AR Remediation Plan – Coordinate Planes and Transformations

Translations

STRAND: Measurement and Geometry

STRAND CONCEPT: Coordinates Planes and Transformations

SOL 5.14a, 7.7, 8.7a

Remediation Plan Summary

Students draw a polygon on a coordinate plane and perform translations by using patty paper or tracing paper.

Common Misconceptions

- Students may incorrectly think that transformed figures are a different shape or size.
- Students may confuse the terms horizontal and vertical in performing the translation.
- Students may confuse the x- and y-coordinates when recording the ordered pair for the new point.
- Students may confuse the terms *image* and *preimage*.

Materials

- Warm-up recording sheet
- Translations worksheets
- Pencils
- Colored pencils
- 2 x 2 inch squares of patty paper or tracing paper
- Rulers
- Scientific calculators
- Reflecting on Translations exit slip

Introductory Activity

Have the students complete the **“**Warm-up” worksheet, offering assistance as needed.

Plan for Instruction

1. Prepare a transparency of the “Translations” worksheet for demonstration purposes.
2. Distribute the “Translations” worksheet, and have students use a regular pencil to draw the pre-image ABCD by graphing the coordinates given and connecting the dots. Make sure they label points A, B, C, and D on the coordinate plane and label the figure “Pre-Image.”
3. Give students patty paper or tracing paper, and ask them to trace the figure ABCD along with the labels.
4. Explain that a translation is a “slide” of a figure along an imaginary “train track.” The figure travels along a straight line in any direction but never rotates as it moves. Demonstrate on the overhead by sliding the patty paper figure across the coordinate plane, and then have the students practice doing the same.

5. Ask students to line up their patty paper figure on top of their pre-image on the coordinate plane. Demonstrate what it means to “translate the figure 4 units to the right.” You might recommend that they focus their eyes on one of the points as they count spaces across the coordinate plane. Then have students practice doing the translation.
6. Have students use a colored pencil to record the new coordinates for A, B, C, and D. Ask if they notice whether the new coordinates give any clue about the translation they just performed. (Some may notice that all *x*-coordinates increased by 4. If not, just continue with the next step, and encourage students to be on the lookout for any patterns that arise.)
7. Have students use the same colored pencil to connect the new points A, B, C, and D on the coordinate plane. Have them label this figure “Image 1” and label the points A′, B′, C′, and D′. (The prime sign is used to indicate that a point belongs to an image.)
8. Direct students to line up their patty paper figure again on top of their pre-image on the coordinate plane. Demonstrate what it means to “translate the figure 7 units to the left.” Ask students to predict what they think will happen to the coordinates. (The *x*-coordinates will decrease by 7.) Then have students perform the translation.
9. Have students use a different colored pencil to record the new coordinates for A, B, C, and D. Ask them to compare this new set of coordinates with the original coordinates. Ask whether their prediction was correct. Have them use calculators to verify that the *x*-coordinates decreased by 7.
10. Have students use the same colored pencil to plot the new coordinates for A, B, C, and D on the coordinate plane. Have them label this figure “Image 2” and again label the points A′, B′, C′, and D′.
11. Have students repeat the process, using different colored pencils, for the “up” (Image 3) and “down” (Image 4) translations, and discuss what they notice about the change in coordinates with each translation. (Translations to the left cause the *x*-coordinates to decrease; translations to the right cause the *x*-coordinates to increase; translations up cause the *y*-coordinates to increase; translations down cause the *y*-coordinates to decrease.)
12. Ask students what they think would happen if a figure translated up *and* right (both *x*- and *y*- coordinates would increase). Have them perform the translation for Image 5.
13. Have students make up their own “double translation” (left or right *and* up or down) that would cause the figure to move to the third quadrant (lower left corner). Have them record this translation under “Image 6” in the table. Make sure they include the number of units (e.g., 10 units left *and* 4 units down). Have them write the new coordinates *first* and then plot the points. Walk around and ask students if the translation turned out the way they planned. If not, have them make adjustments.

Pulling It All Together (Reflection)

Have students complete the “Reflecting on Translations” exit ticket.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

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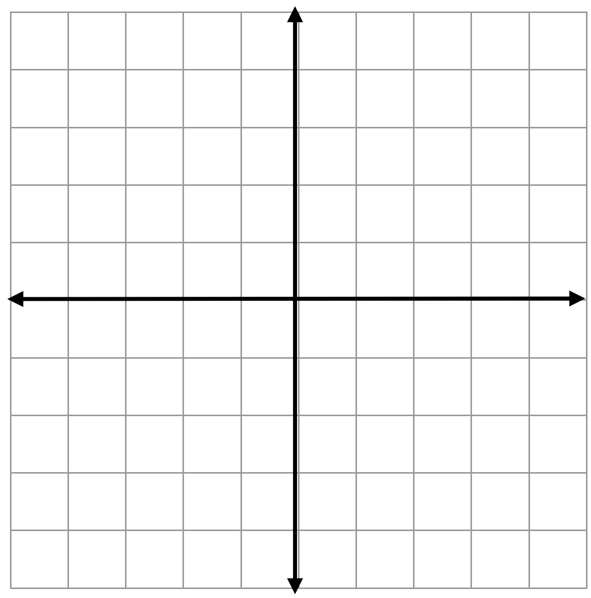
Name:

Warm-up

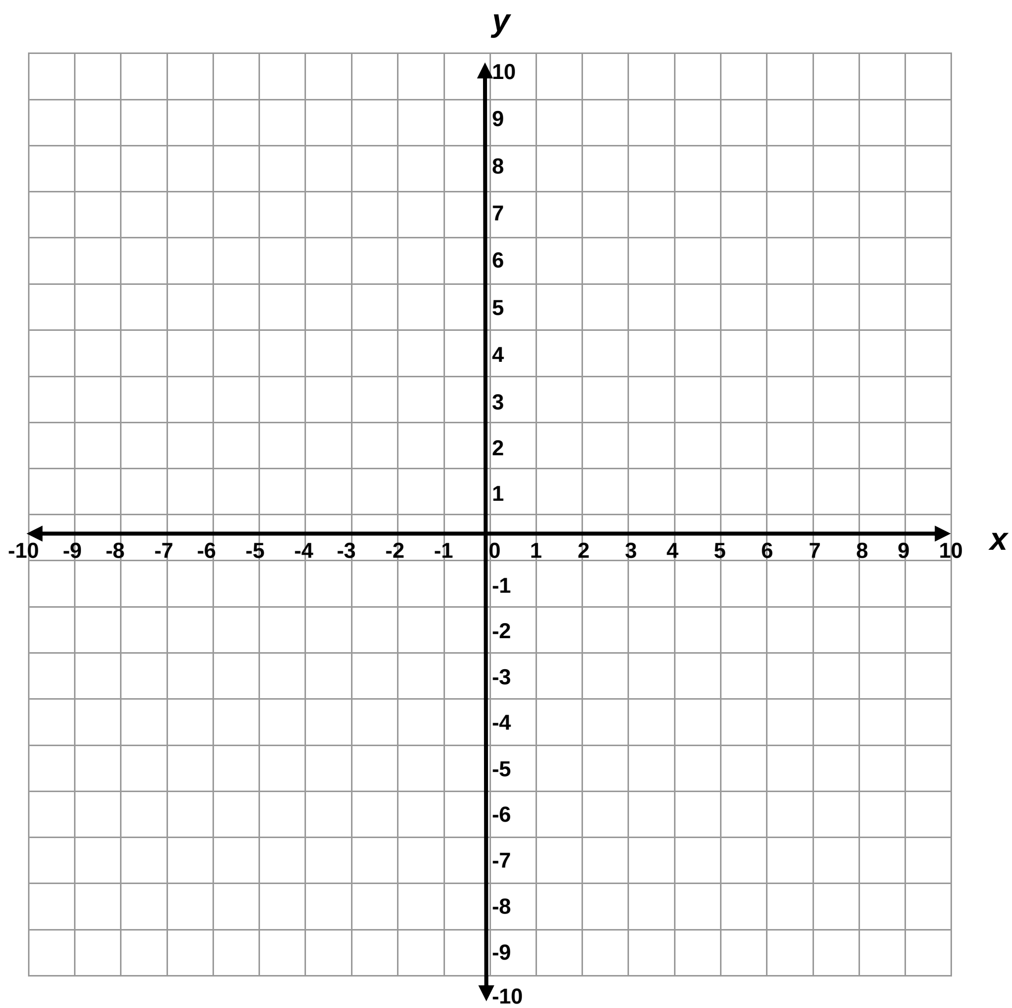
1. Label and number the *x*-axis and *y*-axis.
2. Graph the following points, and connect the dots as you go: (−3, −1), (2, −1), (4, 1), (−1, 1)



3. What shape did you just draw? ______________________________

Name:

Translations



Enter the new coordinates after performing each translation shown below:

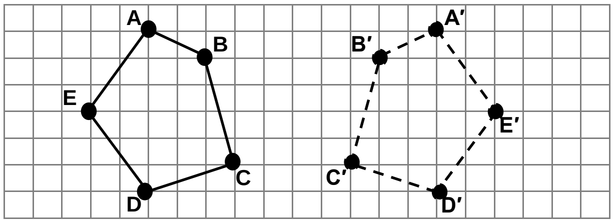
IMAGE	**ORIGINAL COORDINATES**			
	A (2, 3)	**B (3, 4)**	**C (4, 3)**	**D (3, 1)**
Image 1: **4 units right**				
Image 2: **7 units left**				
Image 3: **5 units up**				
Image 4: **8 units down**				
Image 5: **5 units right *and* 4 units up**				
Image 6 **(coordinates of choice in the 3rd quadrant):** ____________________				

Name:

Reflecting on Translations

Each figure below shows a transformation. The pre-image is shown with solid lines and the image is shown with dashed lines. Next to each figure, tell whether the transformation shown represents a translation, and then explain why or why not.

1.

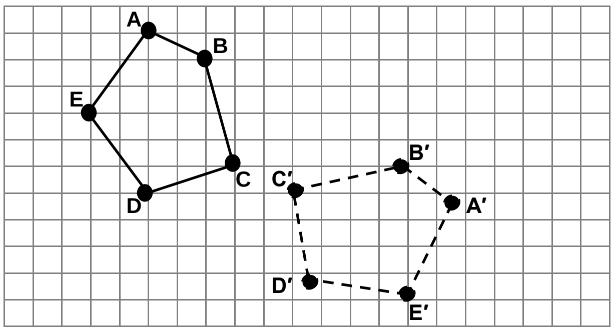


Is this a translation? ______
Explain:

____

____

2.

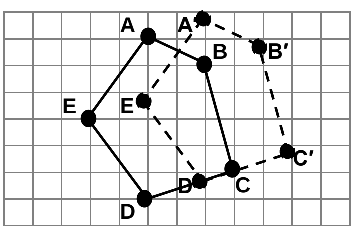


Is this a translation? ______
Explain:

____

____

3.

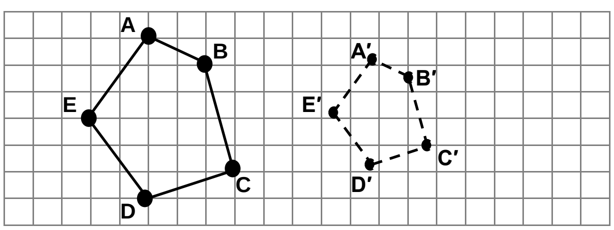


Is this a translation? ______
Explain:

____

____

4.



Is this a translation? ______
Explain:

____

____

5. When you translate a figure on the coordinate plane, explain how the *x*-coordinate and *y*-coordinate of each point is affected.

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