Math 1B, First Midterm Examination

9:00-10:00am, N.Reshetikhin, February 14, 2014

Student's Name:

TA's name:

Student's i.d. number:

Problem	1	2	3	4	5	*Total*
Points	20	20	20	20	20	100
Grade						

1.(*20 points*)Evaluate the integral

$$\int \frac{x^2+2x+4}{(x+2)(x^2+1)}dx$$

2.(*20 points*) Evaluate the integral

$$\int x\sqrt{x^2-4x+5}dx$$

3.(*20 points*)

(a)Indicate which of the following statements are true and which are false. Do **NOT** show your work if the answer is **TRUE**. Give a **counter-example** if the answer is **FALSE**.

1. (*6 points*) If $f(x) \geq 1$ and $\int_0^\infty xf(x)\ dx$ is convergent, then $\int_0^\infty f(x)\ dx$ also converges.

2. (*5 points*) If $\int_{-1}^2 f(x)\ dx$ converges, then $\int_0^1 f(x)\ dx$ also converges.

(b)Indicate which of the following statements are true and which are false. You do **NOT HAVE TO** show your work.

1. (*3 points*) $\displaystyle\int_1^\infty \frac{x+2}{x^{1/2}(1-x)^{1/2}}dx$ converges

2. (*3 points*) $\displaystyle\int_0^\infty \frac{\sin(x)}{x^3}dx$ converges

3. (*3 points*) $\displaystyle\int_0^\pi \frac{\sin(x)-1}{x-\pi/2}dx$ converges

4.(*20 points*) Evaluate the integral

$$\int \sin(\sqrt{x})dx$$

5.(*20 points*) Let n be a number of intervals in the trapezoidal approximation. Find a value of n so that the midpoint approximation to the integral

$$\int_0^1 \cos(x^2+1)dx$$

is accurate to within 10^{-4}. **Do not compute this approximation.**