

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Homework sheet: Alg2H Systems of equations: Graphs\_xyz\_Cramer

1.

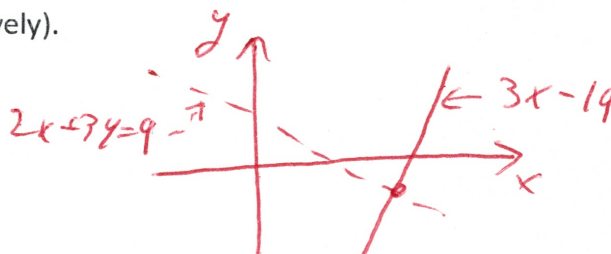
a. Solve the system of equations:

$$\begin{cases} 2x + 3y = 9 \\ 3x - y = 19 \end{cases} \rightarrow y = 3x - 19$$

$$\Rightarrow 2x + 3(3x - 19) = 9$$

$$2x + 9x - 57 = 9 \rightarrow 11x = 66 \rightarrow \boxed{x = 6, y = -1}$$

b. Graph the system of equations using desmos. Do the results agree? Draw the graph (just qualitatively).



2.

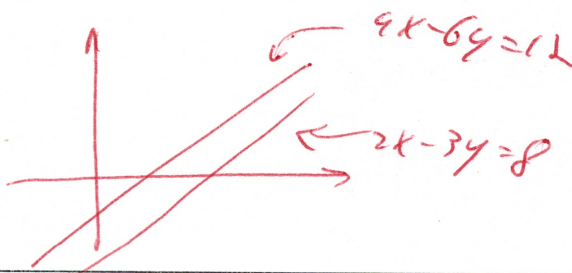
a. Solve the system of equations:

$$\begin{cases} 2x - 3y = 8 \\ 4x - 6y = 12 \end{cases} \leftarrow \times 2$$

$$\begin{cases} 4x - 6y = 16 \\ 4x - 6y = 12 \end{cases} \quad -$$

$$\hline 0 = 4 \rightarrow 0 = 4 \quad \text{no solution}$$

b. Graph the system of equations using desmos. Do the results agree? Draw the graph (just qualitatively).



3.

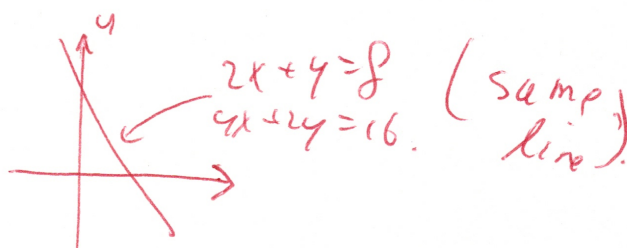
a. Solve the system of equations:

$$\begin{cases} 2x + y = 8 \\ 4x + 2y = 16 \end{cases}$$

$$\begin{cases} 4x + 2y = 16 \\ 4x + 2y = 16 \end{cases} \quad \leftarrow \text{always.}$$

$$y = 8 - 2x$$

b. Graph the system of equations using desmos. Do the results agree? Draw the graph (just qualitatively).

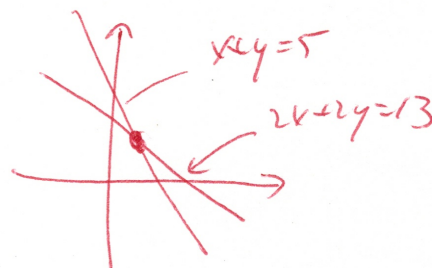


4.

a. Write two equations with solution  $(x, y) = (2, 3)$ .

b. Plot the system you derived, and verify your answer.

$$\begin{cases} 2x + 3y = 13 \\ x + y = 5 \end{cases}$$



5.

a. Write two equations with solutions  $(x, y) = (2, 3)$  AND  $(x, y) = (3, 6)$ . That means, both pairs should be a valid solution to your equations.

$$\begin{cases} 3x - y = 3 \\ 6x - 2y = 6 \end{cases}$$

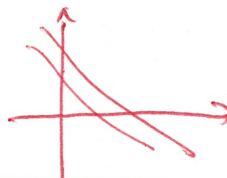
b. Plot the system you derived, and verify your answer.

6.

a. Write two inconsistent equations, namely with no solution.

$$\begin{cases} x + y = 1 \\ 2x + 2y = 3 \end{cases}$$

b. Plot the system you derived, and verify your answer.



7. Solve the system of equations:

$$\begin{cases} 24x + 5y = 25 \\ 6x + 3y = 5 \end{cases}$$

$$\begin{array}{r} 24x + 5y = 25 \\ -24x + 12y = 20 \\ \hline 0 - 7y = 7 \end{array} \Rightarrow y = -1, x = 1\frac{1}{3}$$

8. Solve the following system:

$$\begin{cases} 2x + 3y + 4z = 13 \\ x - 3y + 2z = 11 \\ x - 2y - z = 1 \end{cases} \rightarrow x = 1 + 2y + z$$

$$\begin{aligned} (1 + 2y + z) - 3y + 2z &= 11 \\ 1 - y + 3z &= 10 \\ -y + 3z &= 9 \end{aligned}$$

9. Solve the following system, and then check your answer by graphing:

$$\begin{cases} 2x + 3y = 3 \\ x - 3y = 6 \\ 3x - y = 10 \end{cases}$$

$$\begin{array}{r} 2x + 3y = 3 \\ 2x - 6y = 12 \\ \hline -9y = 9 \end{array} \Rightarrow y = -1 \Rightarrow x = 3$$

or  
with sliders

$$\begin{cases} z = 3 \\ x = 2 \\ y = -1 \end{cases}$$

into 1st one!

10. Cramer's rule.

$$\begin{cases} aX + bY = c \\ dX + eY = f \end{cases}$$

$\times d$   
 $\times a$

When in class, do  
instead  
 $\times e$   
 $\times b$   
and get  $X$

$$\Rightarrow \begin{cases} adX + bdY = cd \\ adX + aeY = af \end{cases}$$

$$\underline{0X + (bd - ae)Y = cd - af} \Rightarrow Y = \frac{cd - af}{bd - ae} = \frac{af - cd}{ae - bd}$$

and

$$X = \frac{ce - bf}{bd - ae} = \frac{ce - bf}{ae - bd}$$

~~what~~

11. Solve the system using Cramer's rule

$$\begin{cases} 24x + 5y = 257 \\ 6x + 3y = 5 \end{cases}$$

what happens when inconsistent?!? ←