

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	B	VG
15-17	C	G
12-14	D	G
9-11	E	G

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

$$\lim_{x \rightarrow 0} \frac{\tan(x^2)}{\sin(x)}$$

2. Let $f(x) = \frac{x}{1+x^2}$. Find the absolute maximum of f on the interval $[0, 10]$.

3. Evaluate the definite integral.

$$\int_0^{\pi} x \cos(x) dx$$

4. Solve the differential equation by the method of integrating factor.

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

5. Find the radius of convergence of the power series. HINT: You can use the ratio test.

$$\sum_{n=1}^{\infty} n^{1/2} x^n$$

Good luck!