

HW2 Solution

Problem A

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

RREF

$$\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{bmatrix}$$

Rank: 2 **Determinant:** 0 **Inverse:** None

Problem B

$$B = \begin{bmatrix} -1 & 2 \\ 3 & -4 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Rank: 2 **Determinant:** -2

$$B^{-1} = \begin{bmatrix} 2 & 1 \\ \frac{3}{2} & \frac{1}{2} \end{bmatrix}$$

Problem C

$$C = \begin{bmatrix} -2 & 1 \\ 3 & -2 \\ 0 & 5 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$$

Rank: 2

Problem D

$$D = \begin{bmatrix} 2 & -6 & 4 \\ 1 & 7 & -2 \\ 3 & -3 & 0 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Rank: 3 Determinant: -72

$$D^{-1} = \begin{bmatrix} \frac{1}{12} & \frac{1}{6} & \frac{2}{9} \\ \frac{1}{12} & \frac{1}{6} & -\frac{1}{9} \\ \frac{1}{3} & \frac{1}{6} & -\frac{5}{18} \end{bmatrix}$$

Problem E

$$E = \begin{bmatrix} 0 \\ 1 \\ -2 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

Rank: 1

Problem F

$$F = \begin{bmatrix} 2 & 1 \\ 4 & 9 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Rank: 2 Determinant: 14

$$F^{-1} = \begin{bmatrix} \frac{9}{14} & -\frac{1}{14} \\ -\frac{2}{7} & \frac{1}{7} \end{bmatrix}$$

Problem G

$$G = \begin{bmatrix} 1 & -1 & 5 \\ 0 & -7 & 3 \\ -1 & -6 & -2 \end{bmatrix}$$

RREF

$$\begin{bmatrix} 1 & 0 & \frac{32}{7} \\ 0 & 1 & -\frac{3}{7} \\ 0 & 0 & 0 \end{bmatrix}$$

Rank: 2 **Determinant:** 0 **Inverse:** None