CALCULUS AND DIFFERENTIAL EQUATIONS

MATH 1B

Lecture 1: Density and approximation, 9/3/2021

DENSITY AND APPROXIMATION

1.1. A function denoting density is often denoted $\rho(x)$. This is the Greek letter ρ. If we are given a problem of integrating up the density along an interval, we can **approximate** that using **slicing**. We will call this a **Riemann sum**. It is

$$\sum_{k=1}^{n} f(x_k)\Delta x$$

where Δx is the spacing. This becomes then in the limit the integral

$$\int_{a}^{b} f(x) \, dx \ .$$

1.2. As a general rule, as finer the spacing is made, as better we can **approximate** the value. For every slicing we can find an **upper bound** and a **lower bound**.

INTEGRATION PROFICIENCY TEST

1.3. In part a) You will be asked to cover 5-6 integration problems from a list of 80 problems. In part b) you will be asked to solve basic pre-calculus questions.
- Integration by parts
- Substitution
- Partial fractions
- Use of symmetry
- Trig identities

ON THE RADAR

1.4.
- Homework PS 01 is due 9/8.
- The area of an iceberg QRD problem is due 9/10.
- Techniques of integration test Wednesday 9/15.