

Examiner: Paul Vaderlind

All calculators, except for the graphic, are allowed. Each solved problem is awarded by up to 10 points. At least 50% of points are necessary for the grade E (Sufficient). Note that the problems are not ordered according to the difficulty!

1. a) For which real numbers x is the serie $S = 1 + \frac{3}{5}e^x + \frac{9}{25}e^{2x} + \frac{27}{125}e^{3x} + \dots$ convergent?
b) Find x for which $S = 5$.
 2. Find the equation for the tangent line to $f(x) = 2x^2 - 3 + \ln(1 + 2x)$ at the point $(x, y) = (0, -3)$.
 3. Consider the function $f(x, y) = x^3 + y^3 + 3xy + 3$. Find all stationary points for this function and determine if they are local maximum, minimum or saddle points.
 4. Evaluate the following integrals:
a) $\int_0^1 xe^{x^2+2} dx$, b) $\int y^{1/2} \ln y dy$
 5. The equation $x^2y^3 + 2x^5y - 3y - 12x = 8$ defines y as a function of x , $y = y(x)$. Find the derivative $y'(x)$ at the point $(x, y) = (-1, 1)$.
 6. Use Cramers rules in order to solve the system of equations:
$$\begin{cases} x - y + 2z = 3 \\ x - 2y + z = 4 \\ 2x - y + z = 5 \end{cases}$$
-

GOOD LUCK!

The papers will be handed out at 16.00 on Thursday, November 4, 2008, in the room next to the Coffee Shop, house 5, and after that in room 208, house 6.