

**MATB41 WEEK 3 QUIZ 2 LEC02****Question 1**

$$f(x, y) = \begin{cases} \frac{xy^2}{x^2 + y^2} & (x, y) \neq (0, 0) \\ 0 & (x, y) = (0, 0) \end{cases}$$

- a) Find all directional derivatives at  $\vec{a} = (0, 0)$ , by setting  $\vec{u} = (a, b)$  with  $a^2 + b^2 = 1$ .
- b) Show whether the function is differentiable at  $\vec{a} = (0, 0)$ .