Names: _____

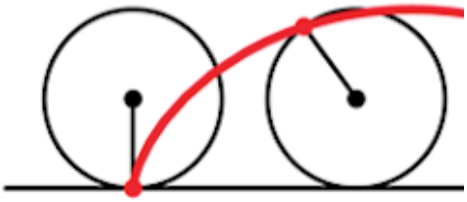
AP Calculus AB
Identity of an Unknown Curve

A chewing gum is stuck to the wheel of a bicycle. As the bicycle rides, the chewing gum traces a curve in the air...

Directions: Work in groups of three or four. Answer all questions. Take a picture of both pages in order to post them as a new chapter in your iBook. Submit one completed project sheet for the whole group at the end of class. Be sure each member of the group participates equally.

Simulation: Attach a pen to the edge of a trashcan so that it only slightly extends outs. Using the large sheet of butcher paper, draw the curve that the pen creates as you roll the trashcan without slipping. Continue until you form two full arches...

Material: Trashcan, butcher paper, adhesive tape, rulers, pens, calculators...



Tasks:

1: Use rulers, pens and anything else you need to estimate the area under *one* arch using any of the Riemann Sums, as precisely as possible, using at least 10 rectangles. Write your result here:

2: Go online and find information about the curve in order to complete it's "ID Card" below:

ID CARD

Name of Curve	**Parametric Equations**
Name of three other curves with similar properties	

3: What happened in 1634 that is related to question 1?

4: Compare your measurement with what you know now. Write the percentage of error of your measurement.

5: Estimate the volume of the solid generated by revolving one arch around the x-axis, using a Riemann sum with the same rectangles you drew earlier. Please show steps below.

6: Closing Exercise
Without calculation, use logic to determine the slowest and the fastest speed that the chewing gum reaches if the bicycle rides at a constant speed of 20 km/h. Explain your reasoning.