

Unit 1 Day 6 Notes

Cramer's Rule

$$\text{given } \begin{cases} ax+by=r \\ cx+dy=s \end{cases}$$

$$x = \frac{|D_x|}{|D|}$$

$$y = \frac{|D_y|}{|D|}$$

$$D = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$D_x = \begin{bmatrix} r & b \\ s & d \end{bmatrix}$$

$$D_y = \begin{bmatrix} a & r \\ c & s \end{bmatrix}$$

Example:

$$\text{given } \begin{cases} 2x+6y=-1 \\ x+8y=2 \end{cases}$$

$$D = \begin{bmatrix} 2 & 6 \\ 1 & 8 \end{bmatrix}$$

$$D_x = \begin{bmatrix} -1 & 6 \\ 2 & 8 \end{bmatrix}$$

$$D_y = \begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$$

$$|D| = 16 - 6 = 10$$

$$|D_x| = -8 - 12 = -20$$

$$|D_y| = 4 - (-1) = 5$$

$$x = \frac{-20}{10} = -2$$

$$y = \frac{5}{10} = \frac{1}{2}$$

Ans: $(-2, \frac{1}{2})$