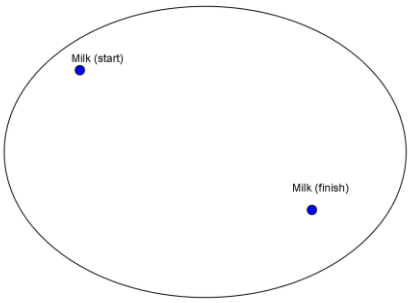
Transformations

ACTIVITY I: Please Pass the Milk.

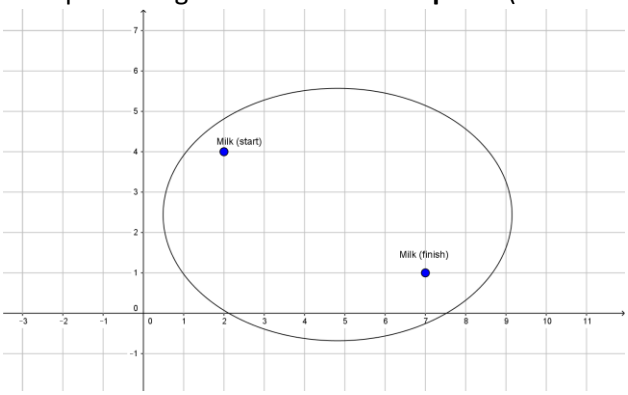
The Smiths are sitting at the table eating supper. Patrick says, "Austin, please pass the milk." Austin slides the jug of milk across the table to his father. Below is a bird's eye view of the table.



From this perspective, describe the milk's movement.

How could you use an arrow to depict the milk's movement? Where would you start the arrow? Where would you stop the arrow?

Let's put the figure on a **coordinate plane** (see below).



What are the coordinates of the milk's starting position?

What are the coordinates of the milk's ending position?

If you use an arrow to depict the milk's movement, can you describe the arrow more specifically now that it is on a coordinate plane?

If the bread is located at (4,2) and moves in the same direction and the same distance as the milk, where does the bread stop?

If the butter is at the point (x,y) and slides the same direction and same distance as the milk, where would the butter stop?

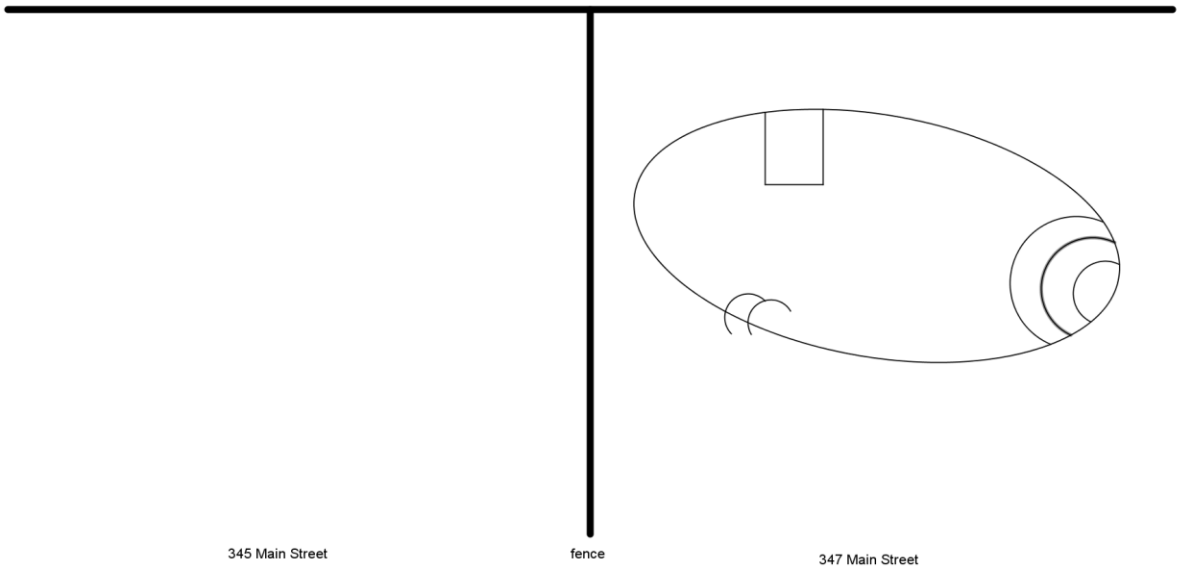
What is the mathematical term for "**slides**"? Is there a mathematical term for the "arrow"?

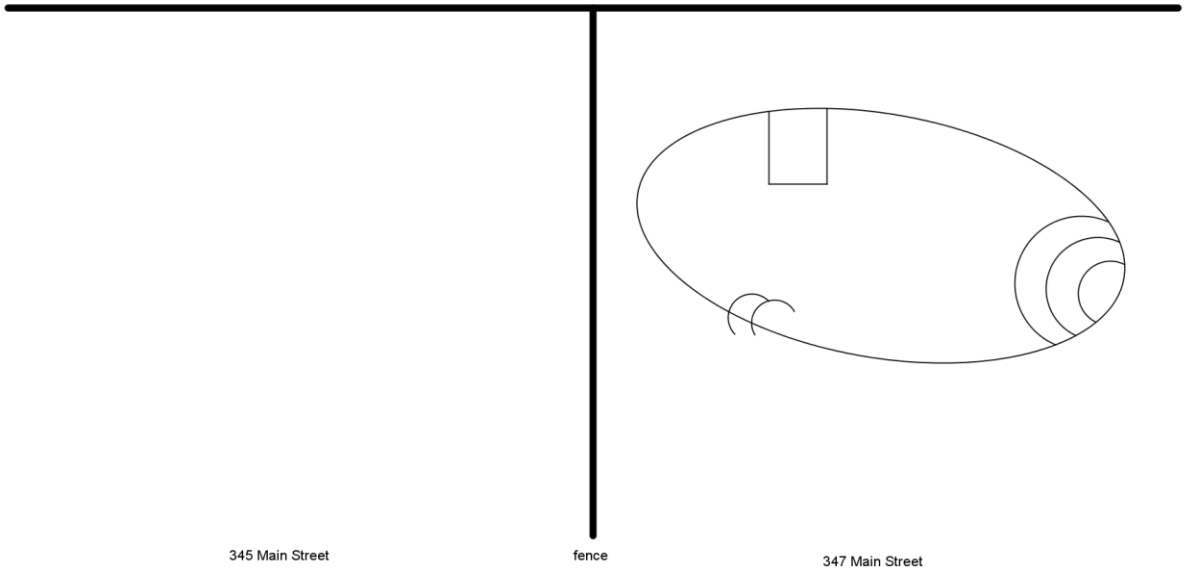
Describe how you could use **patty paper** to slide a figure.

Practice on **Geogebra.** Construct triangle ABC (where A(3,2), B(1,6), and C(-2,-1). Slide triangle ABC two units to the left and 4 units down. Use the space below to note your steps. (The transformation button is four in from the right.)

ACTIVITY II Backyard

The Fosters have decided to put in a pool. They give specific written directions to Pools R Us about where the pool should be placed in the backyard. The fence is used as a reference. The plans for the pool are perfect: The distances away from the fence are ideal. Unfortunately, when Mrs. Foster arrived home from work, she noticed her neighbor's beautiful pool, which looks strikingly like the one that was supposed to have been dug in their yard. Upon calling Pools R Us, it is determined the pool company accidentally went to 347 Main Street instead of 345. Sketch where the pool belongs in the Fosters' yard. (Note: Distance is measured using the perpendicular distance.) Two diagrams have been provided for using two different methods.





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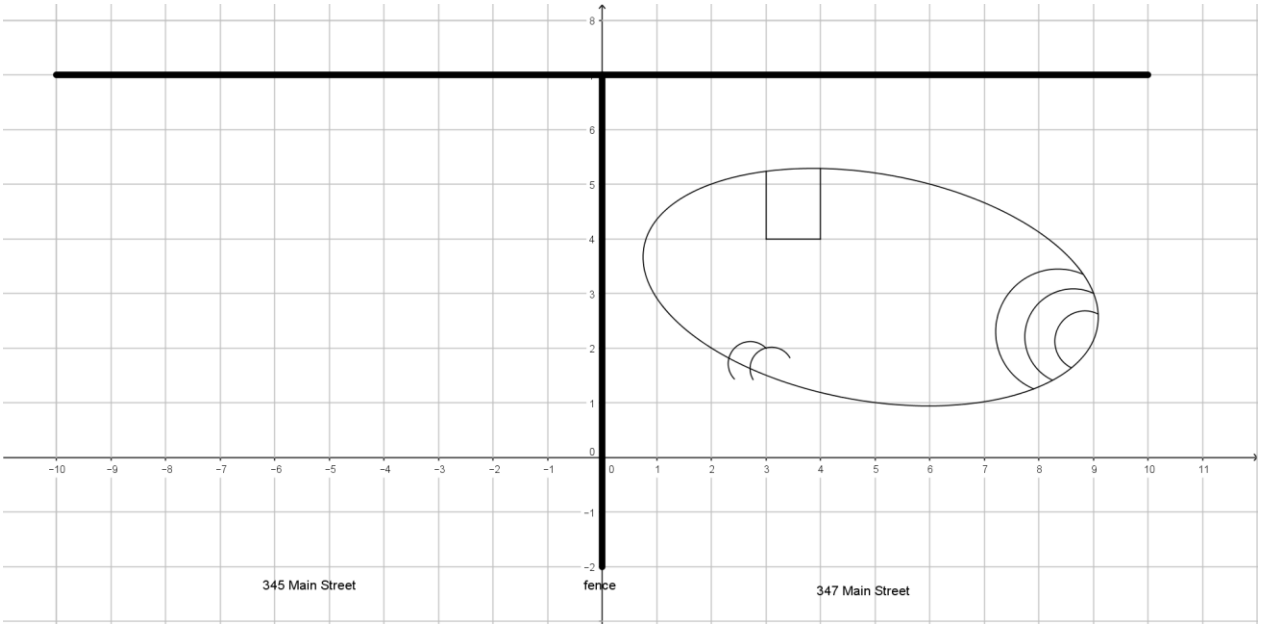
Describe how **you** found where to sketch the pool.

Describe how you could use a **Mira** to find the proper pool placement.

Describe how you could use **patty paper** to find the pool's correct placement.

Suppose the pool's diagram is on a coordinate plane. What happens to each point from 347 Main St. as it is placed in the correct position at 345 Main St.?

What would happen to the point (x,y)?



Suppose the fence is aligned with the x-axis instead of the y-axis. What would happen to the point (x,y)?

What is the mathematical term for what is being done to the diagram of the pool?

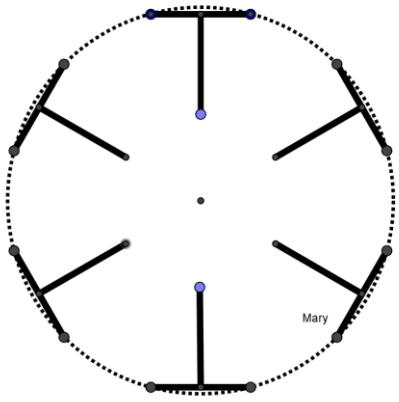
Describe the relationship between the segment that connects a point to its reflection and the line of reflection.

Practice on **Geogebra.** Construct triangle ABC (where A(3,2), B(1,6), and C(-2,-1)). Practice:

*Reflect triangle ABC over the x-axis and label
*Reflect triangle ABC over the y-axis
*Reflect triangle ABC over the line y = x

Activity III. Mary Goes Round and Round

Let's explore the old playground merry-go-round. You remember the type….you hang on as tight as you can as the largest child spins the merry-go-round as fast as he or she can in hopes that 1) a smaller child flings off or 2) someone pukes. Below is a picture of a merry-go-round along with a bird's eye view. Suppose Mary is sitting at the edge facing outward clinging on for dear life.



What fraction of a turn, must the merry-go-round make so that the tree is directly in front of Mary?

Suppose the merry-go-round is stopped in the position shown and Mary stands up where she is. What fraction of a turn must Mary make so that the tree is directly in front of her?

Describe how you could find this (these) angle(s) using a **protractor** and **straight edge**.

Describe how you could find this (these) angles using **patty paper**.

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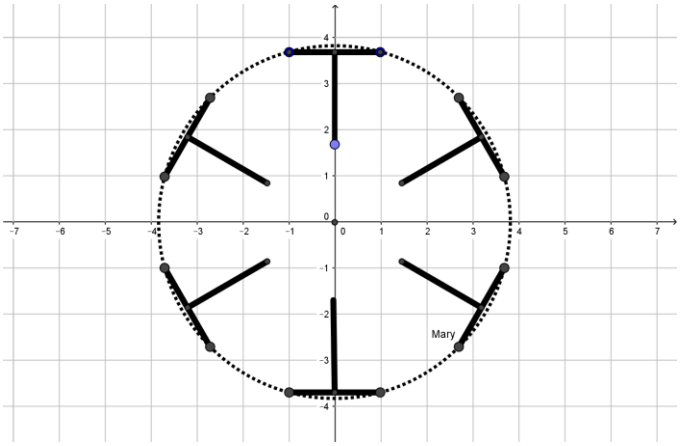

What is the mathematical term for "turn"?

What are important aspects of a turn?

Construct an asymmetrical figure on **Geogebra**. Practice turning it both clockwise and counterclockwise, using different centers of rotation.

Give Mary's coordinates if the merry-go-round rotates 90° counterclockwise.

Give Mary's coordinates if the merry-go-round rotates 90° clockwise.

Give Mary's coordinates if SHE turns 90° counterclockwise. Clockwise?

What information must you know to find the coordinates of (x,y) when turned 90° counterclockwise (or clockwise)?

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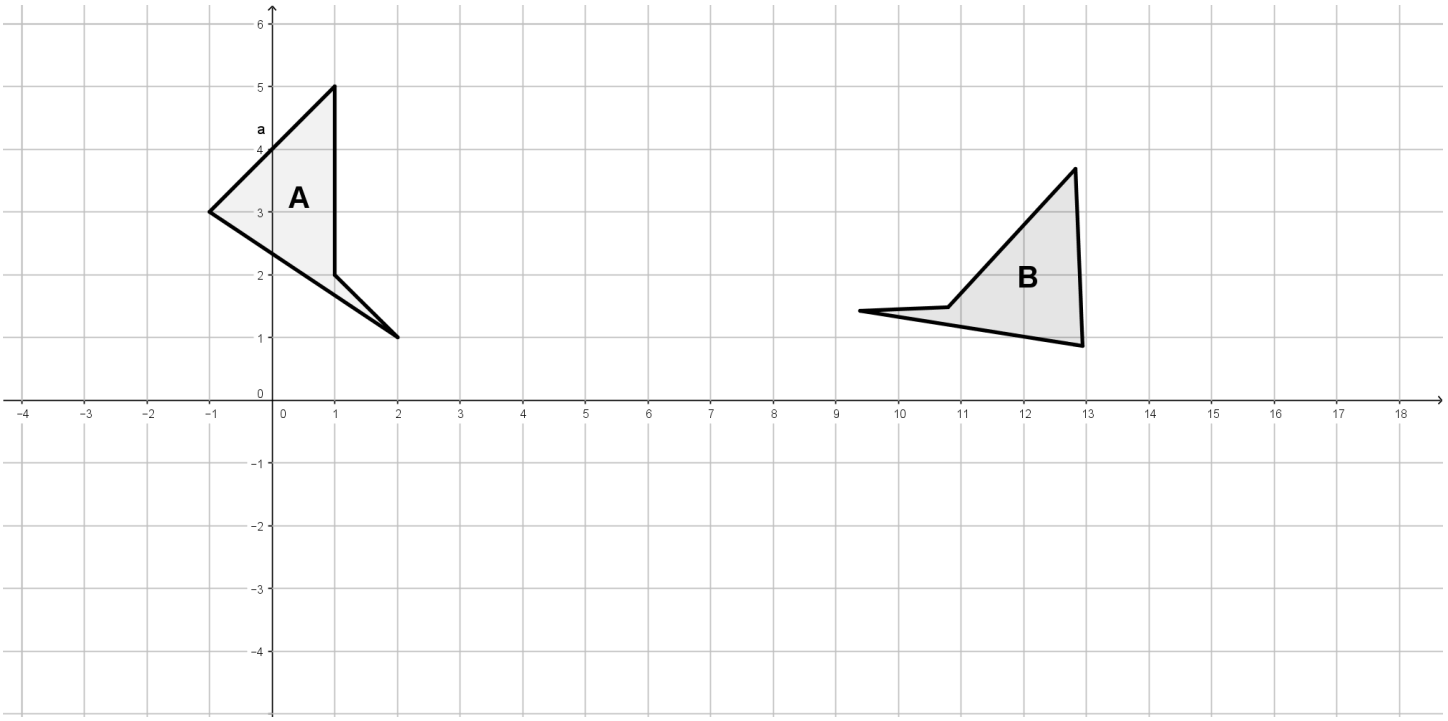
Activity IV. How Did I Get HERE???

Find two ways to get from the preimage A to the image B.



Make your own! Use either the graph below or Geogebra to construct a preimage and an image using transformations. Then hide your work and quiz someone to see if they can get from A to B.

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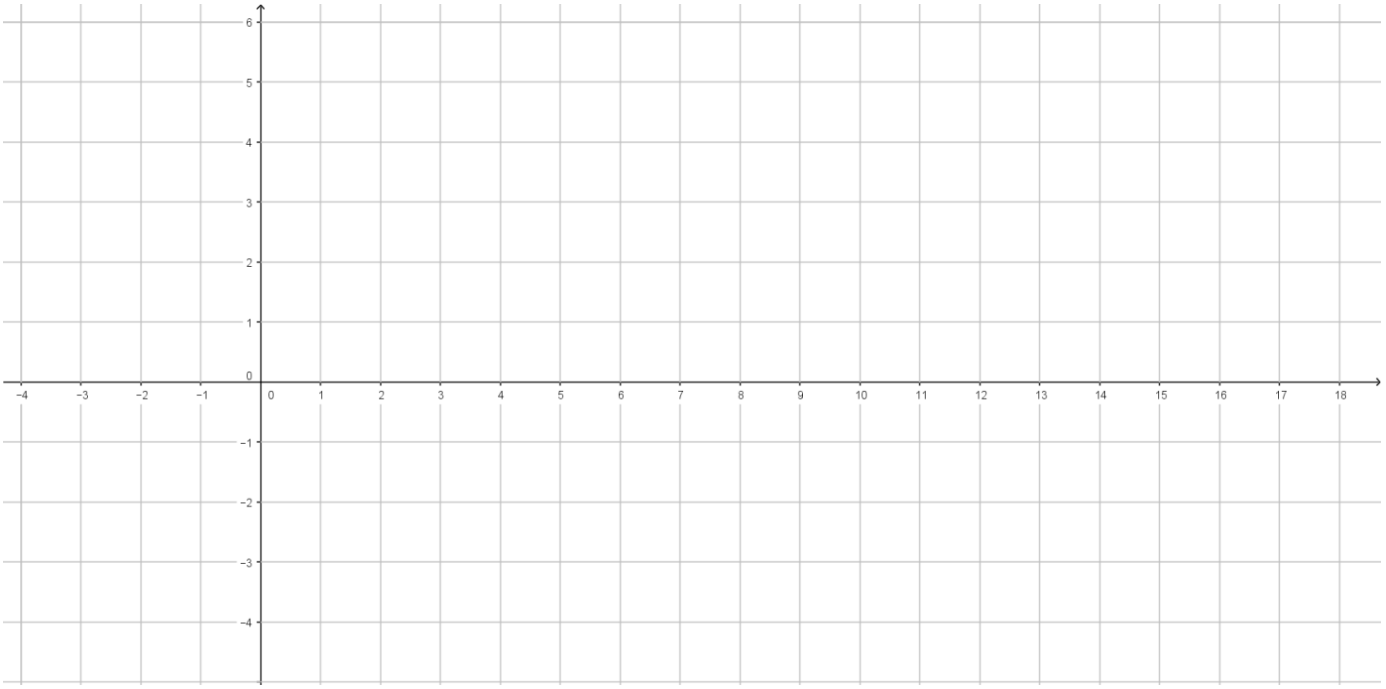

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