Math 125 Writing Up Problem 2: More Cake Cutting
DUE FRIDAY, FEBRUARY 22nd

1. Your 3 year old wants you to cut up her circular pancake. The pancake has a radius of 2 inches. She wants you to cut it into nine pieces using two symmetric vertical cuts ($x = -a$ and $x = a$) and the same symmetric horizontal cuts ($y = -a$ and $y = a$). Prove that it is impossible to cut the pancake in this way and get nine pieces with equal area.

2. On another day, your 3 year old wants the pancake cut into three long pieces. This time assume the radius is just a fixed constant r. Find a in terms of r such that the vertical cuts at $x = -a$ and $x = a$ will divide the circular pancake into three pieces of equal area (Hint: Try to solve for $t = \frac{a}{r}$. You will need to use a solver to finish this problem, one easy way to do this is to go to wolframalpha.com and type in "solve your equation" and replace 'your equation' by what you are trying to solve).

3. Your 3 year old orders an aebelskiver when you are out to breakfast at a European breakfast restaurant. An aebelskiver is a Danish pancake that is in the shape of a sphere. Assume the radius of the sphere is a fixed constant r. Find a in terms of r such that the vertical cuts at $x = -a$ and $x = a$ will divide the aebelskiver into three pieces of equal volume.