

Name: _____
PC: Determinants of Square Matrices

Date: _____
Ms. Loughran

Do Now:

1. Determine if B is the inverse of A .

$$A = \begin{bmatrix} 2 & -17 & 11 \\ -1 & 11 & -7 \\ 0 & 3 & -2 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 4 & -3 \\ 3 & 6 & -5 \end{bmatrix}$$

Determinants help us to see if a matrix is invertible. If $d \neq 0$ then the matrix is invertible (has an inverse).

Remember: If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then the determinant of A $\det(A) = |A|$ is $ad - bc$.

Find the determinant of each matrix.

1. $A = \begin{bmatrix} 2 & -3 \\ 1 & 2 \end{bmatrix}$

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

3. $C = \begin{bmatrix} 0 & \frac{3}{2} \\ 2 & 4 \end{bmatrix}$

The determinant of a matrix of order 1×1 is defined simply as the entry of the matrix.

4. $A = [-2]$

Finding the determinant of a 3×3 matrix

1. Expand matrix by rewriting the matrix with first and second column repeated at the end.
2. Multiply along the diagonals running left to right, and add up numbers.
3. Multiply along the diagonals running right to left, and add up numbers.
4. Subtract what you got in step 3 from what you got in step 2.

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

6. $B = \begin{bmatrix} 6 & 3 & -7 \\ 0 & 0 & 0 \\ 4 & -6 & 3 \end{bmatrix}$

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

$$8. D = \begin{bmatrix} -3 & 8 & 4 \\ 0 & 1 & 2 \\ -4 & 5 & 2 \end{bmatrix}$$

$$9. E = \begin{bmatrix} 1 & 0 & 9 \\ 0 & 5 & 4 \\ 0 & 0 & -2 \end{bmatrix}$$

10. $F = \begin{bmatrix} 1 & a & b \\ 0 & c & d \\ 2 & x & y \end{bmatrix}$

11. What value of x makes the determinant -4 ?

$$\begin{bmatrix} -2 & 0 & 0 \\ -6 & x & 1 \\ -4 & 0 & -1 \end{bmatrix}$$

Homework: Textbook p. 634 #s 1-15 odd