Term Test Bb version 1

(1) [5 points] Project $\vec{u} = (44/3, -127/3, 148/3)^{\mathsf{T}}$ onto the plane H containing $P = (-2, 3, -2), Q = (-1, 5, 1), R = (2, 6, 2)$ in order to find the distance between $\vec{u}$ and H. (Hint: If u_H is the projection, then the distance is $\|u - u_H\|$.

(2) [5 points] Consider the following function:

$$f\left(\begin{bmatrix} x \\ y \end{bmatrix}\right) = \begin{bmatrix} xs(xy) \\ x^2 + 2y^2 \end{bmatrix} \tag{1}$$

Linearize the function around $x = 2, y = \pi$ so it looks as follows,

$$f(x) \approx E + \begin{bmatrix} A & B \\ C & D \end{bmatrix} \begin{bmatrix} x - M \\ y - N \end{bmatrix} \tag{2}$$

Specify the numbers A, B, C, D, E, M, N in your solution.