MIT Spark 2009

M2049 **Integral Calculus Course Structure** Spring 2009

**Instructor:** Andrew Spieker **Place**: Room 12-122 **Time:** 5:05 – 6:55

**Description:** Well, you learn how to find the area of a square when you’re pretty young. What, early middle school? Soon after, you learn how to find the area of a circle. Mainly, it makes sense that you learn these first since these are nice, symmetric figures.

Here comes the curveball…What if you wanted to find the area between two things that are not so nice and symmetric/linear?



What if you wanted to find the area of the figure shaded in blue? This is what integral calculus is good for; actually, finding the area under a curve is one of *many* things you can do with integral calculus. We will define an approximation of the area in question as a Riemann sum, and take a particular *limit* of these sums and ‘cleverly’ and get the area under the curve!

As time permits,an and depending on student interest, we will discuss some of the issues of integration, talk about different methods of integration, including Lebesgue Integration. We will attempt to look at some of the issues of “not having an antiderivative” but *still* having a Riemann integral, which poses specific questions about the ‘method’ of finding an area under a curve. Finally, we will talk about integration in higher dimensions and discuss Fubini’s Theorem.

Note: It *will* help to have a working knowledge of differential calculus, since the Fundamental Theorem of Calculus tells us that the derivative and the integral are inverses of each other. That being said, the way I’m teaching this particular class, you will be able to get by without having had a course in it.