

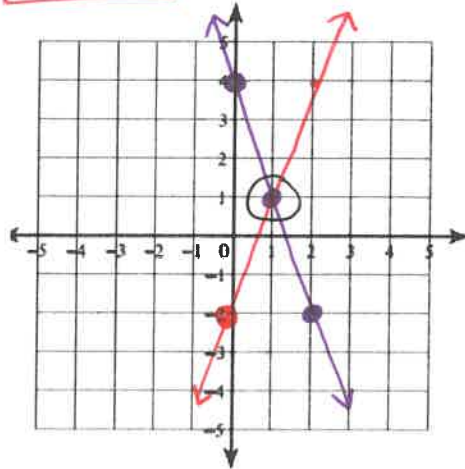
Geometry CP
Solving Systems of Equations

1. Solve the system by graphing:

a.

$$y = -3x + 4$$

$$y = 3x - 2$$



$$y = mx + b$$

$$m = -3$$

$$b = 4$$

$$m = 3$$

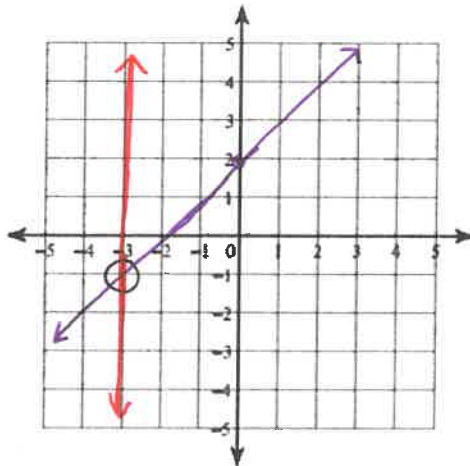
$$b = -2$$

$$(1, 1)$$

b.

$$y = x + 2$$

$$x = -3$$



$$m = 1$$

$$b = 2$$

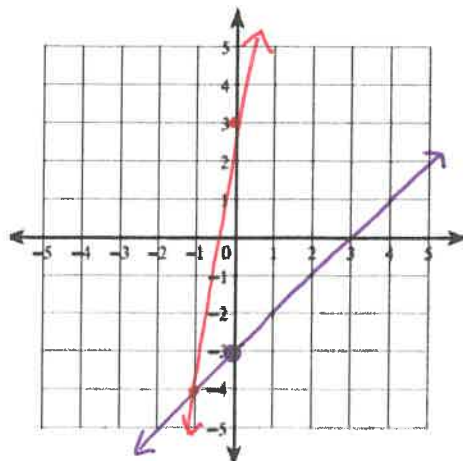
$$m = \text{und}$$

$$(-3, -1)$$

c.

$$x - y = 3$$

$$7x - y = -3$$



$$x - y = 3$$

$$-x \quad -x$$

$$-y = -x + 3$$

$$y = x - 3$$

$$m = 1$$

$$b = -3$$

$$(-1, -4)$$

$$7x - y = -3$$

$$-7x \quad -7x$$

$$-y = -7x - 3$$

$$y = 7x + 3$$

$$m = 7$$

$$b = 3$$

*plug in
replace variable

2. Solve each system by substitution

a. $y = 4x - 9$
 $y = x - 3$

$$4x - 9 = x - 3$$

$$+9 \quad +9$$

$$4x = x + 6$$

$$-x \quad -x$$

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

*choose any eqt

$$y = x - 3$$

$$y = 2 - 3$$

$$y = -1$$

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

b. $4x + 2y = 10$
 $x - y = 13$

$$+y \quad +y$$

$$x = 13 + y$$

$$4(13 + y) + 2y = 10$$

$$52 + 4y + 2y = 10$$

$$52 + 6y = 10$$

$$-52 \quad -52$$

$$6y = -42$$

$$y = -7$$

$$x = 13 + y$$

$$x = 13 + (-7)$$

$$= 6$$

$$\boxed{(6, -7)}$$

c. $x + 7y = 0$
 $2x - 8y = 22$

$$x = -7y$$

$$2(-7y) - 8y = 22$$

$$-14y - 8y = 22$$

$$-22y = 22$$

$$y = -1$$

$$x = -7(-1) = 7$$

$$\boxed{(7, -1)}$$

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3. Solve each system by elimination

a. $(8x - 6y = -22) \cdot 2$

$-16x + 7y = 30$

★ eliminate x

$$\begin{array}{r} 16x - 12y = -44 \\ + \quad -16x + 7y = 30 \\ \hline 0 - 5y = -14 \\ y = \frac{14}{5} \end{array}$$

$(-\frac{13}{20}, \frac{14}{5})$

b. $6x - 12y = 24$
 $-2(-x - 6y = 4)$

★ eliminate y

$$\begin{array}{r} 6x - 12y = 24 \\ + \quad 2x + 12y = -8 \\ \hline 8x + 0 = 16 \\ 8x = 16 \\ x = 2 \end{array}$$

$6x - 12y = 24$

$6(2) - 12y = 24$

$12 - 12y = 24$

$-12y = 12$

$y = -1$

$(2, -1)$

$8x - \frac{6}{1}(\frac{14}{5}) = -22$

$8x - \frac{84}{5} = -22$

$+ \frac{84}{5} \quad + \frac{84}{5}$

$8x = -\frac{22}{1} + \frac{84}{5}$

$8x = -\frac{110}{5} + \frac{84}{5}$

$(\frac{1}{8}) 8x = \frac{-26}{5} (\frac{1}{8}) \quad x = -\frac{26}{40}$

c. $-4y - 11x = 36$

$20 = -10x - 10y$

$= -\frac{13}{20}$

$-5(-4y - 11x = 36)$

$2(-10y - 10x = 20)$

$20y + 55x = -180$

$+ \quad -20y - 20x = 40$

$35x = -140$

$x = -4$

$20 = -10(-4) - 10y$

$20 = 40 - 10y$

$-40 \quad -40$

$-20 = -10y$

$2 = y$

$(-4, 2)$

Special Cases:

1. Solve the system by substitution and elimination:

$$\begin{aligned} (x+y=4) - 2 \\ 2x+2y=10 \end{aligned}$$

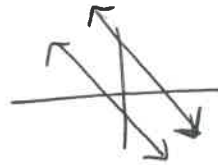
elimination

$$-2x - 2y = -8$$

$$2x + 2y = 10$$

$$0 = 2$$

No solution



2. Solve the system using any method:

$$\begin{aligned} x+y &= 4 \\ \underline{2x+2y} &= 8 \end{aligned}$$

Substitution

$$x = \underline{-y + 4}$$

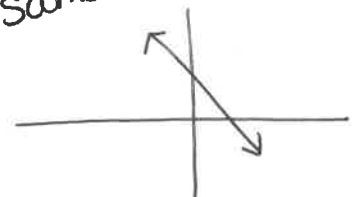
$$2(-y + 4) + 2y = 8$$

$$-2y + 8 + 2y = 8$$

$$8 = 8$$

infinite solution

★ Same line ★



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You try:

Solve the following systems using any method

$$\begin{aligned}(2x + 4y = 20) & \cdot 3 \\ (3x + 6y = 30) & \cdot 2\end{aligned}$$

$$\begin{array}{r} -6x - 12y = -60 \\ 6x + 12y = 60 \\ \hline 0 = 0 \end{array}$$

infinite solutions

$$\begin{aligned}y &= 2x - 1 \\ y &= 2x + 7\end{aligned}$$

$$\begin{array}{r} -y = -2x - 1 \\ y = 2x + 7 \\ \hline 0 = 6 \end{array}$$

no solutions

