

## Problem Sheet 7 for 6401

Due Thursday 1 November 2011, at the Problem Class. You should hand in solutions to all problems, but only some of them will be marked. The deadline for handing in your work is 11.55 am.

1. Find the Taylor series at  $x = 0$  of the following functions:

(a)  $\cos(3x)$ ;

(b)  $\cos^2 x$ ;

(c)  $\frac{1}{5-3x}$ ;

(d)  $\frac{3}{(1-x)^3}$ .

2. Find the Taylor series at  $x = 1$  of the following functions:

(a)  $e^{5x}$ ;

(b)  $\cos x$ ;

(c)  $\frac{1}{1+x}$ .

3. Compute  $f_x$ ,  $f_y$  and  $f_{xx}$  if  $f(x, y) = \cosh(xy^2 + e^y)$ .

4. Find  $w_x$  and  $w_y$  for  $w = u \cos v$ ,  $u = x^3 + y^2$  and  $v = x^2y^3$ .

5. Find all stationary points of

(a)  $f(x, y) = e^{x-y}(x + y)$

and

(b)  $g(x, y) = e^{x^2+y}(x + y)$

and classify them as local maxima, local minima or saddle points.