A foggy landscape with a road leading towards mountains. The scene is overcast and misty, with a road stretching into the distance. The text is overlaid on the upper half of the image.

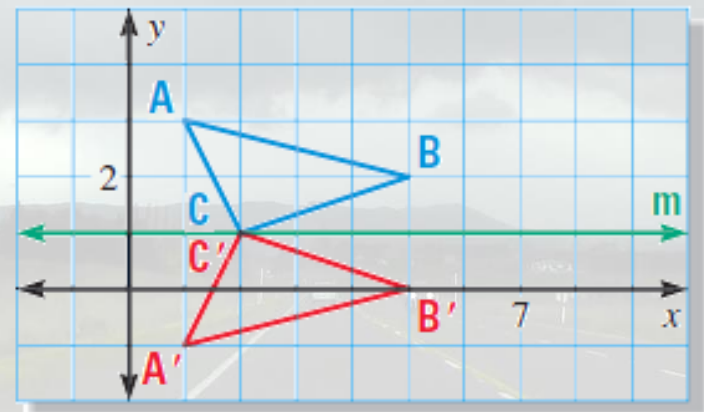
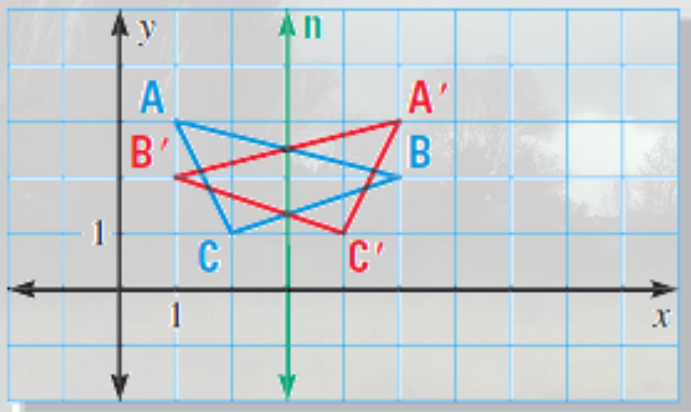
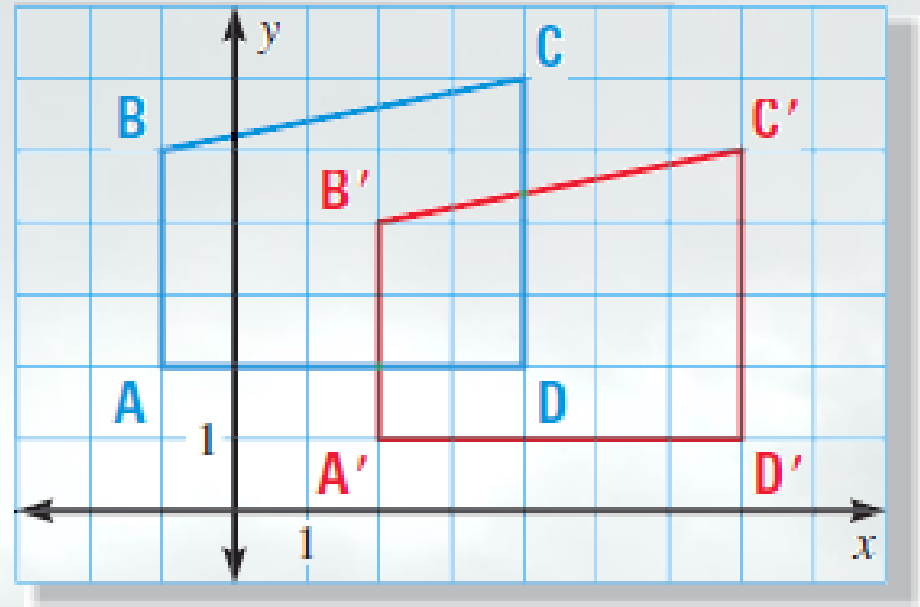
Translations and Reflections

Translations and Reflections

- ***Use a coordinate rule to transform a pre-image to an image.***
- ***Write a rule for a translated figure.***
- ***Perform reflections by inspection and using a rule.***
- ***Language Objectives:***
 - ***Use vocabulary words such as image, pre-image and vector to describe transformations.***

Vocabulary

- **Pre-image:** $ABCD$
- **Image:** $A'B'C'D'$
- **The prime means "new"**
- **Translations and reflections are isometries.**



Translations Example 1

- ***Let the pre-image quadrilateral ABCD be given by $A(3,2)$, $B(-2,8)$, $C(-1,6)$, and $D(0,4)$. Find and sketch the image and write the coordinates using the coordinate rule $(x, y) \rightarrow (x - 2, y + 5)$.***

Translations Example 2

- ***Draw $\triangle RST$ with vertices $R(2,2)$, $S(5,2)$, and $T(3,5)$. Find the image of each vertex after the translation $(x, y) \rightarrow (x + 1, y + 2)$. Graph the image using prime notation.***

Reflections Example 3

- ***The endpoints of \overline{FG} are $F(-1,2)$ and $G(1,2)$.
Reflect the segment over the line $y = x$.***

The Rules

- **Translations:**

- $(x, y) \rightarrow (x + a, y + b)$

- **Reflections across the x -axis:**

- $(x, y) \rightarrow (x, -y)$

- **Reflections across the y -axis:**

- $(x, y) \rightarrow (-x, y)$

- **Reflections across the line $y = x$:**

- $(x, y) \rightarrow (y, x)$

Reflections Example 4

- **The vertices of $\triangle ABC$ are $A(1,3)$, $B(5,2)$, and $C(2,1)$. Graph the reflection of $\triangle ABC$...**
 - **over $y = 4$**
 - **over $x = -3$**
 - **over $y = 2$**

Reflections Example 5

- ***Use a coordinate rule to reflect the quadrilateral over the y -axis: $A(-2, -3)$, $B(-4, 1)$, $C(2, -5)$, $D(1, 4)$***
- ***Then reflect it over the line $y = x$.***