Name: _____ **Precalculus Unit 6, Lesson 11**

Aim: What is Cramer's Rule?

I. Do Now:

1. Solve by Gauss-Jordan Elimination.
$2x+3y=7$
$2x+6y=16$

2. Find each determinant:

(a) $D=\begin{vmatrix} 2 & 3 \\ 2 & 6 \end{vmatrix}$

(b) $D_x=\begin{vmatrix} 7 & 3 \\ 16 & 6 \end{vmatrix}$

(c) $D_y=\begin{vmatrix} 2 & 7 \\ 2 & 16 \end{vmatrix}$

3. Use your answers from #2 to find each value:

(a) $\frac{D_x}{D}=$

(b) $\frac{D_y}{D}=$

II. Cramer's Rule for 2×2 Systems

Given
$ax+by=r$
$cx+dy=s$

$x=$ _____ $y=$ _____

Try Cramer's Rule on these:

4. $3x+4y=-2$
$5x+3y=4$

5. $7x-7y=8$
$-3x+3y=2$

6. $-3x+6y=30$
$x-2y=-10$

III. Cramer's Rule for $n\times n$ Systems

In general, a linear system in n variables, $x_1, x_2, x_3, ..., x_n$ has solutions $x_1=\frac{D_{x_1}}{D}, x_2=\frac{D_{x_2}}{D}, \ldots, x_n=\frac{D_{x_n}}{D}$, where D is the coefficient matrix and D_{x_i} is the matrix obtained by replacing the ith column of D with the "answer column."

IV. Applications: Solve each system using Cramer's Rule. You may use your calculator to compute determinants.

7. $2x-3y+4z=1$
$x+6z=0$
$3x-2y=5$

8. $4x+5y-2z=-14$
$7x-y+2z=42$
$3x+y+4z=28$

9. Find the value of B using Cramer's Rule.

$2A-B-3C+2D=-2$
$A-2B+C-3D=4$
$3A-4B+2C-4D=12$
$2A+3B-C-2D=-4$