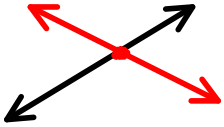
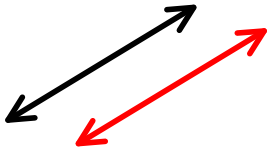
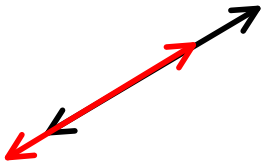
Solving Systems of Equations Graphically



Intersecting Lines
One Solution
Consistent
Independent



Parallel Lines
No Solution
Inconsistent



Coinciding Lines
Infinite Solutions
Consistent
Dependent

Step 1: Rewrite each equation in slope-intercept form. $y = mx + b$
Step 2: Graph the lines and find the intersection point.
Step 3: Check your answer.

Directions: Solve each system of equations graphically.

1. $x + y = 4$
   $x - y = 2$

$x + y = 4$
$-x \quad -x$

$y = -x + 4$

$m = \frac{-1}{1}$ ↓1 →1

$b = (0, 4)$

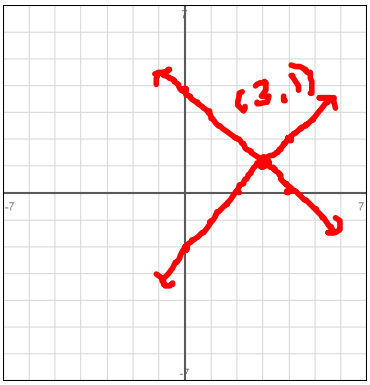
$x - y = 2$
$-x \quad -x$

$\frac{-y}{-1} = \frac{-x}{-1} + \frac{2}{-1}$

$y = x - 2$

$m = \frac{1}{1}$ ↑1 →1

$b = (0, -2)$



Check
$x + y = 4$
$3 + 1 = 4$
$4 = 4$ ✓

$x - y = 2$
$3 - 1 = 2$
$2 = 2$ ✓

(3,1)

2. $2x-3y=4$

$x+4y=-9$

$*2x-3y=4$ $\quad -2x \quad -2x$

$-3y=-2x+4$

$\frac{-3y}{-3}=\frac{-2x}{-3}+\frac{4}{-3}$

$y=\frac{2}{3}x-\frac{4}{3}$

$m=\frac{2}{3}\ \begin{matrix}\uparrow 2\\ \rightarrow 3\end{matrix}$

$b=(0,-4|_3)$

$+x+4y=-9$ $\quad -x \quad -x$

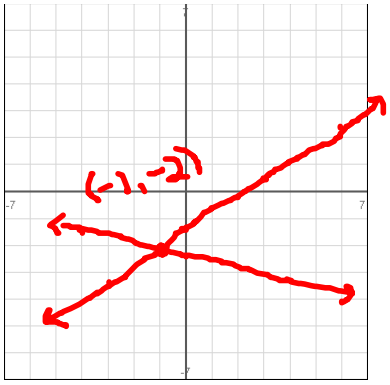
$4y=-x-9$

$\frac{4y}{4}=\frac{-x}{4}-\frac{9}{4}$

$y=-\frac{1}{4}x-\frac{9}{4}$

$m=-\frac{1}{4}\ \begin{matrix}\downarrow 1\\ \rightarrow 4\end{matrix}$

$b=(0,-9|_4)$



Check

$2x-3y=4$

$2(-1)-3(-2)=4$

$-2+6=4$

$4=4$ ✓

$x+4y=-9$

$-1+4(-2)=-9$

$-1-8=-9$

$-9=-9$ ✓

$(-1,-2)$

3. $y=\frac{3}{2}x$

$y=-2$

$y=\frac{3}{2}x$

$m=\frac{3}{2}\ \begin{matrix}\uparrow 3\\ \rightarrow 2\end{matrix}$

$b=(0,0)$

$y=-2$

horizontal

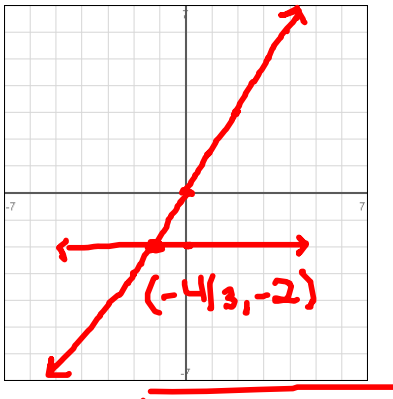
$m=0$

$-2=\frac{3}{2}x$

$\frac{-2}{1}=\frac{3x}{2}$

$\frac{3x}{3}=\frac{-4}{3}$

$x=-4|_3$



$(-4|_3,-2)$

4. $\frac{3}{4}y=\frac{1}{2}x-3$

$2x-3y=-6$

$\frac{4}{3}\cdot\frac{3}{4}y=\frac{4}{3}\cdot\frac{1}{2}x-3\cdot\frac{4}{3}$

$y=\frac{2}{3}x-4$

$m=\frac{2}{3}\ \begin{matrix}\uparrow 2\\ \rightarrow 3\end{matrix}$

$b=(0,-4)$

$2x-3y=-6$

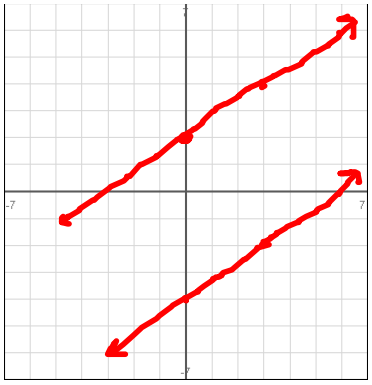
$-2x\qquad -2x$

$\frac{-3y}{-3}=\frac{-2x}{-3}-\frac{6}{-3}$

$y=\frac{2}{3}x+2$

$m=\frac{2}{3}\ \begin{matrix}\uparrow 2\\ \rightarrow 3\end{matrix}$

$b=(0,2)$



NO solution
INCONSISTENT

5. $y=2x-1$

$3x-\frac{3}{2}y=\frac{3}{2}$

$-3x\qquad -3x$

$y=2x-1$

$m=\frac{2}{1}\ \begin{matrix}\uparrow 2\\ \rightarrow 1\end{matrix}$

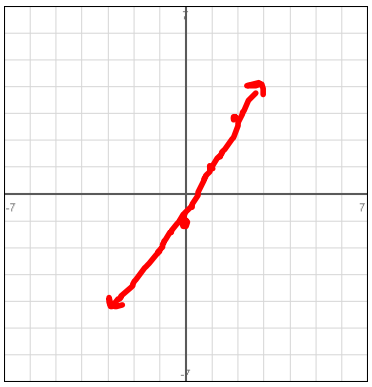
$b=(0,-1)$

$-\frac{2}{3}\cdot-\frac{3}{2}y=-\frac{2}{3}\cdot-3x+\frac{3}{2}\cdot-\frac{2}{3}$

$y=2x-1$

$m=\frac{2}{1}$

$b=(0,-1)$



INFINITE SOLUTIONS
CONSISTENT
DEPENDENT