NAME _____ DATE _____

4-3

Reteaching Worksheet

Matrices and Determinants

Every square matrix has a determinant. The determinant of a 2×2 matrix is called a second-order determinant.

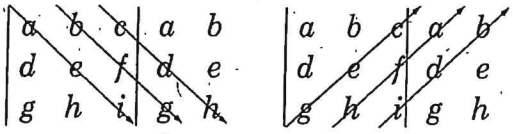
Rule for Second-Order Determinants	$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$

A method called expansion by minors can be used to evaluate a third-order determinant.

Expansion of a Third-Order Determinant	$\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = a\begin{vmatrix} e & f \\ h & i \end{vmatrix} - b\begin{vmatrix} d & f \\ g & i \end{vmatrix} + c\begin{vmatrix} d & e \\ g & h \end{vmatrix}$

Another method for evaluating a third-order determinant is to use diagonals.

Example:



First write the first two columns on the right of the determinant. Next, add the products of the numbers on the diagonals from upper left to lower right:

$$aei + bfg + cdh$$

Then subtract the products of the numbers on the diagonals from lower left to upper right:

$$aei + bfg + cdh - gec - hfa - idb$$

Determine the value of the determinant of each matrix.

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

Use expansion by minors to find the value of each determinant.

4. $\begin{vmatrix} 1 & 3 & -2 \\ 2 & -1 & 1 \\ -2 & 2 & 3 \end{vmatrix}$ **5.** $\begin{vmatrix} -4 & 1 & 3 \\ 2 & 0 & 1 \\ 4 & -5 & 0 \end{vmatrix}$ **6.** $\begin{vmatrix} 2 & -1 & 3 \\ 3 & 2 & 1 \\ 1 & 3 & -2 \end{vmatrix}$

Use the diagonal method to find the value of each determinant.

7. $\begin{vmatrix} 1 & -1 & 1 \\ 4 & 3 & 1 \\ 0 & 5 & 2 \end{vmatrix}$ **8.** $\begin{vmatrix} 3 & -1 & 2 \\ 0 & 4 & 1 \\ 5 & -2 & -3 \end{vmatrix}$ **9.** $\begin{vmatrix} 40 & 20 & -25 \\ 10 & 15 & 55 \\ -5 & -10 & -30 \end{vmatrix}$