What a System Is, and Solving by Graphing

A system is two equations at once. A solution works in every equation: the point where the lines cross. Graph both from m and b, read the crossing, check in both.

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
System of equations	Two or more equations that must all be true at once.	Treat them as one problem with one answer.
Solution of a system	A point that makes every equation in the system true.	Check it in both. One true and one false is not a solution.
Intersection	The point where the graphs cross: the one point on both lines.	Read its x and y off the grid, then check.
Solve by graphing	Graph both lines from m and b, read the crossing, check it.	Good for seeing the answer; not exact when the crossing is off a grid corner.
Exact answer	The true x and y, even when they are fractions.	Lessons 2 and 3 give it by algebra.

Part A Is it a solution of the system?

Check each point in both equations. Write both sentences and yes or no.

SYSTEM	POINT	EQUATION 1	EQUATION 2	SOLUTION?
$y = 2x - 1$, $y = -x + 5$	(2, 3)			
$y = 2x - 1$, $y = -x + 5$	(0, –1)			
$y = x + 3$, $y = 3x - 1$	(2, 5)			
$y = x + 3$, $y = 3x - 1$	(1, 4)			

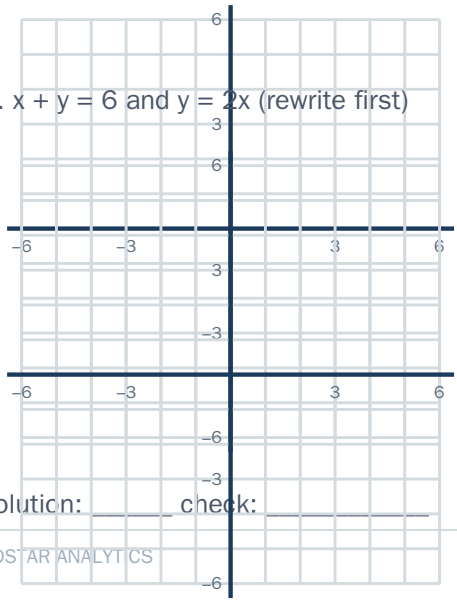
Part B Solve by graphing

Graph both lines from m and b, mark the crossing, write the solution, and check it in both.

1. $y = x - 2$ and $y = -x + 4$

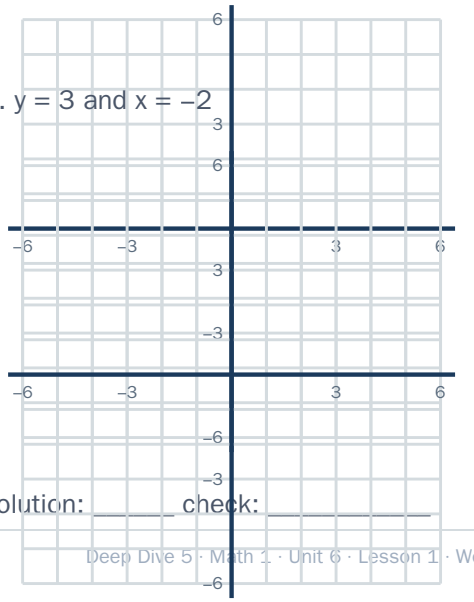
2. $y = 2x + 1$ and $y = -x + 4$

3. x + y = 6 and y = 2x (rewrite first)



solution: _____ check: _____

4. y = 3 and x = −2



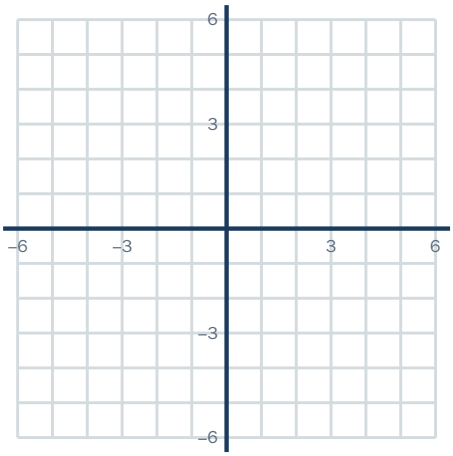
solution: _____ check: _____

solution: _____ check: _____

solution: _____

Part C The limit of graphing

1. Graph y = 3x + 1 and y = −2x + 4 on the grid. Estimate the crossing. Why can you not read it exactly?



Part D In your own words

1. What is a system of equations, and what is a solution of one?

2. Why is the crossing point the solution?

3. When do you need algebra instead of a graph?

Part E Exit ticket

1. Is (1, 4) a solution of $y = 3x + 1$ and $y = -x + 5$?

2. Solve by graphing, in words: $y = x + 2$ and $y = -x + 4$.

Answer key

Part A. (2, 3): 3 = 3 true, 3 = 3 true, yes. (0, –1): –1 = –1 true, 5 = –1 false, no. (2, 5): 5 = 5 true, 5 = 5 true, yes. (1, 4): 4 = 4 true, 2 = 4 false, no.

Part B. 1. (3, 1). 2. (1, 3). 3. $y = -x + 6$ and $y = 2x$: (2, 4). 4. (–2, 3).

Part C. About (0.6, 2.8); the exact point (3/5, 14/5) is not on a grid corner.

Part D. 1. Two or more equations true at once; a point that works in all of them. 2. It is on both lines, so it makes both equations true. 3. When the crossing is not on a grid corner.

Part E. 1. Yes: 4 = 4 and 4 = 4. 2. (1, 3).