

**Course 2E1 2005-06 (SF Engineers & MSISS & MEMS)****S h e e t 3**

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Due: in the tutorial sessions next Wednesday/Thursday

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**Exercise 1**

Find limits provided they exist or justify it if they don't exist:

$$\lim_{(x,y,z) \rightarrow (0,0,0)} \frac{x+y+z}{x+y}, \quad \lim_{(x,y,z) \rightarrow (0,0,0)} \frac{x^2-y}{z^2+1}.$$

**Exercise 2**

Calculate the first order partial derivatives  $\frac{\partial f}{\partial x}$  and  $\frac{\partial f}{\partial y}$ :

- (i)  $f(x, y) = 2x - y + 3$ ,
- (ii)  $f(x, y) = x^2 - y^2$ ,
- (iii)  $f(x, y) = e^{2x+y}$ ,
- (iv)  $f(x, y) = x^2/y$ .