Show all work and don’t forget to check your answers.

1. (5 points) Find all critical points for the function \( f(x, y) = 5x^2 + 3y^3 - 9y \), then determine which of these points are maximum, minimum, or saddle points.
2. (5 points) Solve the system

\[
\begin{bmatrix}
\frac{dx_1}{dt} \\
\frac{dx_2}{dt}
\end{bmatrix} =
\begin{bmatrix}
1 & 3 \\
0 & 2
\end{bmatrix}
\begin{bmatrix}
x_1(t) \\
x_2(t)
\end{bmatrix}
\]

with initial values \(x_1(0) = 2\) and \(x_2(0) = 5\)