9/24-25 Tu/W

Solving Systems using Substitution - Classifying Systems

$2x+y=3$

$y=-2x+3$

$y=-2(2)+3$

$y=-4+3$

$y=-1$

$3x-2y=8$

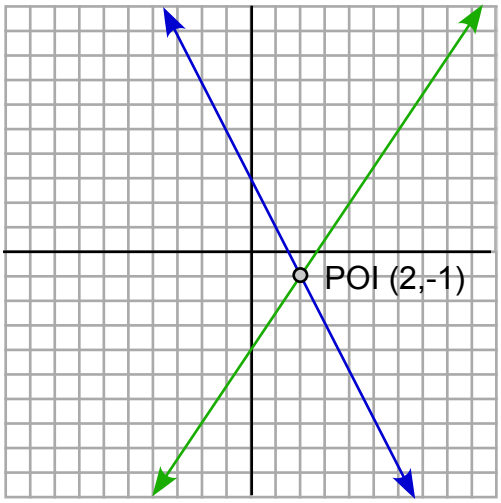
$3x-2(-2x+3)=8$

$3x+4x-6=8$

$7x=14$

$x=2$

POI (2, -1)
one solution



$3x-2y=8$

$-2y=-3x+8$

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

intersecting lines - 1 POI
system is independent & consistent

$6x-4y=8$

$-4y=-6x+8$

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

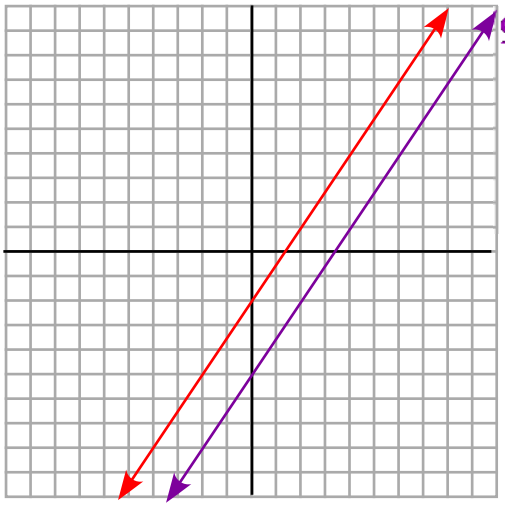
$9x-6y=30$

$9x-6\left(\frac{3}{2}x-2\right)=30$

$9x-9x+12=30$

$12=30$

no solution
no POI



$9x-6y=30$

$-6y=-9x+30$

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

parallel lines - 0 POIs
system is independent & inconsistent

$9x-12y=36$

$-12y=-9x-3$

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

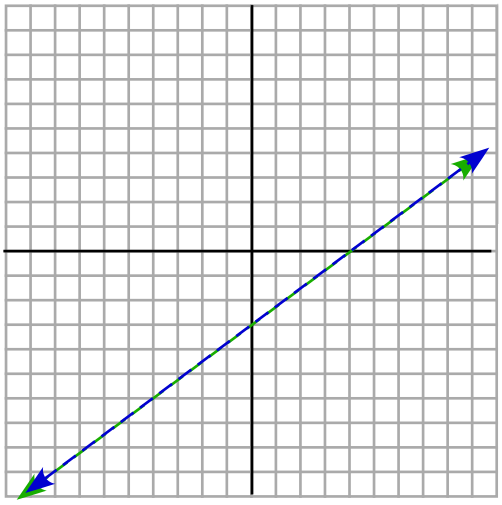
$6x-8y=24$

$6x-8\left(\frac{3}{4}x-3\right)=24$

$6x-6x+24=24$

$24=24$

infinite solutions
infinite POIs



$6x-8y=24$

$-8y=-6x+24$

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

overlapping/same lines - infinite POIs
system is dependent & consistent

Solving a 3x3 system

$$x-y-z=-4$$
$$5x+2y-3z=7$$
$$6z=-24$$

$$6z=-24$$
$$z=-4$$

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

$$5x+2y-3(-4)=7$$
$$5x+2y+12=7$$
$$5x+2y=-5$$

$$x=y-8$$
$$x=(5)-8$$
$$x=-3$$

$$5x+2y=-5$$
$$5x+2(5)=-5$$
$$5x+10=-5$$
$$5x=-15$$
$$x=-3$$

$$5(y-8)+2y=-5$$
$$5y-40+2y=-5$$
$$7y=35$$
$$y=5$$

POI (-3,5,-4)

Determining if a point is a solution for a 2x2 system

Is (1,5) a solution for the system x - y = -4 & 3x + y = 8?

$$x-y=-4$$
$$(1)-(5)=-4$$
$$-4=-4$$

(1,5) is on x - y = -4

$$3x+y=8$$
$$3(1)+(5)=8$$
$$3+5=8$$
$$8=8$$

(1,5) is on 3x + y = 8

Therefore (1,5) is a solution for the system (the POI).