Division of Applied Mathematics

Examiner: Anatoliy Malyarenko

School of Education, Culture and Communication

EXAMINATION IN MATHEMATICS

MMA302 Calculus I

Date: March 27, 2014 Time: 3 hours

Aids: Pen, ruler, eraser

This exam consists of five problems, each of which is worth 4 points. Premium points obtained in the problem solving class will be taken into account. Marks:

Points	ECTS mark	Swedish mark
20-24	A	VG
18-19	В	VG
15-17	C	G
12-14	D	G
9–11	Е	G

1. Evaluate the limit or explain why it does not exist.

$$\lim_{x \to 0} \frac{\cos(2x) - \cos(x)}{\sin(x)}$$

- 2. Let $f(x) = x x^3$. Find the absolute maximum of f on the interval [0, 10].
- 3. Evaluate the definite integral.

$$\int_0^2 \frac{\cos(2x) + 2\sin^2(x)}{e^x} \, \mathrm{d}x$$

4. Solve the differential equation

$$e^{-x}y' + 2y = 0$$

5. Determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{e^{2n+1}}{n^n}$$

Good luck!