Destiny is not a matter of chance, it is a matter of choice; it is not a thing to be waited for, it is a thing to be achieved.

I can...
- Represent transformations in the plane, describe transformations as functions that take points in the plane as inputs and give other points as outputs.
- Compare transformations that preserve distance and angle to those that do not

There are four types of transformations: **rotations, reflections, translations**, and **dilations**.
Some of these preserve distance and angle measure, meaning they are **rigid motions**.

**DIRECTIONS**: With a partner, fill out the following charts:

<table>
<thead>
<tr>
<th></th>
<th>Definition</th>
<th>Rigid Motion, yes or no?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dilation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Translation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dilations**
If the scale factor is greater than 1, it is an ______________
If the scale factor is less than 1, it is a ______________

Explain how to perform a dilation:

Quadrilateral ABCD has the points A(2, 3), B(2, 5), C(-1, 3) and D(-2, -2). A'B'C'D' is created with a scale factor of 2. What are the coordinates of A'B'C'D'?  

**Translations**
A shift (a slide)

Explain how to perform a translation:

▲ABC is has coordinates A(2, 3), B(2, 5), C(-1, 3), what are the coordinates with the translation rule (x, y) → (x + 2, y - 1)?
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**Reflections**
The line of reflection is called the ___________

Explain how to perform the reflection when the following is the axis of symmetry:

<table>
<thead>
<tr>
<th>x-axis</th>
<th>y-axis</th>
<th>y=x</th>
<th>y=constant</th>
<th>x=constant</th>
</tr>
</thead>
</table>

Reflect each over the given axis:

- **X-axis**
  - y = -1
  - x = -2

- **y-axis**

- **y=x**

**Rotations**
Must know the degree of rotation and the direction

Rotate each segment counterclockwise with the degrees given. A(2,2) B(4,5)

- 90°
- 180°
- 270°

What are the new coordinates of A and B? Don’t forget to label them on each graph.

A’
B’
A’
B’
A’
B’

Why is a dilation not a rigid transformation?
1. A square is to be dilated with a scale factor of 4. If a side of the original square is 12, what is the measure of a side of the new square?
   A. 3
   B. 8
   C. 12
   D. 48

2. Haley looked at Figure 1 and moved the shape to create Figure 2.
   Figure 1
   Figure 2
   Which term describes the change that Haley made?
   A. dilation
   B. reflection
   C. rotation
   D. translation

3. A community wants to move a skateboard park for safety and noise reasons. The volunteers decide to move the skateboard park 128 feet east and 52 feet south. Assuming the positive y-axis on a coordinate plane as north, which function represents the translation coordinates of the skateboard park?
   (A) \((x, y) \rightarrow (x + 52, y + 128)\)
   (B) \((x, y) \rightarrow (x + 128, y - 52)\)
   (C) \((x, y) \rightarrow (x - 128, y - 52)\)
   (D) \((x, y) \rightarrow (x - 128, y + 52)\)

4. Triangle \(\triangle KLM\) is the pre-image of \(\triangle K'L'M'\), before a transformation. Determine if these two figures are similar.
   Which statements are true?
   Select all that apply.
   - Triangle \(\triangle KLM\) is similar to \(\triangle K'L'M'\).
   - Triangle \(\triangle KLM\) is not similar to \(\triangle K'L'M'\).
   - There was a dilation of scale factor 0.5 centered at the origin.
   - There was a dilation of scale factor 1 centered at the origin.
   - There was a dilation of scale factor 1.5 centered at the origin.
   - There was a translation left 0.5 and up 1.5.
   - There was a translation left 1.5 and up 0.5.
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The figure graphed below is rotated 90° clockwise about the origin and translated up 1 unit.

The pool of a health club undergoing renovation is being moved from the center of the bottom floor to the far right roof deck. If they want to move the pool up 8 stories and to the right 6 yards, which of the following represents the job the construction workers need to do?

(A) 6 units in the +x direction and 8 units in the +y direction

(B) 8 units in the -x direction and 6 units in the +y direction

(C) 6 units in the -x direction and 8 units in the +y direction

(D) 8 units in the +x direction and 6 units in the +y direction

8. The rule for translation is \((x, y) \rightarrow (x + 3, y - 5)\). What is the coordinate for \(A'\)?

9. If \(ABCD\) is dilated by a scale factor of \(\frac{1}{2}\), what is the coordinate of \(D'\)?

Use quadrilateral \(ABCD\) to answer questions 8-12

10. If reflected over the line \(y=x\), what is the coordinate of \(B'\)?

11. \(ABCD\) is rotated counterclockwise 180°. Give the coordinate for \(C'\).

12. \(ABCD\) is rotated clockwise 90°. What is the coordinate of \(D'\)?