DEFINITION

A square matrix is called **upper triangular** if it has all zeros below its main diagonal, and **lower triangular** if it has all zeros above its main diagonal. A matrix that is both upper and lower triangular is called a **diagonal** matrix.

THEOREM

If A is triangular (upper, lower, or diagonal), then $\det A$ is the product of the entries on the main diagonal. That is, if A is $n \times n$, then

$$\boxed{\det A = a_{11}a_{22}a_{33}\ldots a_{nn}}.$$

DETERMINANTS AND EROS

Section 3.2

EXAMPLE

Find the determinant of

$$A=\begin{bmatrix} 2 & -3 & 10 \\ 1 & 2 & -2 \\ 0 & 1 & -3 \end{bmatrix}$$ by applying EROs.

EXAMPLE

Find the determinant of

$$A = \begin{bmatrix} -1 & 2 & 2 \\ 3 & -6 & 4 \\ 5 & -10 & -3 \end{bmatrix}.$$

CONDITIONS THAT YIELD A ZERO DETERMINANT

- A row (or column) consists entirely of zeros.
- Two rows (or columns) are identical.
- One row (or column) is a multiple of another row (or column).