

Math 1313
Homework 8
Section 3.5

1. Let $A = \begin{bmatrix} 4 & -8 \\ -2 & 3 \end{bmatrix}$. Find the determinant (i.e. $D = ad - bc$).
- a. 12
 - b. 4
 - c. -16
 - d. 28
 - e. -28

2. Let $B = \begin{bmatrix} 6 & 8 \\ 3 & 4 \end{bmatrix}$. Find the determinant (i.e. $D = ad - bc$).
- a. 24
 - b. 6
 - c. 0
 - d. 18
 - e. -24

3. Are the following matrices inverses of each other?

$$\begin{bmatrix} 3 & 9 \\ -2 & -7 \end{bmatrix}, \begin{bmatrix} \frac{-1}{7} & \frac{-1}{9} \\ \frac{1}{2} & \frac{1}{3} \end{bmatrix}$$

- a. Yes
- b. No

4. Are the following matrices inverses of each other?

$$\begin{bmatrix} -6 & -2 \\ -7 & -5 \end{bmatrix}, \begin{bmatrix} \frac{-5}{16} & \frac{1}{8} \\ \frac{7}{16} & \frac{-3}{8} \end{bmatrix}$$

- a. Yes
- b. No

Math 1313
Homework 8
Section 3.5

5. Are the following matrices inverses of each other?

$$\begin{bmatrix} -1 & 2 & -2 \\ 3 & -5 & 3 \\ -3 & 10 & -17 \end{bmatrix}, \begin{bmatrix} -55 & -14 & 4 \\ -42 & -11 & 3 \\ -15 & -4 & 1 \end{bmatrix}$$

- a. Yes
- b. No

6. Find the inverse of the following matrix.

$$M = \begin{bmatrix} \frac{1}{3} & -\frac{1}{3} \\ \frac{4}{9} & -\frac{5}{18} \end{bmatrix}$$

a. $M^{-1} = \begin{bmatrix} -5 & 6 \\ -8 & 6 \end{bmatrix}$

b. $M^{-1} = \begin{bmatrix} -\frac{18}{5} & -3 \\ -\frac{9}{4} & 3 \end{bmatrix}$

c. $M^{-1} = \begin{bmatrix} -\frac{5}{3} & \frac{1}{3} \\ \frac{4}{9} & \frac{1}{18} \end{bmatrix}$

d. $M^{-1} = \begin{bmatrix} 3 & 3 \\ -\frac{9}{4} & \frac{18}{5} \end{bmatrix}$

- e. The inverse does not exist

Math 1313
Homework 8
Section 3.5

7. Find the inverse of the following matrix.

$$\begin{bmatrix} \frac{1}{14} & -\frac{9}{14} \\ \frac{2}{5} & -\frac{18}{5} \end{bmatrix}$$

a. $\begin{bmatrix} 5 & -9 \\ -1 & -1 \end{bmatrix}$

b. $\begin{bmatrix} 14 & \frac{14}{9} \\ -\frac{5}{2} & -\frac{5}{18} \end{bmatrix}$

c. $\begin{bmatrix} -\frac{5}{18} & \frac{14}{9} \\ -\frac{5}{2} & 14 \end{bmatrix}$

d. $\begin{bmatrix} 1 & -9 \\ 2 & -18 \end{bmatrix}$

e. The inverse does not exist

8. Find the inverse of the following matrix.

$$C = \begin{bmatrix} 1 & -2 & -2 \\ 1 & -1 & 0 \\ 3 & -7 & -7 \end{bmatrix}$$

a. $C^{-1} = \begin{bmatrix} 1 & 1 & 3 \\ -2 & -1 & -7 \\ -2 & 0 & -7 \end{bmatrix}$

Math 1313
Homework 8
Section 3.5

b. $C^{-1} = \begin{bmatrix} 1 & 1 & \frac{1}{3} \\ -\frac{1}{2} & -1 & -\frac{1}{7} \\ -\frac{1}{2} & 0 & -\frac{1}{7} \end{bmatrix}$

c. $C^{-1} = \begin{bmatrix} -1 & \frac{1}{2} & \frac{1}{2} \\ -1 & 1 & 0 \\ -\frac{1}{3} & \frac{1}{7} & \frac{1}{7} \end{bmatrix}$

d. $C^{-1} = \begin{bmatrix} 7 & 0 & -2 \\ 7 & -1 & -2 \\ -4 & 1 & 1 \end{bmatrix}$

e. The inverse does not exist

9. Given the linear system of equations. How would you set up using the inverse coefficient matrix to solve the system?

$$\begin{aligned}x + 4y + 2z &= 2 \\ -3x - 11y - 7z &= -9 \\ 2x + 11y &= -8\end{aligned}$$

a. $X = \begin{bmatrix} 1 & 4 & 2 \\ -3 & -11 & -7 \\ 2 & 11 & 0 \end{bmatrix} \begin{bmatrix} 2 \\ -9 \\ -8 \end{bmatrix}$

b. $X = \begin{bmatrix} -77 & -22 & 6 \\ 14 & 4 & -1 \\ 11 & 3 & -1 \end{bmatrix} \begin{bmatrix} 2 \\ -9 \\ -8 \end{bmatrix}$

c. $X = \begin{bmatrix} 77 & -22 & 6 \\ -14 & 4 & -1 \\ -11 & 3 & -1 \end{bmatrix} \begin{bmatrix} 2 \\ -9 \\ 8 \end{bmatrix}$

Math 1313
Homework 8
Section 3.5

d. $X = \begin{bmatrix} 1 & -\frac{1}{3} & \frac{1}{2} \\ -\frac{1}{4} & -\frac{1}{11} & -\frac{1}{11} \\ \frac{1}{2} & \frac{1}{7} & 0 \end{bmatrix} \begin{bmatrix} 2 \\ -9 \\ -8 \end{bmatrix}$

e. No solution

10. Given the linear system of equations. Using the inverse coefficient matrix to solve the system, solve for x

$$\begin{aligned}x + 4y + 2z &= 2 \\ -3x - 11y - 7z &= -9 \\ 2x + 11y &= -8\end{aligned}$$

- a. $x = -50$
- b. $x = 1$
- c. $x = 400$
- d. $x = -4$
- e. No solution