Problem 1: (4 points) Find the equation of the plane that is parallel to the $x,y$ -plane and passes though the point (2,3,4).

Problem 2: (6 points) If $f(x,y) = \sin(xy + x^2 - y^2)$, find $f_x + f_y$ at the point (1,1)

Problem 3: (10 points) Find all local extrema of the function

$$f(x,y) = 3xy + 2x^2 + \frac{3}{2}y^2 - 10x - 9y + 2$$