Transformations Unit Project

Due Date  Tuesday, March 3

[I will be after school on these following days to help with or answer any questions about the unit projects. You can also ask me about it after school or during tutoring sessions.]

Wednesday, February 18 3:00-3:30 and Monday, March 2 3:00-3:30

Your goal is to perform four different transformations on a figure. You will translate (slide) your figure. You will reflect (flip) your figure. You will rotate (turn) your figure. And you will reflect your figure over a pair of parallel lines.

Your end product should have five images on five separate pieces of graph paper:

1. Your original figure.
2. Your translation of that figure.
3. Your reflection of that figure over a line.
4. Your rotation of that figure about a point.
5. Your reflection of that figure over a pair of parallel lines.

They should be labeled with the kind of transformation used as well as lines of reflection and points of rotation.

You also need to answer one question.

Instructions

1. Original Figure.
Draw or print or copy a figure. It can be as simple or complex as you want. There are two rules, though: (1) the figure cannot have a vertical (up and down) line of symmetry and (2) the figure cannot have a horizontal (right and left) line of symmetry. Besides that the figure is up to you. You can use SpongeBob or Mr. Crabs or you can draw a triangle or you can write your name. Whatever you want (as long as it is appropriate). Label this image as your Original Figure.

2. Translation.
Trace your figure onto another piece of paper. Place that tracing below another piece of graph paper where your original image is. Slide the tracing in any direction you want and trace it onto your new piece of paper.
Label this image as Translation.

3. Reflection over ONE Line.
Pick a line of reflection. Make sure you label it or make it clear what the line of reflection is. You can draw it darkly.
Place the tracing paper on the line so that the edge of the paper lines up with the line. Trace your figure onto the paper. Flip the paper and trace onto the back of the tracing paper to make it dark enough. Place this under the new piece of graph paper where the picture would be flipped to. Trace onto the new piece of paper. Note: If your figure crosses the line of reflection you will have to do the two pieces separately. Label this image as Reflection. Make sure you label your line of reflection on your reflection image.

4. Rotation.
Pick a point of rotation. Place your tracing paper so that it covers both your figure and your point of rotation. Make a mark on your tracing paper where the point is. Place the tracing paper below a new sheet of graph paper. Find the point of rotation on this paper and line it up with that on the tracing paper. Push the brass clasp through both. Turn the tracing paper however many degrees you want and trace your figure onto the new piece of graph paper. Label this image as Rotation. Make sure you label your point of rotation on your rotation image.

5. Reflection over TWO Lines.
Pick two parallel lines. Remember parallel lines run the same way but never touch. You can use any two parallel lines (but it may be easier to use two vertical or two horizontal grid lines).
Reflect your figure over one of these lines. Then reflect it over the second line (see section 3 for instructions on reflecting over a line). Put this new reflection on a separate piece of graph paper and label it “Reflection over Parallel Lines.” Make sure you label the two lines of reflection.

6. Questions to Answer.
What do you notice about your reflection over two parallel lines? This could be mistaken for another type of transformation. What kind of transformation? Do you suppose the same would happen if the lines were not parallel? Answer each part in complete sentences.

Grading

Grade = 3 x (Points from Rubric) + 46

The best grade you can get if any sections are INCOMPLETE is a 60.

An extra 5 points will be awarded for complex original figures (such as a cartoon figure as opposed to a triangle).
# Rubric for Grading

<table>
<thead>
<tr>
<th></th>
<th>3 - Excellent</th>
<th>2 - Acceptable</th>
<th>1 - Unacceptable</th>
<th>0 - Incomplete</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original Figure</strong></td>
<td>The figure does not have a vertical or horizontal line of symmetry. The figure is labeled as the original figure.</td>
<td>The figure does not have a vertical or horizontal line of symmetry. The figure is NOT labeled as the original figure.</td>
<td>The figure has a vertical or horizontal line of symmetry.</td>
<td></td>
</tr>
<tr>
<td><strong>Translation</strong></td>
<td>The figure has ONLY been translated in some direction. The figure is labeled as a translation.</td>
<td>The figure has been translated in some direction, but some other transformation has also been used on it OR The figure is NOT labeled as a translation.</td>
<td>The figure has not been translated OR the image and the original figure are NOT congruent.</td>
<td></td>
</tr>
<tr>
<td><strong>Reflection over ONE Line</strong></td>
<td>The figure has ONLY been reflected over a line of reflection. The line is labeled as such. The figure is labeled as a reflection.</td>
<td>The figure has ONLY been reflected over a line of reflection. The line is NOT labeled as such. The figure is labeled as a reflection.</td>
<td>The figure has been reflected over a line of reflection, but some other transformation has also been used on it OR The figure is NOT labeled as a reflection.</td>
<td>The figure has not been reflected OR the image and the original figure are NOT congruent.</td>
</tr>
<tr>
<td><strong>Rotation</strong></td>
<td>The figure has ONLY been rotated around a point of rotation. The point is labeled. The figure is labeled as a rotation.</td>
<td>The figure has ONLY been rotated around a point of rotation. The point is NOT labeled. The figure is labeled as a rotation.</td>
<td>The figure has been rotated around a point of rotation, but some other transformation has also been used on it OR The figure is NOT labeled as a rotation.</td>
<td>The figure has not been rotated OR the image and the original figure are NOT congruent.</td>
</tr>
<tr>
<td><strong>Reflection over TWO Parallel Lines</strong></td>
<td>The figure has ONLY been reflected over a pair of parallel lines. The lines are labeled as such. The figure is labeled as a reflection over two lines.</td>
<td>The figure has ONLY been reflected over a pair of parallel lines. The lines are NOT labeled as such. The figure is labeled as a reflection over two lines.</td>
<td>The figure has been reflected over a pair of parallel lines, but some other transformation has also been used on it OR The figure is NOT labeled as a reflection over two lines.</td>
<td>The figure has not been reflected over two parallel lines OR the image and the original figure are NOT congruent.</td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td>The questions are answered completely and the correct type of transformation is identified.</td>
<td>The questions are answered completely, but the correct type of transformation is NOT identified.</td>
<td>Some parts of the questions were not answered.</td>
<td>The questions were not answered in complete sentences OR the questions were not answered.</td>
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</table>