

- 9 True or false (with reason if true or example to show it is false):
- (a) A square matrix has no free variables.
 - (b) An invertible matrix has no free variables.
 - (c) An m by n matrix has no more than n pivot variables.
 - (d) An m by n matrix has no more than m pivot variables.
- 16 The nullspace of a 5 by 5 matrix contains only $\mathbf{x} = \mathbf{0}$ when the matrix has _____ pivots. The column space is \mathbf{R}^5 when there are _____ pivots. Explain why.
- 17 The equation $x - 3y - z = 0$ determines a plane in \mathbf{R}^3 . What is the matrix A in this equation? Which are the free variables? The special solutions are $(3, 1, 0)$ and
- Find the nullspace of matrix A :

$$A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$