1.1	$f(x_1, x_2, x_3) = x_1^2 x_2 + 5x_2 x_3 - x_3 + 10$

$\frac{\partial f}{\partial x_1} = 2x_1 x_2$

$\frac{\partial f}{\partial x_2} = x_1^2 + 5x_3$

$\frac{\partial f}{\partial x_3} = 5x_2 - 1$

1.2	$f(x,y,z) = e^{yz^2}\cos(2x+z) + \ln\left(\frac{xy}{z}\right) + \frac{1}{xy}$

$\frac{\partial f}{\partial x} = e^{yz^2}(-\sin(2x+z)) \cdot 2 + \frac{z}{xy} \cdot \frac{y}{z} - \frac{1}{x^2 y}$

$\frac{\partial f}{\partial y} = z^2 e^{yz^2}\cos(2x+z) + \frac{z}{xy} \cdot \frac{x}{z} - \frac{1}{xy^2}$

$\frac{\partial f}{\partial z} = (2yz\, e^{yz^2}\cos(2x+z) + e^{yz^2}(-\sin(2x+z)) + \frac{z}{xy} \cdot \left(-\frac{xy}{z^2}\right)$

2.1	$f(x,y) = \frac{x}{x+y}$

$f_x = \frac{1(x+y) - x}{(x+y)^2} = \frac{y}{(x+y)^2} = y(x+y)^{-2}$ $\quad f_y = -\frac{x}{(x+y)^2}$

$f_{xx} = -\frac{2y}{(x+y)^3}$

$f_{xy} = f_{yx} = \frac{(x+y)^2 - y \cdot 2 \cdot (x+y)}{(x+y)^4} = \frac{x-y}{(x+y)^3}$

$f_{yy} = \frac{2x}{(x+y)^3}$