

Discovering Rotation Rules Using Geogebra and Circles:

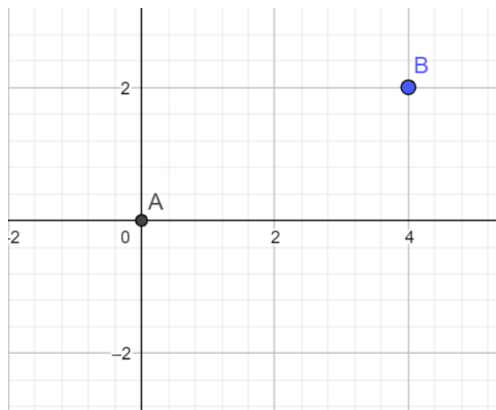
Using geogebra, you can discover the rules of rotation using. Geogebra is an interactive graph that allows you to plot points and create shapes to discover new rules. In this project, with the use of circles and perpendicular lines we discover how to rotate points about a fixed point with precision. With this project and the technique that you discover, you can rotate a point an infinite amount of degrees and Geogebra will give you the exact coordinate points.

What is a rotation? The action of rotating around a point, axis or center.

How to perform a rotation in Geogebra using circles and radii about the origin:

Step 1:

Plot a point on the origin (0,0) and then plot a point at (4,2)

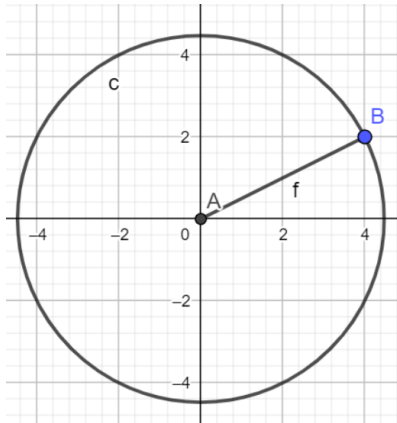


Step 2:

Using the tool “Circle with center through point”



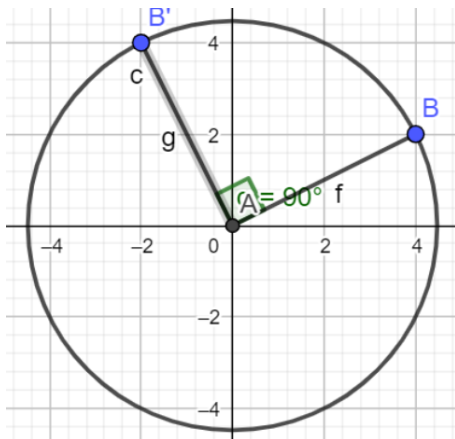
Create a circle with the center at the origin that goes through point B(4,3). Use the “Line Segment tool” to connect points A and B.



Step 3:



Using the tool “Angle with given size ”, start from outside the circle (point B) and then (point A). A toolbar will pop up. Type 90* (This is to perform a 90 degree counterclockwise rotation) Then connect with a line segment.



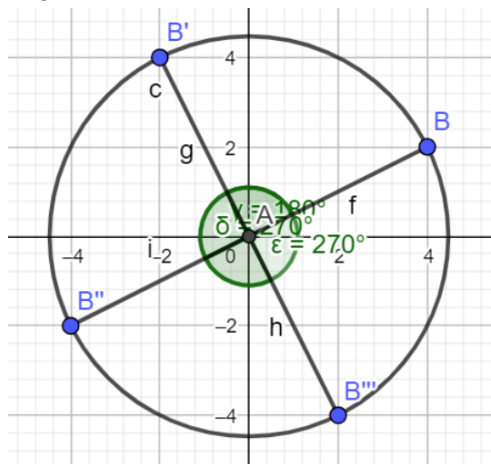
-Note: that B' is the new point:

What are the coordinates of B and B'?

What is a universal rule for counterclockwise rotations of 90*? (Hint use X and Y)

Step 4: (Solving for Rotations of 180 and 270 degrees)

Continue using the "Angle with given size" tool and solve for a 180 degree rotation and a 270 degree rotation.



What are the coordinates of B, B', B'', and B'''?

What is a universal rule for counterclockwise rotations of 180 and 270 degrees?

What is the relationship between negative rotation? (clockwise rotations)

(*Note that these rules only apply to rotations about the origin)

Using Geogebra, rotate point (-5,3) 270 degrees counterclockwise about point (0,2).

What are the coordinates of the new point?

270 degrees clockwise about point (0,2)?

We can also use Geogebra to rotate points not factors of 90 degrees.

Example: Using Geogebra, Rotate point (3,4) 2500 counterclockwise about the origin. What is the new point? (Round to the nearest hundredths).

Wrap Up:

- Learned How to rotate a point in Geogebra
- Found where the rotation rules derived from
- Found a way to rotate any point infinitely around a given point
- See the relationship between negative and positive rotations