

**MULTIVARIABLE CALCULUS**  
**DAY 11 WORKSHEET**  
**DIFFERENTIABILITY AND DIRECTIONAL DERIVATIVE**

**Question 1.** *Compute directional derivative in the direction  $\mathbf{u} \neq \mathbf{0}$  of the functions*

(1)  $f(\mathbf{x}) = |\mathbf{x}|^2$ .

(2)

$$f(\mathbf{x}) = \begin{cases} \frac{x_1^2 x_2}{x_1^4 + x_2^2} & \mathbf{x} \neq \mathbf{0} \\ 0 & \mathbf{x} = \mathbf{0}. \end{cases}$$