An **ISOMETRY** or **RIGID TRANSFORMATION** is a transformation that **preserves distance** between the pre-image and its image. It also **preserves angle measure**.

**Example:** Do you know what kind of transformation this is?

**Same Shape & Size!**

Rotations, Translations, and Reflections are examples of Isometries and Rigid Transformations.
A non-isometric transformation (non-rigid motion) is a transformation that does not preserve the distances and angles between the pre-image and image.

A **dilation** is a transformation where both dimensions' scale factors are the same. In a dilation, the sides are proportional... the size of the shape changes.

A **stretch** is a transformation where the scale factors are different from side to side; it is not proportional. In a stretch, the shape of the image is definitely a distortion of the pre-image.
1. Circle which of the following are isometric transformations? (there may be more than 1 answer)

   Pre-Image  a) Image  b) Image  c) Image

   ![Pre-Image Dog](image1)
   ![Image Dog 1](image2)
   ![Image Dog 2](image3)

2. Use the previous example to determine which transformation took place, circle the answer.

   Pre-Image  a) Reflection Translation Rotation Dilation Stretch Other  b) Reflection Translation Rotation Dilation Stretch Other  c) Reflection Translation Rotation Dilation Stretch Other

   ![Pre-Image Dog](image4)
   ![Image Dog 1](image5)
   ![Image Dog 2](image6)

3. Circle which of the following are isometric transformations? (there may be more than 1 answer)

   Pre-Image  a) Image  b) Image  c) Image

   ![Pre-Image Bug](image7)
   ![Image Bug 1](image8)
   ![Image Bug 2](image9)

4. Use the previous example to determine which transformation took place, circle the answer.

   Pre-Image  a) Reflection Translation Rotation Dilation Stretch Other  b) Reflection Translation Rotation Dilation Stretch Other  c) Reflection Translation Rotation Dilation Stretch Other

   ![Pre-Image Bug](image10)
   ![Image Bug 1](image11)
   ![Image Bug 2](image12)
5. Determine the coordinates of the image, plot the image and determine if it is an isometric transformation or not.

<table>
<thead>
<tr>
<th>PRE-IMAGE</th>
<th>Transformation</th>
<th>COORDINATES</th>
<th>PLOT THE IMAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A(-1,1)</td>
<td></td>
<td>A'(-1,-1)</td>
<td>Reflection over x-axis</td>
</tr>
<tr>
<td>B(0,4)</td>
<td></td>
<td>B'(0,-4)</td>
<td></td>
</tr>
<tr>
<td>C(4,1)</td>
<td></td>
<td>C'(4,-1)</td>
<td></td>
</tr>
</tbody>
</table>

Reflection in x-axis

5. Determine the coordinates of the image, plot the image and determine if it is an isometric transformation or not.

<table>
<thead>
<tr>
<th>PRE-IMAGE</th>
<th>Transformation</th>
<th>COORDINATES</th>
<th>PLOT THE IMAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A(0,0)</td>
<td></td>
<td>A'(0,0)</td>
<td></td>
</tr>
<tr>
<td>B(1,3)</td>
<td></td>
<td>B'(1,-6)</td>
<td></td>
</tr>
<tr>
<td>C(5,0)</td>
<td></td>
<td>C'(5,0)</td>
<td></td>
</tr>
</tbody>
</table>

Reflection in x-axis

Reflection in x-axis