

## Chapter 7.2 – Determinants and Inverse Matrices

Find the inverse of each matrix.

$$1.) \begin{bmatrix} 11 & -5 \\ 2 & -1 \end{bmatrix} \begin{matrix} -11 & -10 \\ -1 & \end{matrix}$$

$$\frac{-1}{1} \begin{bmatrix} -1 & 5 \\ -2 & 11 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -5 \\ 2 & -11 \end{bmatrix}$$

$$2.) \begin{bmatrix} 1 & -1 \\ 6 & -3 \end{bmatrix} \begin{matrix} -3 & -10 \\ 3 & \end{matrix}$$

$$\frac{1}{3} \begin{bmatrix} -3 & 1 \\ -6 & 1 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 1/3 \\ -2 & 1/3 \end{bmatrix}$$

$$3.) \begin{bmatrix} -6 & 11 \\ -4 & 7 \end{bmatrix} \begin{matrix} -42 & -44 \\ 2 & \end{matrix}$$

$$\frac{1}{2} \begin{bmatrix} 7 & -11 \\ 4 & -6 \end{bmatrix}$$

$$\begin{bmatrix} 7/2 & -11/2 \\ 2 & -3 \end{bmatrix}$$

$$4.) \begin{bmatrix} 5 & -8 \\ 6 & -9 \end{bmatrix} \begin{matrix} -45 & -48 \\ 3 & \end{matrix}$$

$$\frac{1}{3} \begin{bmatrix} -9 & 8 \\ -6 & 5 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 8/3 \\ -2 & 5/3 \end{bmatrix}$$

$$5.) \begin{bmatrix} -2 & -2 \\ 6 & 8 \end{bmatrix} \begin{matrix} -16 & -12 \\ -4 & \end{matrix}$$

$$\frac{-1}{4} \begin{bmatrix} 8 & 2 \\ -6 & -2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1/2 \\ 3/2 & 1/2 \end{bmatrix}$$

$$6.) \begin{bmatrix} -2 & 2 \\ -9 & 8 \end{bmatrix} \begin{matrix} -16 & -18 \\ 2 & \end{matrix}$$

$$\frac{1}{2} \begin{bmatrix} 8 & -2 \\ 9 & -2 \end{bmatrix}$$

$$\begin{bmatrix} 4 & -1 \\ 9/2 & -1 \end{bmatrix}$$

7.) Create a 2x2 matrix that has a determinant of 6.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \quad ad - bc = 6 \quad * \text{ many answers}$$

8.) Explain, in complete sentences, when a matrix does not have an inverse.

A matrix does not have an inverse when the determinant equals zero.

9.) Give the dimensions of two matrices whose product would result in a 3x5 matrix.

$$3 \times \square \quad \square \times 5$$

$\downarrow$   
 same #'s  
 \* many answers

Find x.

10.)  $|A| = 10 \quad A = \begin{bmatrix} 2x+3 & -1 \\ 4 & -2 \end{bmatrix}$

$$-2(2x+3) - (-4) = 10$$

$$-4x - 6 + 4 = 10$$

$$-4x - 2 = 10$$

$$\quad +2 \quad +2$$

$$-4x = 12$$

$$\boxed{x = -3}$$

11.)  $|B| = -13 \quad B = \begin{bmatrix} 1 & 2x-9 \\ 2 & -3 \end{bmatrix}$

$$-3(-2(2x-9)) = -13$$

$$-3 - 4x + 18 = -13$$

$$-4x + 15 = -13$$

$$-4x = -28$$

$$\boxed{x = 7}$$

Find the product of the following matrices.

12.)  $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 5 & 0 & -7 \end{bmatrix}$

$$\begin{array}{l} 6 \cdot 5 \quad 6 \cdot 0 \quad 6 \cdot -7 \\ -1 \cdot 5 \quad -1 \cdot 0 \quad -1 \cdot -7 \\ 2 \cdot 5 \quad 2 \cdot 0 \quad 2 \cdot -7 \end{array} \quad \begin{bmatrix} \underline{30} & \underline{0} & \underline{-42} \\ \underline{-5} & \underline{0} & \underline{7} \\ \underline{10} & \underline{0} & \underline{-14} \end{bmatrix}$$

13.)  $\begin{bmatrix} 1 & -2 \\ 9 & 5 \end{bmatrix} \cdot \begin{bmatrix} 2 & 4 \\ 1 & -10 \end{bmatrix} = \begin{bmatrix} \underline{0} & \underline{24} \\ \underline{23} & \underline{-24} \end{bmatrix}$

$$\begin{array}{l} 2 + -2 \quad 4 + 20 \\ 18 + 5 \quad 36 + -50 \end{array}$$