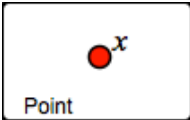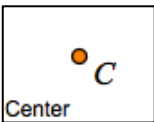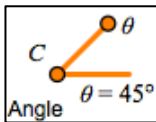# Rotation Challenges   Name(s):

ROTATE A POINT

1. Open geometricfunctions.org/links/rotation-family/. Go to page 2.

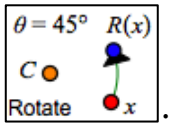2. Tap the **Point** tool [Point] to create an independent variable.

3. Drag variable x around the screen.

4. Tap the **Center** tool [Center] and then the **Angle** tool [Angle]. Be sure to attach the two points C to each other.

Q1 Drag point θ and notice how its measurement changes. What is the smallest value you can make? What is the largest value you can make?

Smallest value:	Largest value:

5. Set θ back to 90°. Then tap the **Rotate** tool [Rotate]. Attach point x, and attach angle measurement θ.

6. Vary x and observe the behavior of $R_{C,\theta}(x)$.

Q2 Use tracing to make a simple pattern. Write down the angle you used, and draw your pattern below.
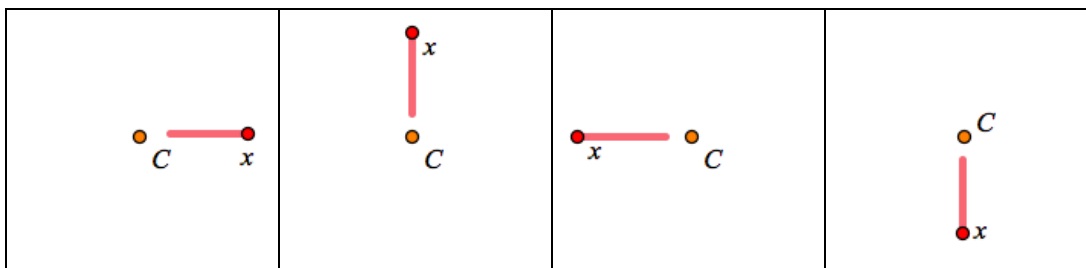
The angle I used was θ =

Q3 Compare the speed of x and $R_{C,\theta}(x)$. Which one is faster, or do they move with the same speed?

Q4 Choose a new angle, and make a pattern that includes fixed points. How many fixed points could you make? Where were they?

My pattern: Angle I used: $\theta =$	What I noticed about rotation fixed points:

Q5 Set the angle to 90°. Then start with x near C and drag x to the right. Use the first box to draw where $R_{C,\theta}(x)$ went. Fill in the other boxes the same way.
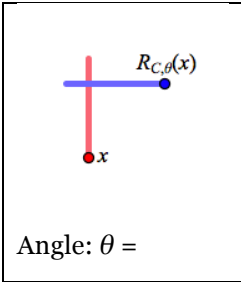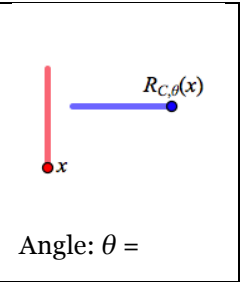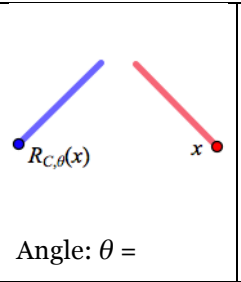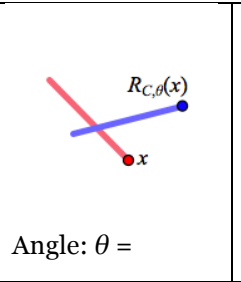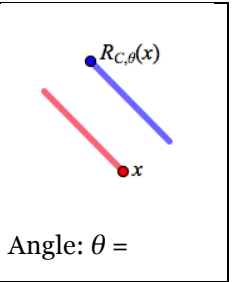

What do you notice about these four patterns?

Q6 Trace a new pattern using $\theta = 180°$. Draw your pattern on the left, and write what you noticed on the right.
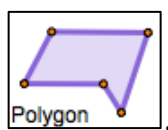
My pattern:	What I noticed:

Q7 Move the center and change the angle to try to match each picture below. In each box, draw a point to show where you put the center, and write the angle you used. Try to match all 5!

$R_{C,\theta}(x)$	$R_{C,\theta}(x)$	$R_{C,\theta}(x)$	$R_{C,\theta}(x)$	$R_{C,\theta}(x)$
x	x	x	x	x
Angle: $\theta =$	Angle: $\theta =$	Angle: $\theta =$	Angle: $\theta =$	Angle: $\theta =$

RESTRICT THE DOMAIN

7. Go to page 3 and use the **Polygon** tool Polygon .

8. Use the **Point** tool Point to restrict independent variable x to the polygon.

9. Use the **Center**, **Angle**, and **Rotate** tools to rotate point x.

Q8 Trace a rotation of your polygon, using whatever angle you like. Draw your picture on the left, and write the angle you used and anything you noticed on the right.
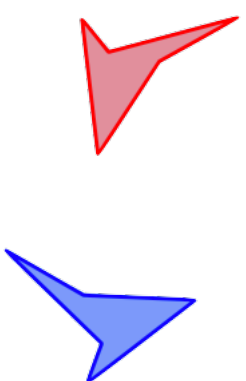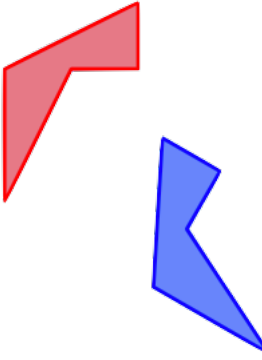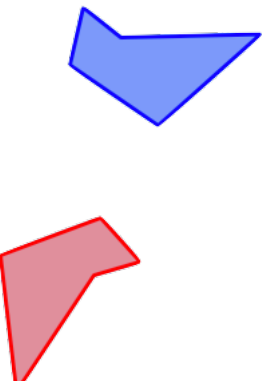
My picture:	Angle I used: $\theta =$
	What I noticed:

10. On page 5 restrict x to the red polygon and construct your own reflection function.

11. Adjust the center and angle to make the trace of your dependent variable exactly match the blue polygon.

Q9 On the picture below, mark where you put the center point, and write down the angle you used. Do the same thing for the polygons on page 6 and page 7.

Page 5	Page 6	Page 7
Angle of rotation: θ =	Angle of rotation: θ =	Angle of rotation: θ =

Q10 On page 8 is a rotation puzzle that has only two points. Try to solve it. Explain below how you figured it out. Include a drawing.

Q11 On page 9 there are 8 suspects. You have evidence that the crime was committed by a dependent variable of the rotation family. Your job is to figure out which two suspects belong to the rotation family, and which of them is the dependent variable. Explain in the space below how you found the suspect.