Worksheet 4

MATH 222, Week 4: 2.1,2.2,2.3,2.5

Name:______________________________

You aren’t necessarily expected to finish the entire worksheet in discussion. There are a lot of problems to supplement your homework and general problem bank for studying.

Problem 1. Compute \( \int \frac{x}{\sqrt{x^2-1}} \, dx \)

Problem 2. Let \( a \) be some constant. Compute the following integral in two ways \( \int \frac{1}{\sqrt{x^2-a^2}} \, dx \).

Problem 3. Compute \( \int \frac{(z+3)^2}{(40-6z-z^2)^{1/2}} \, dz \)

Problem 4. Compute \( \int \frac{e^x}{\sqrt{e^{2x}+1}} \, dx \). You may find problem 2 helpful.
Problem 5.  (a) Compute $\int_0^\infty \frac{x}{\sqrt{1+x^2}} \, dx$

(b) Compute $\int_{-\infty}^0 \frac{x}{\sqrt{1+x^2}} \, dx$

(c) What does this say about $\int_{-\infty}^\infty \frac{x}{\sqrt{1+x^2}} \, dx$

Problem 6.  (a) Show that $\int_1^\infty \frac{dx}{x^2-4}$ is not a finite number.

(b) What answer do you get if you forget to account for the asymptote at $x = 2$?