

1.4 Using Graphs and Tables to Solve Linear Systems

Objectives: Students will solve systems of equations by graphing. Students will classify systems of equations using slope and y-intercept.

- system of equations: set of two or more equations
- linear system: contains only linear equations
- line: infinite set of points that are solutions to an equation

Ex 1) Use substitution to determine if the given ordered pair is an element of the solution set for the system of equations.

$$A) (2,4): \begin{cases} x - 2y = -6 \\ 2x + y = 8 \end{cases}$$

$$2 - 2(4) \stackrel{?}{=} -6 \checkmark$$

$$2(2) + 4 \stackrel{?}{=} 8 \checkmark$$

Yes, $(2,4)$
is a solution

$$B) (3,2): \begin{cases} 2x + 3y = 12 \\ 8x - 6y = 24 \end{cases}$$

$$2(3) + 3(2) \stackrel{?}{=} 12 \checkmark$$

$$8(3) - 6(2) \stackrel{?}{=} 24 \quad \times$$

$(3,2)$ is
not a soln.

- To Solve a System of Equations by Graphing:
Graph both equations on the same coordinate plane
Find the point of intersection
- The point (x, y) where both equations intersect will be your solution

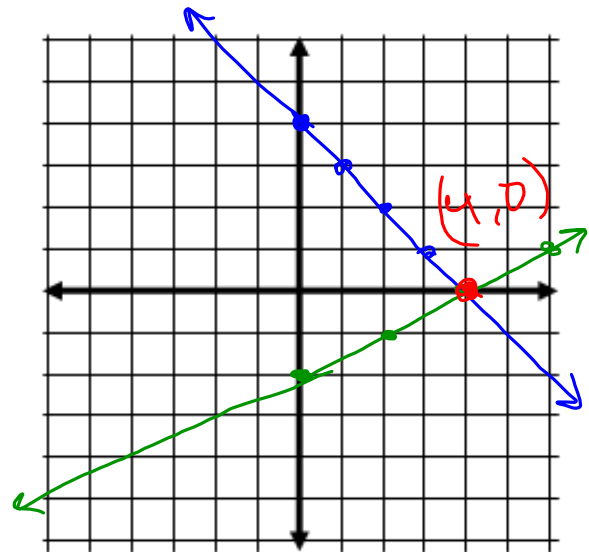
Ex 2) Use a graph to solve the system
then check your answer
by substituting back into the equations.

$$y = -x + 4$$

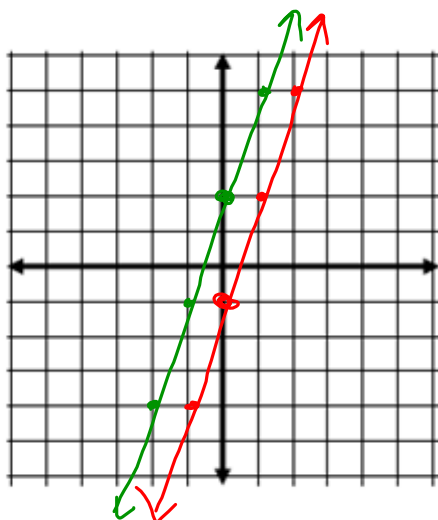
$$0 = -4 + 4$$

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

$$0 = \frac{1}{2}(4) - 2$$



b. $y = 3x - 1$ ✗
 $y = 3x + 2$ ✗

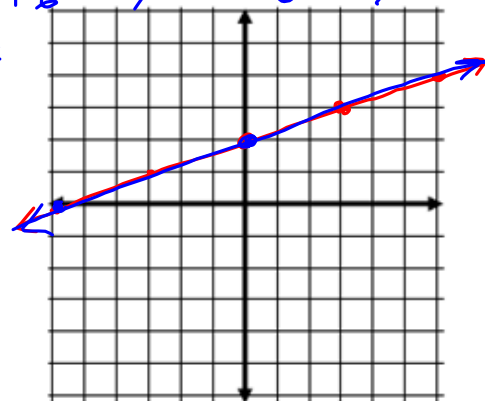


Solution no soln.

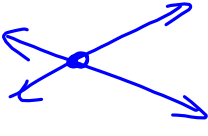
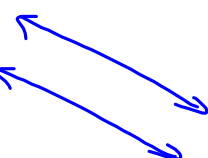
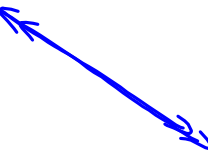
c. $y = \frac{1}{3}x + 2$ ✗
 $3y = x + 6$ ✗

$$0 = x + 6 \quad 3y = 0 + 6 \rightarrow y = 2$$

$$-6 = x$$



Solution infinitely many solns.

Type of Lines	Picture	Slopes and Y-Int	Name of System	# of Solutions
Intersecting		slopes are not equal y int. could be unequal	consistent & independent	1
Parallel Lines		slopes equal y int are not equal	inconsistent & independent	0
Coinciding		same slope & same y int	consistent & dependent	infinite # of solns

Ex 3) Without graphing, classify each system and determine the number of solutions.

A)
$$\begin{cases} 2x + y = 3 \\ 6x = 9 - 3y \end{cases}$$

$\frac{6x}{3} = \frac{9}{3} - \frac{3y}{3}$

$2x = 3 - y$

$2x + y = 3$

type of system: consistent & dependent
of solutions: infinite

B)
$$\begin{cases} 4x + 2y = 3 \\ 2 + y = -3x \end{cases}$$

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

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

$+3x$

$3x + y + 2 = 0$

-2

$3x + y = -2$

$-3x$

$y = -2 - 3x$

type of system: consistent & indep.
of solutions: 1

Ex 4) Big Dog Snowboard Co. charges \$15 for equipment rental plus \$35 per hour for lessons. Half-Pipe Snowboards charges \$40 for equipment rental plus \$25 per hour for lessons. For what number of hours is the cost of equipment and lessons the same for each company?

$y = \text{cost}$
 $x = \# \text{ hrs.}$

Big Dog $y = 15 + 35x$

x	y
0	15
1	50
2	85
3	120 \$
4	155 \$

Half pipe $y = 40 + 25x$

x	y
0	40 \$
1	65 \$
2	90 \$
3	115 \$
4	140

b/w 2 & 3 hours

$x = 2.5$

$$15 + 35(2.5) = 102.5$$

$$40 + 25(2.5) = 102.5$$

at 2.5 hours