

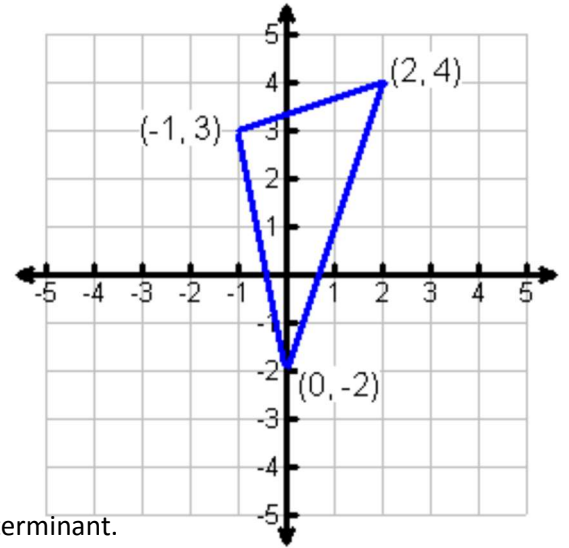
### Finding Area Using Determinants 15.5

Review: Find the determinant of the matrix  $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

Given a triangle with vertices at  $(-1,3)$ ,  $(2,4)$ , and  $(0,-2)$  find the area of the triangle using the determinant of a matrix.

STEPS:

1. Pick a vertex to be the tail of the two vectors:
2. Find the component form:
3. Write the vectors in a matrix:
4. The area of the triangle is the absolute value of half the determinant.



$$\text{Area of a triangle} = \frac{1}{2} \begin{vmatrix} a & b \\ c & d \end{vmatrix} = \frac{1}{2}(ad - bc)$$

Example: Find the area of the parallelogram with vertices  $(-1,0)$ ,  $(0,5)$ ,  $(1,-4)$  and  $(2,1)$ .

Area of a Parallelogram:  $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = (ad - bc)$  \*\* Why not  $\frac{1}{2}$ ?

