Worksheet 5

Spring 2016

MATH 222, Week 5: 2.5,3.1,3.2,3.3

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.

Determine the convergence or divergence of the following integrals without computing them. Then compute them explicitly.

Problem 1. $\displaystyle\int_4^\infty \frac{1}{x-2}\,dx.$

Problem 2. $\displaystyle\int_4^\infty \frac{1}{x^3-x}\,dx.$

Problem 3. $\displaystyle\int_1^\infty \frac{dt}{1+e^{2x}}.$

Problem 4. $\displaystyle\int_0^\infty \frac{\sin(x^2)}{x^2}\,dx.$ What happens at $x=0$?

Problem 5. Find a solution to the initial value problem:

$$\frac{dy}{dx} = e^y x^3$$

With initial value $y(0) = 0$.

Problem 6. Find a solution to the initial value problem:

$$\frac{dy}{dx} = y\sqrt{y^2 - 1}\cos(x)$$

With initial value $y(0) = 1$.

Problem 7. Find the general solution to the differential equation

$$\frac{dy}{dx} = x^2 + y^2 x^2$$