Calculus Exercises (11.3)

1. Find the domain of the function.  
   (1) \( f(x, y) = \frac{\sqrt{x + y}}{x^2 - y} \)  
   (2) \( g(x, y, z) = \ln(x + y + z) \)

2. Find \( \frac{\partial z}{\partial x} \) and \( \frac{\partial z}{\partial y} \) if \( z \) is defined implicitly as a function of \( x \) and \( y \) by the equation \( x^3 y + y^2 z^3 = xyz \).

3. \( u = x^3 y + x \sin(y^3) \), find \( u_{xx} \). (要照符號所示順序微分)

4. \( u = e^{\theta} \), find \( \frac{\partial^2 u}{\partial r \partial \theta} \). (要照符號所示順序微分)

5. Determine the signs of the partial derivatives for the function whose graph is shown.

   (a) \( f_x (1, 2) \)  
   (b) \( f_y (1, 2) \)  
   (c) \( f_{xx} (1, 2) \)  
   (依據下圖判斷這些偏導數的正負)