

(-1, -6)

(-6, -1)

(-1, 6)

20. Circle the coordinates of point  $M$ .

(-4, -3)

(-3, -4)

(-4, 3)

(-3, 4)

21. Circle the coordinates of point  $N$ .

(-1, 1)

(1, -1)

(-1, 0)

(-1, -1)

22. Find the horizontal change from  $L$  to  $L'$ .

$1 - \text{  } = \text{  }$

23. Find the vertical change from  $L$  to  $L'$ .

$-2 - \text{  } = \text{  }$

**Underline the correct word to complete each sentence.**

24. From  $\triangle LMN$  to  $\triangle L'M'N'$ , each value of  $x$  increases / decreases.

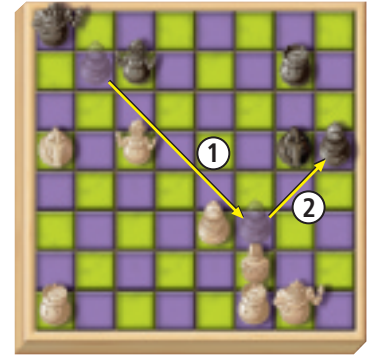
25. From  $\triangle LMN$  to  $\triangle L'M'N'$ , each value of  $y$  increases / decreases.

26. A rule that describes the translation is?  $(x, y) \rightarrow ( \text{  } , \text{  } )$ .



## Problem 5 Composing Translations

**Got It?** The diagram at the right shows a chess game with the black bishop 6 squares right and 2 squares down from its original position after two moves. The bishop next moves 3 squares left and 3 squares down. Where is the bishop in relation to its original position?



27. If  $(0, 0)$  represents the bishop's original position, the bishop is now at the point (  ,  ).

28. Write the translation rule that represents the bishop's next move.

$$(x, y) \rightarrow (x - \text{}, y - \text{})$$

29. Substitute the point you found in Exercise 27 into the rule you wrote in Exercise 28.

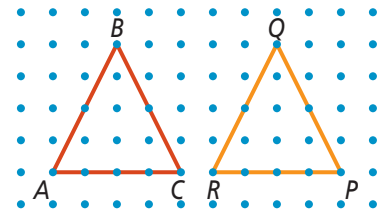
$$(\text{}, \text{}) \rightarrow (\text{} - \text{}, \text{} - \text{})$$

30. In relation to  $(0, 0)$ , the bishop is at (  ,  ).



## Lesson Check • Do you UNDERSTAND?

**Error Analysis** Your friend says the transformation  $\triangle ABC \rightarrow \triangle PQR$  is a translation. Explain and correct her error.



31. Find the distance between the preimage and image of each vertex.

$$BQ = \text{} \quad AP = \text{} \quad CR = \text{}$$

32. Does this transformation map all points the same distance?  Yes / No

33. Is  $\triangle ABC \rightarrow \triangle PQR$  a translation? Explain.

34. Correct your friend's error.



## Math Success

Check off the vocabulary words that you understand.

transformation    preimage    image    isometry    translation

Rate how well you can *find transformation images*.

