

Math 2550
HW 4 - Part 1
Inverses

1. Determine if A and B are inverses of each other.

(a) $A = \begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 1/2 \\ 0 & 1/2 \end{pmatrix}$

(b) $A = \begin{pmatrix} 1 & 0 & 1 \\ 1 & 1 & 2 \\ 0 & 1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 & -1 \\ 1 & 0 & 1 \\ 1 & 2 & 1 \end{pmatrix}$

2. Find the inverse if it exists.

(a) $\begin{pmatrix} 1 & 4 \\ 2 & 7 \end{pmatrix}$ (b) $\begin{pmatrix} -3 & 6 \\ 4 & 5 \end{pmatrix}$ (c) $\begin{pmatrix} 6 & -4 \\ -3 & 2 \end{pmatrix}$

3. Find the inverse if it exists.

(a) $\begin{pmatrix} 3 & 4 & -1 \\ 1 & 0 & 3 \\ 2 & 5 & -4 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 3 & -4 \\ 2 & 4 & 1 \\ -4 & 2 & -9 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{pmatrix}$

(d) $\begin{pmatrix} 2 & 6 & 6 \\ 2 & 7 & 6 \\ 2 & 7 & 7 \end{pmatrix}$ (e) $\begin{pmatrix} 1 & 0 & 1 \\ -1 & 1 & 1 \\ 0 & 1 & 0 \end{pmatrix}$

4. Find the inverse if it exists.

(a) $\begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 3 & 0 & 0 \\ 1 & 3 & 5 & 0 \\ 1 & 3 & 5 & 7 \end{pmatrix}$ (b) $\begin{pmatrix} -8 & 17 & 2 & \frac{1}{3} \\ 4 & 0 & \frac{2}{5} & -9 \\ 0 & 0 & 0 & 0 \\ -1 & 13 & 4 & 2 \end{pmatrix}$

5. Solve the system by inverting the coefficient matrix.

(a)

$$\begin{aligned} x_1 + x_2 &= 2 \\ 5x_1 + 6x_2 &= 9 \end{aligned}$$

(b)

$$\begin{aligned}4x_1 - 3x_2 &= -3 \\2x_1 - 5x_2 &= 9\end{aligned}$$

(c)

$$\begin{aligned}x_1 + 3x_2 + x_3 &= 4 \\2x_1 + 2x_2 + x_3 &= -1 \\2x_1 + 3x_2 + x_3 &= 3\end{aligned}$$

(d)

$$\begin{aligned}5x_1 + 3x_2 + 2x_3 &= 4 \\3x_1 + 3x_2 + 2x_3 &= 2 \\x_2 + x_3 &= 5\end{aligned}$$