

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.

$$\lim_{s \rightarrow 0} \frac{(s+1)^2 - (s-1)^2}{s}.$$

2. Let $y = \frac{x-1}{x+1}$.

- a) Find y' (1 p.)
b) Find y'' (1 p.)
c) Find y''' (2 p.)

3. Evaluate the integral.

$$\int (x+3)e^{2x} dx.$$

4. Solve the separable differential equation.

$$\frac{dx}{dt} = e^x \sin t.$$

5. Consider the following power series.

$$\sum_{n=0}^{\infty} 3n(x+1)^n.$$

- a) Determine the centre of convergence (1 p.)
b) Determine the radius of convergence (1 p.)
c) Determine the interval of convergence (2 p.)

Good luck!