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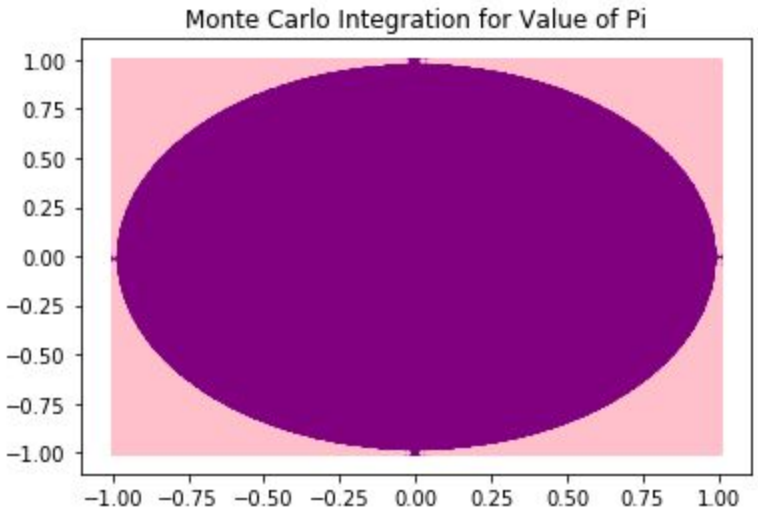
Exercise 10
Monte Carlo Integration

With using the random sampling to determine the integral, or area of a circle, we can use randomly generated values and see where they land in regards to inside or outside of a circle, and if they land inside, we can count them and determine the ratio of number of counts inside versus outside. This ratio is proportional to the area of the circle versus the area of the square you begin with. With an integral of a circle being $a = \pi R^2$, then with the radius set to 1, we can determine the value of pi.

Unfortunately, my code does not work quite well and I do not have quite a circle and may value of N already surpass 2 million. There is a great number of samples that need to be generated, but my value of pi only reaching 2.57 is most likely due to a coding error. This is the closest I can come with a N=1500000 and the count for the pond is actually N_pond = N_pond + 2.5...



Ratio of N_pond / N or approx for pi: 2.9651383333333334