# Übungsaufgaben Analysis II

## K5

1.) a) $f(x,y) = x^2 \ln(y) + y^2 \ln(x) + xy + 7$

$f_x = 2x \ln(y) + y^2 \frac{1}{x} + y$

$f_y = \frac{x^2}{y} + 2y \ln(x) + x$

$f_{xx} = 2 \ln(y) + \left(-\frac{y^2}{x^2}\right) + 0$

$f_{yy} = -\frac{x^2}{y^2} + 2 \ln(x) + 0$

$f_{xy} = \frac{2x}{y} + \frac{2y}{x} + 1$

NR:

$x^2 \ln(y)$

b) $f(x,y) = e^{x+y^2} x^2 + \ln(x^2) + y$

$f_x = e^{x+y^2} \cdot x^2 + e^{x+y^2} \cdot 2x + \frac{2}{x}$

$f_y = e^{x+y^2} \cdot x^2 \cdot 2y + 1$

~~$f_{xx} = e^{x+y^2} \cdot x^2 + e^{x+y^2} \cdot 2x$~~

$f_x = e^{x+y^2} (x^2 + 2x) + \frac{2}{x}$

$f_{xx} = e^{x+y^2} (x^2 + 2x) + e^{x+y^2} (2x + 2) + \left(-\frac{2}{x^2}\right)$

$f_{xx} = e^{x+y^2} (x^2 + 4x + 2) - \frac{2}{x^2}$

$f_{yy} = e^{x+y^2} \cdot 2y \cdot 2yx^2 + e^{x+y^2} \cdot 2x^2$

$f_{yy} = 2x^2 \left(e^{x+y^2} \cdot 2y \cdot y + e^{x+y^2}\right)$

$f_{yy} = 2x^2 \left(e^{x+y^2} \cdot 2y^2 + e^{x+y^2}\right)$

$f_{xy} = e^{x+y^2} (2x^2 y + 4xy)$