

Name: \_\_\_\_\_

Consider the following system of equations (in matrix form),

$$\begin{pmatrix} 1 & 1 \\ 1 & \alpha \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (1)$$

- (1) [**5 pts.**] Solve for  $x$  and  $y$  in terms of  $\alpha$  using Gaussian elimination.
- (2) Show mathematically for each:
  - (a) [**3 pts.**] For what value of  $\alpha$  is the matrix singular?
  - (b) [**2 pts.**] Does (1) have infinitely many or no solutions for this value?