Use this document to record your observations and describe your work as you explore the Rotate Family. If you get stuck, ask a friend or use the hint videos.

## Warm-Up

What did you notice about moving the balls? What did you wonder?

Which player made it easiest to score? Which made it hardest? Why?

Paste your screen capture below.

## Introduction

**p1** In this box draw a picture of your shape. Show *x, C,* *θ*, and *RC,θ*(*x*).

What do you notice, and wonder, when you drag *x*? What can you say about the relative speeds of *x* and *RC,θ*(*x*)?

**p2** In this box paste a screen capture of the shape you traced.

What do you notice, and wonder, about the fixed point(s) of your function?

## Interlude

How does this video relate to the rotate function you just constructed?

## Rotate Dances

### Example

**Q1** If you played the game on page 2, what did you try that worked? What did you try that didn’t work?

### Do the Rotate Dance

### Virtual Dance Challenge

## Rotation Stars

**p1** List the steps you used to trace the other three arms of the star.

**p2-5** Fill in this table for

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Page | Example | 2 | 3 | 4 | 5 |
| Drawing |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**p3** What did you do differently to make this star?

**p4** This star is more complicated. How did you make it?

**p5** This star is still more complicated. How did you make it?

**p67** Pages 2–5: Pick a page on which you used several different functions

## Where, Oh Where, Can the Center Be?

### Develop Your Methods

**p1** On page 1, how can you tell where the rotated image must be?

**p2** On page 2, how can you tell where the rotated image must be?

**p3-4** Pages 3–4: Describe your strategy. Were some problems harder than others? What made them harder?

**p6-7** Pages 6–7: Was it easier to use distances or a circle to find possible center points? Explain.

**p8** Page 8: Could you find a way to use the line and/or two circles to help you? Explain.

### Solve the Mystery

**p1** Explain your construction. Would any other location of *C* work?

Describe what happens when you drag *D*.

**p2** How did you adjust the centers? What did you notice about the angle values?

What happens when you drag points *D* and *E*? Can you adjust the construction so it still has a single center point? Explain.

**p3** Explain the construction you used to find the hidden location for C.

Drag several of the original points. Do the original C and θ still work? Why or why not?