

Summary of Systems (Sections 4.1, 4.2, 4.3)

Two-variable systems of linear equations

Methods of solution: **Elimination, Substitution, Graphing:** The solution you find by using substitution or elimination is the intersection point when you graph the equations! ALL SOLUTIONS WILL HAVE BOTH AN X AND A Y VALUE!! Once you have solved for one variable, be sure to go back and solve for the other!!!

Graphing: Graph each line (use the checkerboard), find the point at which they cross. This is the solution. CHECK IT in each equation.

Substitution: solve for one variable in one equation, substitute into the other.

Elimination: multiply one or both equations to get opposite coefficients on one variable. Add equations.

Types of systems:

Consistent (with one solution, two intersecting lines),

Dependent (with infinite solutions, one single line---variables drop out and leave a true statement)

Inconsistent (with no solutions, parallel lines---variables drop out and leave a false statement)

1. (a) Solve the given system by substitution.

$$\begin{aligned} 3x + 4y &= 2 \\ x - 2y &= 4 \end{aligned}$$

$\rightarrow x = 2y + 4$

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

$$6y + 12 + 4y = 2$$

$$10y = -10$$

$$y = -1$$

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

$x = 2$ $y = -1$

$\{(2, -1)\}$

(b) Solve the given system again by graphing. Check your answer. Show the check!

$$\begin{aligned} 3x + 4y &= 2 \\ x - 2y &= 4 \end{aligned}$$

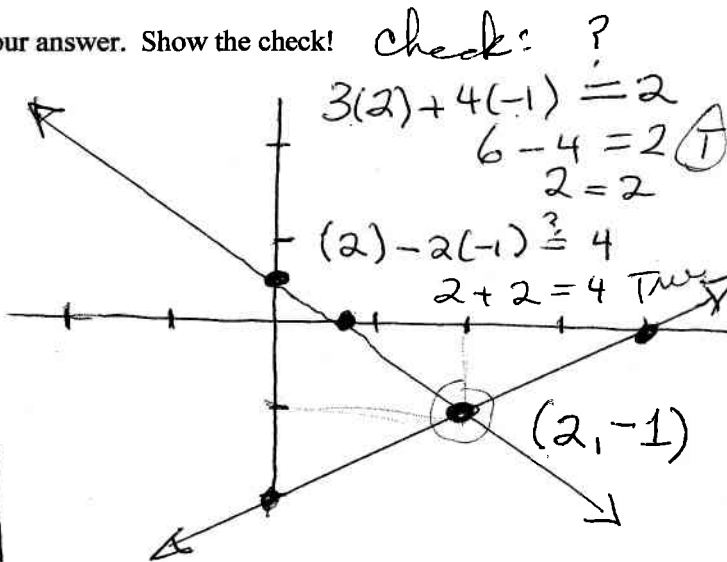
$$3x + 4y = 2$$

x	y
0	$\frac{2}{4} = \frac{1}{2}$
$\frac{2}{3}$	0

$$x - 2y = 4$$

x	y
0	-2
4	0

SOLUTION: $\{(2, -1)\}$



2. (a) Put each of the given line equations into SLOPE INTERCEPT FORM and determine whether the lines are parallel, perpendicular or neither parallel nor perpendicular. Clearly state your answer!

Equation 1: $2x - 3y = 5$

Equation 2: $-6x + 9y = 12$

$\Rightarrow 2x - 3y = 5$

$$-6x + 9y = 12$$

$$\frac{9y}{9} = \frac{6x}{9} + \frac{12}{9}$$

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

$$-\frac{3y}{-3} = \frac{-2x + 5}{-3}$$

$$y = \frac{2}{3}x - \frac{5}{3}$$

Lines are Parallel! Same slope!