Exercise 1

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

\[
\lim_{(x,y,z)\to(0,0,0)} \frac{x + y + z}{x + y}, \quad \lim_{(x,y,z)\to(0,0,0)} \frac{x^2 - y}{z^2 + 1}.
\]

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) \( f(x, y) = \frac{x^2}{y}. \)