MTH 362 Sec 2 F09 Quiz IV Name:

1) Let A be a 4×4 matrix

$$A = \begin{bmatrix} 1 & 2 & 0 & 0 \\ 3 & 4 & 0 & 0 \\ 0 & 0 & 5 & 6 \\ 0 & 0 & 7 & 8 \end{bmatrix}.$$

(a) Find $\det A$. (b) Find $\operatorname{rank} A$ using determinants.

(c) Consider the system:

$$(NH)\begin{cases} x_1 + 2x_2 = 1 \\ 3x_1 + 4x_2 = 1 \\ 5x_3 + 6x_4 = 2 \\ 7x_3 + 8x_4 = 0 \end{cases}$$

That is, $A\cdot X = b$ for $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$, $b = \begin{bmatrix} 1 \\ 1 \\ 2 \\ 0 \end{bmatrix}$.

Without solving the system, does (NH) have solutions and how many?

(d) How about the corresponding homogeneous system:

(H) $A\cdot X = 0$?

2) # 12, p. 314 3) # 20 p. 314 4) # 10, p. 323