Intermediate II
Chapter 6 Review

Lesson 6.1 (Translations)

Remember: Translations are just SLIDING the image around the coordinate plane
Pre-image: original image (A, B, C)
Image: new image AFTER transformation of any kind (A', B', C')
IF you're moving LEFT OR RIGHT, this affects your X-COORDINATE.
IF you’re moving UP OR DOWN, this affects your Y-COORDINATE.
TRANSLATION NOTATION: (change in all x-coordinates, change in all y-coordinates)
   Example: Shift the pre-image left 3 and up 4: (x – 3, y + 4)

Sample Problems:
Write the following transformations in translation notation.
1. Shift 3 down and 4 to the right.  2. Shift 2 up and 6 to the left  3. Shift 4 down and 5 to the right.

4. $A(3, -4) \rightarrow A'(5, 0)$  5. $B(-4, -2) \rightarrow B'(-6, 2)$

6. Translation notation from point D to point A:

7. Translation notation from point A to point B:

8. Translation notation from point C to point A:
Lesson 6.2: (Reflections)

Remember:

REFLECTION: a mirror image that is CONGRUENT to the pre-image

Two lines of symmetry (this year ☺):

- Reflection over the X-AXIS: x-coordinate stays the same; y-coordinate changes signs (same, −)
- Reflection over the Y-AXIS: x-coordinate changes signs; y-coordinate stays the same (−, same)

Sample Problems:

1. Graph the following triangle on both coordinate planes below.
   Triangle ABC has coordinates A (2, 3) B (3,1) and C (4,3).

   | Graph triangle ABC’s reflection | New coordinates: | Graph triangle ABC’s reflection | New coordinates: |
   | over the x-axis. Write the new |               | over the y-axis. Write the new |               |
   | coordinates.                   |               | coordinates.                   |               |

2. Graph the following triangle on both coordinate planes below.
   Triangle DEF has coordinates A (−2, −3) B (−3, 0) and C (2, 5).

   | Graph triangle DEF’s reflection | New coordinates: | Graph triangle DEF’s reflection | New coordinates: |
   | over the x-axis. Write the new |               | over the y-axis. Write the new |               |
   | coordinates.                   |               | coordinates.                   |               |
Lesson 6.3 (Rotations)

Remember:
Rotations are clockwise (to the right) or counter-clockwise (to the left)

Degrees we use (this year) are \(90^\circ, 180^\circ, \text{and} 270^\circ\)

*\(90^\circ\) clockwise is \underline{counter clockwise}, \(180^\circ\) clockwise is \underline{counter clockwise}, \(270^\circ\) clockwise is \underline{counter clockwise}*

There are two kinds of rotations:
* Rotation about the origin
* Rotation about a fixed point (not the origin)

**Rotations about the ORIGIN**

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Clock-wise</th>
<th>Counter Clock-wise</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°</td>
<td>(x, y) → (x, y)</td>
<td>(x, y) → (y, x)</td>
</tr>
<tr>
<td>180°</td>
<td>(x, y) → (x, y)</td>
<td>(x, y) → (y, x)</td>
</tr>
<tr>
<td>270°</td>
<td>(x, y) → (x, y)</td>
<td>(x, y) → (y, x)</td>
</tr>
</tbody>
</table>

Triangle \(\triangle RST\) has vertices \(R(1, 1), S(1, 4), \text{and} T(3, 1)\). Graph the figure and its rotated image after a clockwise rotation of 90° about the origin. Then give the coordinates of the vertices for triangle \(\triangle R'S'T'\).

Quadrilateral \(\square KLMN\) has vertices \(K(2, 0), L(4, 0), M(5, -2), \text{and} N(1, -2)\). Graph the figure and its rotated image after a counterclockwise rotation of 90° about the origin. Then give the coordinates of the vertices for quadrilateral \(\square K'L'M'N'\).

**Rotations about a Fixed Point**

Rectangle \(ABCD\) with vertices \(A(-7, 4), B(-7, 1), C(-2, 1), \text{and} D(-2, 4)\) represents the bed in Jackson’s room. Graph the figure and its image after a clockwise rotation of 90° about vertex \(C\). Then give the coordinates of the vertices for rectangle \(A'B'C'D'\).

90° clockwise about vertex \(H\)

180° counterclockwise about vertex \(E\)
Lesson 6.4: (Dilations)

Remember:

Multiply each x value and each y value by the scale factor (k)

\[ k > 1, \text{ then the dilation is an enlargement (get’s bigger)} \]

\[ k < 1, \text{ then the dilation is a reduction (get’s smaller)} \]

\[ k = 1, \text{ then the figure stays the same size} \]

Sample Problems:

\[ F(-2, \ 1), \ U(-1, \ 2), \ N(3, \ 1); \ k = 2 \]

\[ P(-3, \ 3), \ Q(6, \ 3), \ R(6, \ -3), \ S(-3, \ -3); \ k = \frac{1}{3} \]

David built a model of a regulation basketball court. His model measured approximately 3.75 feet long by 2 feet wide. The dimensions of a regulation court are 94 feet long by 50 feet wide. What is the scale factor David used to build his model?
7.3 Similar Figures

- Two figures are similar if the second can be obtained from the first by a sequence of transformations and dilations. In other words the two shapes are the same shape but not the same size.

- You can determine whether two side lengths are similar by finding the ratios comparing the lengths of each side. If the ratios are equal, the figures are similar.

- The sizes of the two figures are related to the scale factor of the dilation. If the scale factor is between 0 and 1 then the dilated figure is smaller than the original. If the scale factor is equal to one, then the dilated figure is the same size as the original. If the scale factor is greater than 1, then the dilated figure is larger than the original.

Determine whether the figures are similar using transformations. Explain your reasoning.

An iron-on measures 3 inches by 4 inches. It is enlarged by a scale factor of 2 for a t-shirt. The second iron-on is enlarged by a scale factor of 3 for a bag. What are the dimensions of the largest iron on? Are both of the enlarged iron-ons similar to the original?

Casey is reducing the size of her painting to make it into a postcard. The painting is 12 inches by 20 inches. She will reduce it by a scale factor of $\frac{1}{4}$. What are the dimensions of the postcard?