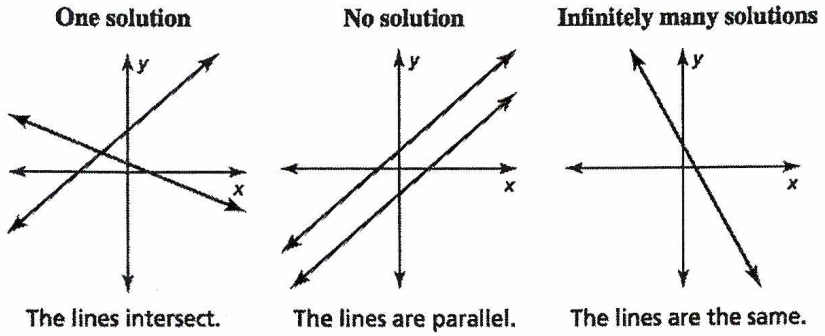
AA PREP: LINEAR RELATIONSHIPS—SOLVING SYSTEMS LECTURE

Solutions of Systems of Linear Equations:

A system of linear equations can have one solution, no solution, or infinitely many solutions.



Solving Systems of Linear Equations:

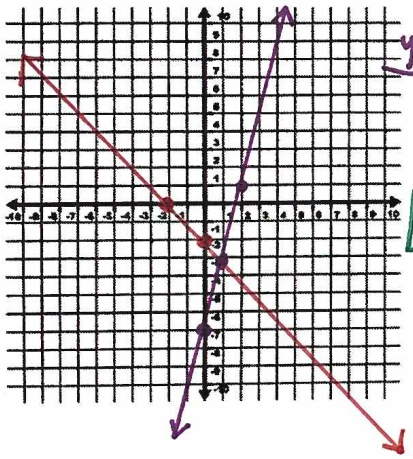
EX 1: Solve the system using three methods: graphing, substitution, and elimination.

a) Graphing

$\begin{cases} x+y=-2 \\ -8x+2y=-14 \end{cases}$ (-2,0) (0,-2)

$+8x \quad +8x$ $\quad \frac{2y}{2}=\frac{8x}{2}\frac{-14}{2}$

$y=4x-7$



(1,-3)

b) Substitution

$\begin{cases} x+y=-2 \\ -8x+2y=-14 \end{cases}$

$x+y=-2$

$-x \quad -x$

$y=-x-2$

$-8x+2(-x-2)=-14$

$-8x-2x-4=-14$

$-10x-4=-14$

$+4 \quad +4$

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

$x=1$

$x+y=-2$

$(1)+y=-2$

$-1 \quad -1$

$y=-3$

(1,-3)

c) Elimination

$\begin{cases} (x+y)=(-2) \\ -8x+2y=-14 \end{cases}$

$8 \quad 8$

$8x+8y=-16$

$-8x+2y=-14$

$10y=-30$

$\frac{10y}{10}=\frac{-30}{10}$

$y=-3$

$x+y=-2$

$x+(-3)=-2$

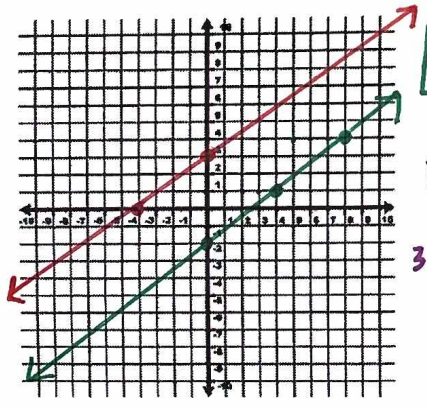
$+3 \quad +3$

$x=1$

(1,-3)

EX 2: Graph each system, then solve the system using substitution or elimination.

a) $\begin{cases} 3x-4y=-12 \\ y=\frac{3}{4}x-2 \end{cases}$ (-4,0) (0,3)



PARALLEL (||)

NO SOLUTION

$3x-4\left(\frac{3}{4}x-2\right)=-12$

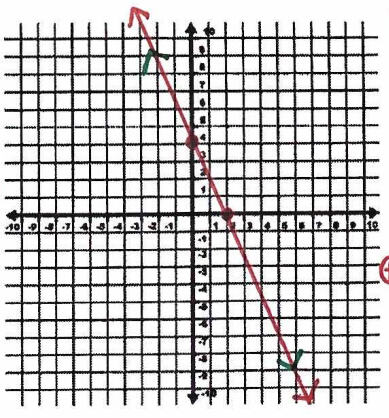
$3x-3x+8=-12$

$8=-12$

FALSE!

NO SOLUTION

b) $\begin{cases} 2x+y=4 \\ 6x+3y=12 \end{cases}$ (2,0) (0,4) (2,0) (0,4)



SAME LINE

INFINITE SOLUTIONS

$-3(2x+y)=(4)-3$

$6x+3y=12$

$-6x-3y=-12$

$6x+3y=12$

$0=0$

TRUE!

INFINITE SOLUTIONS