

Algebra 2 3.7

Evaluate determinants

Use Cramer's rule to solve systems of equations

second order determinant

third order determinant

Cramer's rule

coefficient matrix

variable matrix

2×2
 3×3

whiteboards

graphing calcs

Guided Practice

1A. $\begin{vmatrix} -6 & -7 \\ 10 & 8 \end{vmatrix}$

1B. $\begin{vmatrix} 7 & 5 \\ 9 & -4 \end{vmatrix}$

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$$65h + 25c = 375$$

$$h + c = 7$$

$$\begin{bmatrix} h \\ c \end{bmatrix}$$

$$\begin{vmatrix} 65 & 25 \\ 1 & 1 \end{vmatrix} \begin{vmatrix} 375 \\ 7 \end{vmatrix}$$

$$65 - 25 = 40$$

$$\left(\frac{2600}{40}, \frac{80}{40} \right) c = 2 \text{ hrs}$$

$$h = 5 \text{ hrs}$$

$$\begin{vmatrix} 375 & 25 \\ 7 & 1 \end{vmatrix} \begin{vmatrix} 25 \\ 375 \end{vmatrix}$$

$$375 - 25 = 200$$

$$\begin{vmatrix} 65 & 25 \\ 1 & 7 \end{vmatrix} \begin{vmatrix} 875 \\ 455 \end{vmatrix} = 80$$

$$\begin{bmatrix} 5 \\ 2 \end{bmatrix}$$

GuidedPractice

Evaluate each determinant.

$$\mathbf{2A.} \begin{vmatrix} -5 & 9 & 4 \\ -2 & -1 & 5 \\ -4 & 6 & 2 \end{vmatrix}$$

$$\mathbf{2B.} \begin{vmatrix} -8 & -4 & 4 \\ 0 & -5 & -8 \\ 3 & 4 & 1 \end{vmatrix}$$

KeyConcept Cramer's Rule

Let C be the coefficient matrix of the system $ax + by = m$
 $fx + gy = n \rightarrow \begin{bmatrix} a & b \\ f & g \end{bmatrix}$.

The solution of this system is $x = \frac{\begin{vmatrix} m & b \\ n & g \end{vmatrix}}{|C|}$ and $y = \frac{\begin{vmatrix} a & m \\ f & n \end{vmatrix}}{|C|}$, if $|C| \neq 0$.

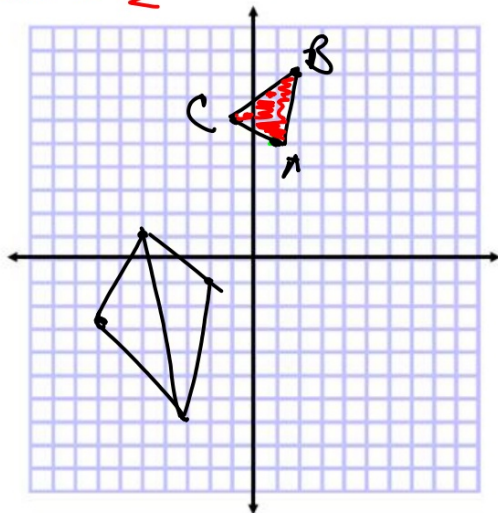
coefficient matrix (C)

Cramer's rule: systems of 2 eq

Triangle area

A B C
(1, 5) (2, 8) (-1, 6)

$$\Delta \text{ area} = \frac{1}{2} \cdot \det$$



$$\frac{1}{2} \cdot \begin{vmatrix} 1 & 5 \\ 2 & 8 \\ -1 & 6 \end{vmatrix}$$

$$\frac{1}{2} (7) = 3.5$$

graphing calcs

2x2 Show the work
3x3+ Can use calc

Whiteboards