

Unit 1 - Systems of Linear Equations

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(1.3) Graphically Solving Linear Systems

Feb 7/201

Each of the following pairs of equations forms a linear system.

Think about their graphs to determine the number of solutions:

- a) $y=2x+4$
 $y=2x$ b) $y=2x+4$
 $y=-x+4$ c) $y=x-3$
 $4x-4y=12$ d) $y=2x+4$
 $y=2-x$

solve graphically

a) $y=2x+4$
 $y=2x$

$y = 2x + 4$

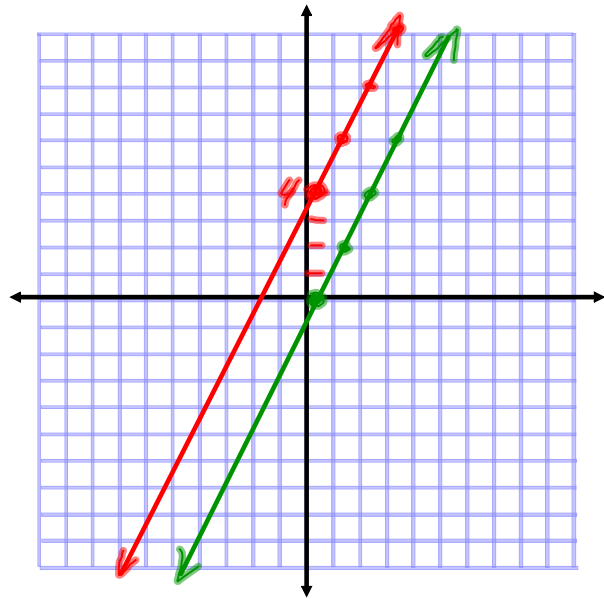
slope = $\frac{2}{1}$ y-int = 4

$y = 2x$

slope = $\frac{2}{1}$ y-int = 0

\therefore lines are parallel

\therefore no intersection, zero solutions



#1, #2

b) $y=2x+4$
 $y=-x+4$

$y = 2x + 4$

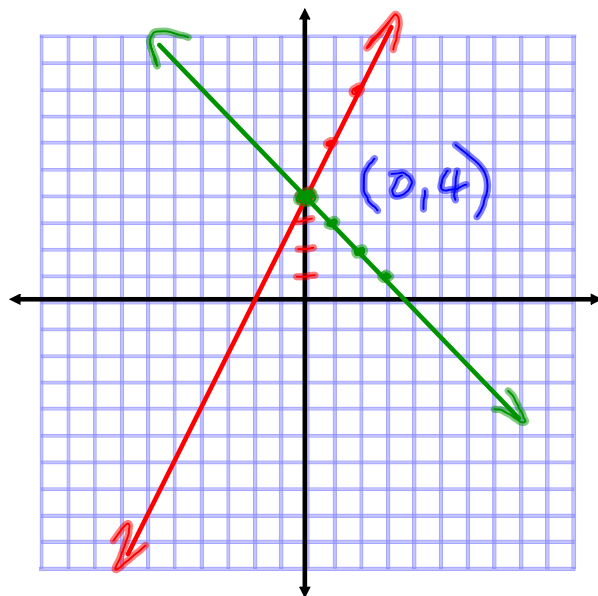
slope = 2 y-int = 4

$y = -x + 4$

slope = -1 y-int = 4

$= \frac{-1}{1}$

\therefore one solution only. (0, 4)



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c) $y = x - 3$
 $4x - 4y = 12$

$y = x - 3$
 slope = 1 y-int = -3

$$\frac{4x - 4y}{4} = \frac{12}{4}$$

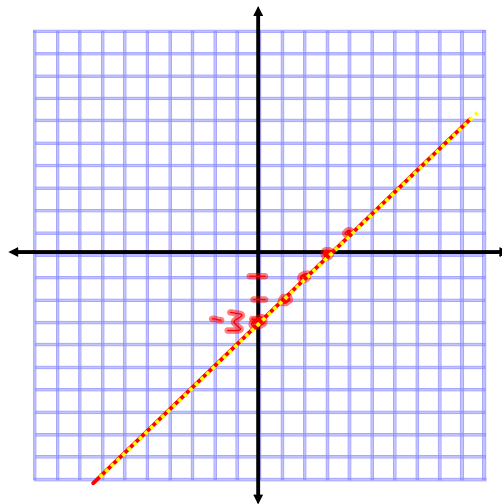
$$x - y = 3$$

$$\frac{-y}{-1} = \frac{-x + 3}{-1}$$

$$y = x - 3$$

Same line!

\therefore an infinite number of solutions

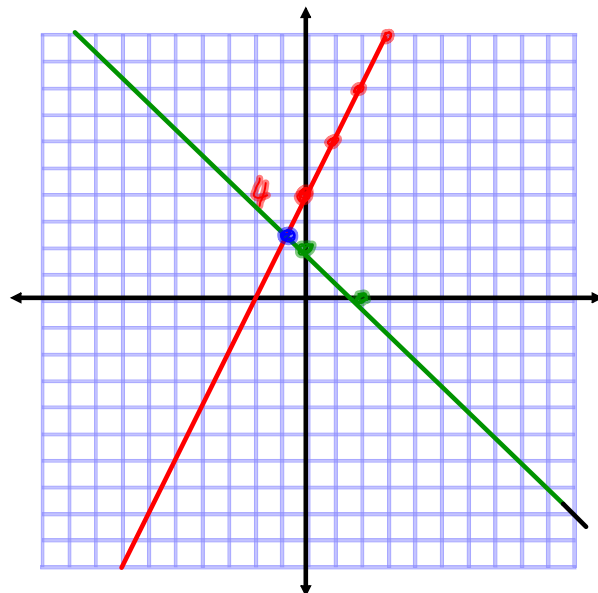


#3, #4

d) $y = 2x + 4$
 $y = 2 - x$

$y = 2 - x$

<u>x-int</u>	<u>y-int</u>
$0 = 2 - x$	$y = 2$
$x = 2$	



\therefore one solution, but difficult to determine from graph

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In Summary:

For no solution:
same slope and different y-intercepts.

For exactly one solution:
different slopes only.

For infinitely many solutions:
same slope and same y intercept.

Some systems can only be solved graphically using technology (graphing calculator or software).

summary

Ex1. Given $y=2x+5$, write a second equation such that the system has:

- i) no solution
- ii) exactly one solution
- iii) infinitely many solutions.

(i) same slope (2), different
y-int (4 or 3, or 1000)
 $y = 2x + (\text{anything but } 5)$
 $y = 2x - 3$

(ii) $y = \underline{3}x + 5$, $y = \underline{-7}x - 11$

(iii) $y = 2x + 5$
 $2x - y + 5 = 0$ (rearrange)
 $2y = 4x + 10$ (multiplies)

ex3

Ex2. Jessica is considering two job offers. Passion Fashion offers \$1500/month plus 2.5% commission. Fly Styles offers \$1250/month plus 5.5% commission.

- Write two equations to describe the situation.
- What value of sales would result in the same total salary for both jobs?
- Which job should Jessica take? Explain.

ex1

Ex.3. What value of a gives a system with no solution?

$$\begin{aligned} x(a-1)-y+6 &= 0 \\ 2x+y-3 &= 0 \end{aligned}$$

$$2x+y-3=0$$

$$y = -2x + 3$$

$$m = -2$$

for no sol'n, same slopes

$$a-1 = -2$$

$$a = -1$$

\therefore for no solution, $a = -1$

$$x(a-1)-y+6=0$$

$$(a-1)x + 6 = y$$

$$m = a-1$$

Same slope
diff. y-int

ex2

Assigned Work:

p. 26 # 1ab, 2a, 3ab, 4, 5abf, 6

hw

Attachments

Basic 2D Grid.agg