Lab 10

Name:

Start time: Number of questions: 11

This set of questions goes with the pages of applets and activities for Lab 10. Use the applets and activities there to answer the questions.

Question 1 (.5 points)

Refer to lab page 2. Adjust the green circle diameter to be half of the cyan circle diameter. When the cyan circle's red point spins around the cyan circle twice, how many times does the green circle's red point spin around the green circle?

- a. Once
- b. Twice
- c. Three times
- d. Four times
- e. Pi times

Question 2 (.5 points)

Refer to lab page 2. Consider the frequency to be the speed of the rotation of one of the red points, measured in rotations per minute. What happens to the frequency when the diameter of a circle is doubled?

- a. It stays the same
- b. Cut in half
- c. Doubled
- d. Quadrupled

Question 3 (1 point)

Refer to lab page 2. Suppose the diameter of the cyan circle is 300, the diameter of the green circle is

100, and the point on the cyan circle moves so that its vertical position at time t is given as 150 sin(t). If the point on the green circle starts at the red end of the diameter, what equation could describe its horizontal motion?

- a. 50 cos(t)
- b. 50 cos(t/3)
- c. 50 cos(3t)
- d. 450 cos(t)
- e. 450 cos(t/3)
- f. 450 cos(3t)

Question 4 (1 point)

Refer to lab page 2. Match the starting conditions to the shape of the final curve. **Note:** in all cases you must first drag the red points on the circles to the black points at the end of the diameters, and then click on "Animate both" to start the movement on both circles simultaneously.

1. Vertical diameter 200, horizontal diameter 150	Arch
2. Vertical diameter 150, horizontal diameter 300	Ribbon for remembrance
3. Vertical diameter 150, horizontal diameter 100	Pretzel

Question 5 (.5 points)

Refer to lab page 2. The lissajous curve always fits inside a certain rectangle. What are the dimensions of the rectangle?

- a. green diameter wide, cyan diameter high
- b. green radius wide, cyan diameter high
- c. green diameter wide, cyan radius high
- d. green circumference wide, cyan circumference high
- e. green radius wide, cyan radius high

Question 6 (1 point)

Refer to lab page 3. The initial picture uses $m = 2$ and $n = 3$. m is controlled by the slider on the left and n is controlled by the slider on the right. What other settings for m and n give the same picture (mark all correct choices)?

- ☐ a. m=3, n=4
- ☐ b. m=4, n=5
- ☐ c. m=4, n=6
- ☐ d. m=5, n=7
- ☐ e. m=6, n=9
- ☐ f. m=8, n=16

Question 7 (1 point)

Refer to lab page 3. m is controlled by the slider on the left and n is controlled by the slider on the right. What happens when $m = 0$?

- ○ a. There is a horizontal line
- ○ b. There is a vertical line
- ○ c. There is a diagonal line
- ○ d. There is a circle
- ○ e. There is a swirly-curly thing

Question 8 (.5 points)

Refer to lab page 3. m is controlled by the slider on the left and n is controlled by the slider on the right. What happens when $m = n$ (with offset 0)?

- ○ a. There is a horizontal line
- ○ b. There is a vertical line
- ○ c. There is a diagonal line
- ○ d. There is a circle
- ○ e. There is a swirly-curly thing

Question 9 (1 point)

Refer to lab page 3. What happens when $m = n$ and you increase the x offset to Pi/2?

- a. The figure goes to a horizontal line
- b. The figure goes to a vertical line
- c. The figure goes to a longer diagonal line
- d. The figure goes to a circle
- e. There is a swirly-curly thing

Question 10 (2 points)

Refer to lab page 3. m is controlled by the slider on the left and n is controlled by the slider on the right. You can find the values of m and n by counting tick marks, or by reading the "fine print" at the bottom of the grapher. Put the offsets back to 0. Set m=10. If n=20 the graph has a simple appearance. What other setting for n gives a similar graph? Describe how these two graphs are alike and how they are different.

Question 11 (1 point)

Refer to lab page 4. This is an artsy Lissajous curve sketcher. You can change settings by clicking on the digits of the display. Click the digit at the top to make it bigger and at the bottom to make it smaller. Which of the preset letters on the left of that Lissajous sketcher gives the prettiest picture (in your opinion)? Use a capital letter to answer.

Answer