Name:_____ Date: _____ 8-10 (Day 1)

8-10 SYSTEMS OF EQUATIONS BY GRAPHING

System of Equations: two (or more) equations with the same set of two (or more) variables.
Ex: y = 4x and y = x + 6 - two equations with same two variables, x and y

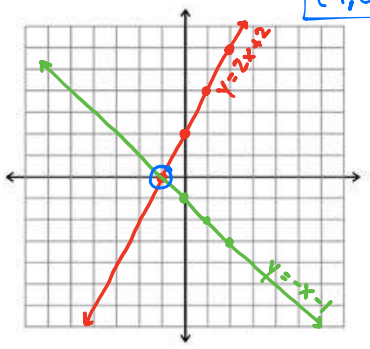
Solutions:
1. One Solution – an ordered pair that is a solution to both equations (in other words, where the two graphs intersect)
2. Infinitely Many Solutions – two equations that produce the same line
3. No Solution – parallel lines (same slope) because they do not intersect

Solving Systems of Equations:
1. Graphing – graphing all equations and visualizing where they intersect (HINT: use straight edge & sharp pencil)
2. Substitution – algebraically
3. Elimination – algebraically

Ex. 1: Solve and graph, then check solution algebraically. Determine whether the system has one solution, no solution, or infinitely many. * use y-intercept then slope to graph! * same slope ⇒ parallel lines

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

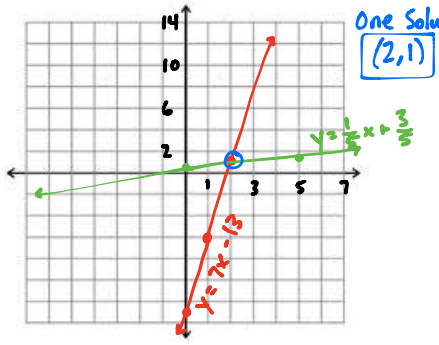
One Solution (-1,0)



Check: (-1,0)
$y = 2x+2$ | $y = -x-1$
$0 = 2(-1)+2$ | $0 = -(-1)-1$
$0 = -2+2$ | $0 = 1-1$
$0 = 0$ ✓ | $0 = 0$ ✓

B. $-7x + y = -13$ ⇒ $y = 7x - 13$
$x - 5y = -3$ ⇒ $y = \frac{1}{5}x + \frac{3}{5}$

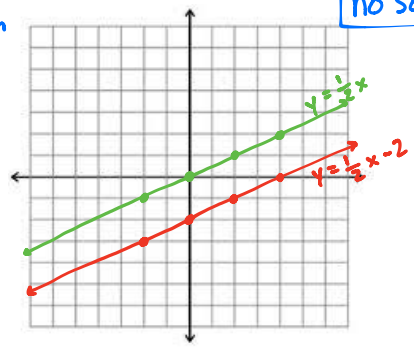
One Solution (2,1)



Check:

C. $\frac{1}{2}x - y = 2$ ⇒ $y = \frac{1}{2}x - 2$
$y = \frac{1}{2}x$

no solution



Check:

Ex. 2: Use algebra to determine whether the point (2, 10) is a solution for each system of equations. → substitute into both equations

A. $y = -x + 12$
$x = -y + 16$

No

1) $y = -x+12$
$10 = -(2)+12$
$10 = 10$ ✓
2) $x = -y+16$
$2 = -(10)+16$
$2 = 6$ ✗

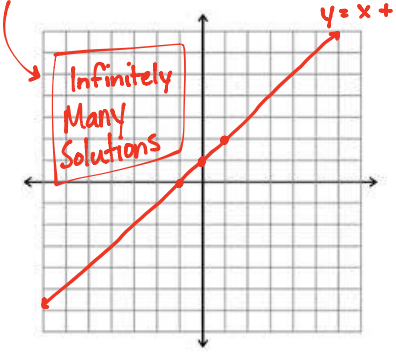
B. $8x - y = 6$
$-6 = 2x - y$

Yes

1) $8(2)-10 = 6$
$16-10 = 6$
$6 = 6$ ✓
2) $-6 = 2(2)-10$
$-6 = 4-10$
$-6 = -6$ ✓

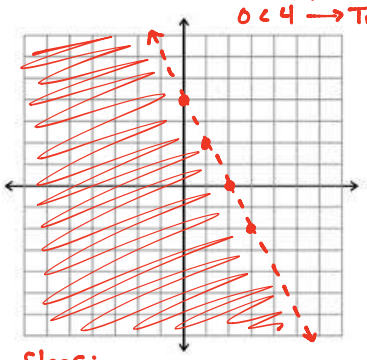
Ex. 3: Infinitely many solutions

same line
$y = x + 1$
$2x - 2y = -\frac{6}{3}$ ⇒ $-2y = -2x - 2$
$y = x + 1$



Ex. 4: Graphing Inequality
$y < -2x + 4$

Test (0,0) (if not on line)
$y < -2x+4$
$0 < -2(0)+4$
$0 < 4$ → True



Steps:
1. Graph as $y = -2x+4$ first
2. Use dotted line for < or >
   Use solid line for ≤ or ≥
3. Test a point for shading
   True → shade side of point
   False → shade side opposite point

Homework: 8-1 Worksheet (all problems)