Mathematics 552 Homework due Wednesday, January 25, 2006

(1) Problem 1, page 32 of the text.
(2) Problem 2, page 32 of the text.
(3) Problem 3, page 33 of the text.
(4) Problem 5, page 33 of the text.
(5) Problem 6, page 33 of the text.
(6) Problem 8, page 33 of the text.

Quiz on Wednesday: Know the definition of derivative: The **_derivative_**, $f'(z)$, of f exists at z iff the limit

$$f'(z) = \lim_{h \to 0} \frac{f(z+h) - f(z)}{h}$$

exists.

   Alliterative definition: The **_derivative_**, $f'(z)$, of f exists at z iff the limit

$$f'(z) = \lim_{w \to z} \frac{f(w) - f(z)}{w - z}$$

exists.

   Know the definition of the **_partial derivatives_** of a function $u(x, y)$. If $u(x, y)$ is defined in an open set U, then

$$\frac{\partial u}{\partial x}(x, y) = \lim_{h \to 0} \frac{u(x+h, y) - u(x, y)}{h}, \qquad \frac{\partial u}{\partial y}(x, y) = \lim_{k \to 0} \frac{u(x, y+k) - u(x, y)}{k},$$

Remark: We will often use the abbreviations u_x and u_y for the partial defivatives. That is

$$u_x = \frac{\partial u}{\partial x}, \qquad u_y = \frac{\partial u}{\partial y}.$$