

7-7 DETERMINANTS

$$A = \begin{bmatrix} a_1 & b_1 \\ a_2 & b_2 \end{bmatrix}$$

$$|A| = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix} = a_1 b_2 - a_2 b_1$$

Ex 1 Find $|A|$

$$A = \begin{bmatrix} 8 & 3 \\ -5 & 2 \end{bmatrix} : 16 - (-15) = 31$$

Ex 2 Find $|A|$

$$A = \begin{bmatrix} 5 & 2 & 3 \\ 7 & 1 & 8 \\ 4 & 9 & 6 \end{bmatrix}$$

① only 3x3
 ~~$\begin{vmatrix} 5 & 2 & 3 \\ 7 & 1 & 8 \\ 4 & 9 & 6 \end{vmatrix}$~~ + - + - +

② $30 + 64 + 189 - 12 - 360 - 84 = -173$

~~$\begin{vmatrix} 5 & 2 & 3 \\ 7 & 1 & 8 \\ 4 & 9 & 6 \end{vmatrix}$~~ - 2 $\begin{vmatrix} 7 & 8 \\ 4 & 6 \end{vmatrix}$ + 3 $\begin{vmatrix} 7 & 1 \\ 4 & 9 \end{vmatrix}$
 $6 \cdot 72$
 $= -173$

Ex 3 Find $|A|$

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

②

$$3 \begin{vmatrix} -5 & 4 \\ 1 & 6 \end{vmatrix} - 0 \begin{vmatrix} 8 & -7 \\ 8 & 1 \end{vmatrix} + 8 \begin{vmatrix} 8 & -7 \\ 5 & 4 \end{vmatrix}$$

$$3(-34) + 8(-3)$$

$$= -126$$

Ex 4 Find the determinant of the matrix.

$$\begin{bmatrix} 2 & 8 & -7 & 4 \\ 3 & -1 & 0 & 5 \\ 9 & 6 & 1 & -2 \\ 7 & 4 & 8 & 9 \end{bmatrix} = -5355$$

det(A)

-5355

Find the determinant of the matrices.

$$\begin{bmatrix} 0 & 5 \\ 2 & 4 \end{bmatrix}$$

$$0 - 10 = -10$$

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

$$4 - (-3) = 4 + 3 = 7$$

$$\begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$$

$$4 - 4 = 0$$

Find the determinant of the matrices.

$$\begin{bmatrix} -2 & 2 & 3 \\ 1 & -1 & 0 \\ 0 & 1 & 4 \end{bmatrix}$$

$$3$$

$$\begin{bmatrix} 1 & 3 & -2 \\ -4 & -1 & 1 \\ 5 & 2 & 3 \end{bmatrix}$$

$$52$$

Find the determinant of the matrix.

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

$$= 2624$$

Homework

p.556

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