## Algebra 2

## 1-06 Evaluate Determinants (12.3)

## Determinant

- Number associated with $\qquad$ matrices
- Symbolized by $\qquad$ or $\qquad$


## Determinant of $\mathbf{2 \times 2}$ matrix

- Multiply along the $\qquad$ diagonal and $\qquad$ the product of the $\qquad$ diagonal.
$\left|\begin{array}{cc}2 & -1 \\ 3 & 4\end{array}\right|$


## Determinant of $\mathbf{3 \times 3}$ Matrix

- Copy the first $\qquad$ behind the matrix and then $\qquad$ the products of the $\qquad$ diagonals and the product of the $\qquad$ diagonals.
$\left|\begin{array}{lll}1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9\end{array}\right|$


## Area of a Triangle

$$
\text { Area }= \pm \frac{1}{2}\left|\begin{array}{lll}
x_{1} & y_{1} & 1 \\
x_{2} & y_{2} & 1 \\
x_{3} & y_{3} & 1
\end{array}\right|
$$

where $x$ 's and $y$ 's are the coordinates of the $\qquad$
Find the area of a triangle with vertices of $(2,4),(5,1)$, and $(2,-2)$

## Cramer's Rule

1. Write the equations in $\qquad$ form
2. Make a matrix out of the $\qquad$
2×2 System
$\begin{aligned} a x+b y & =e \\ c x+d y & =f\end{aligned}$ gives $x=\frac{\left|\begin{array}{ll}e & b \\ f & d\end{array}\right|}{\left|\begin{array}{ll}a & b \\ c & d\end{array}\right|}, y=\frac{\left|\begin{array}{ll}a & e \\ c & f\end{array}\right|}{\left|\begin{array}{ll}a & b \\ c & d\end{array}\right|}$

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$2 x+y=1$
$3 x-2 y=-23$

## $3 \times 3$ System

- Same as $\qquad$ system
- The denominator is the determinant of the $\qquad$ matrix and the numerator is the $\qquad$ only with the column of the $\qquad$ you are solving for replaced with the $\qquad$ —.

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2x-y+6z=-4
6x+4y-5z=-7
-4x-2y+5z=9
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