

Name: _____

Date: _____

SYSTEMS OF EQUATIONS (REVISITED)
N-GEN MATH[®] 8



A system of equations is a set of two or more equations with two or more variables. To solve a system means to find sets of values that solve all the equations **simultaneously** (at the same time).

Exercise #1: Consider the system of equations shown to the right.

$$y = 2x + 3$$

$$x + y = 18$$

- (a) Show that $x = 4$ and $y = 11$ is a solution to the first equation, but not the second.
- (b) Show that $x = 7$, $y = 11$ is a solution to the second equation, but not the first.
- (c) Show that $x = 5$, $y = 13$ is a solution to both equations and therefore a solution to the system of equations.

Exercise #2: Is the coordinate point $(6, 11)$ a solution to the system comprised of $y = \frac{1}{2}x + 8$ and $y = 3x - 7$? Justify.

Exercise #3: Two numbers, x and y , have the properties that their sum is 20 and their positive difference is 8. Assuming x is the larger number, write a system of equations that models these two numbers.



We have already seen that when the two equations in a system both represent **equations of a line** we can solve the system by **finding the intersection point** of the two lines.

Exercise #4: Consider the system of equations shown below.

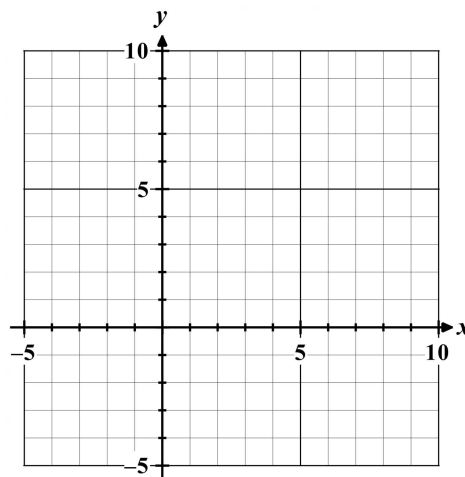
$$y = x + 3$$

$$y = -\frac{1}{2}x + 9$$

(a) Graph each of these lines and label each with its equation.

(b) Circle the intersection point of the two lines. State its coordinates below.

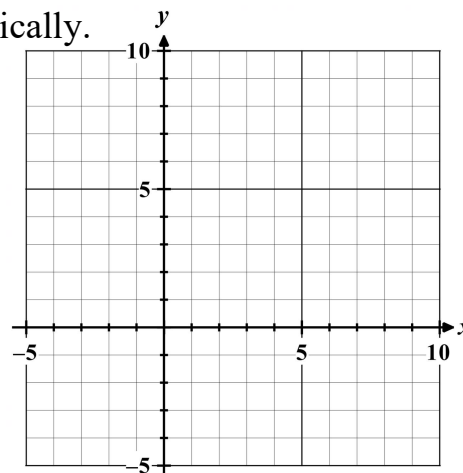
(c) Show by substitution that this point makes both equations true and is a solution to the system.



Exercise #5: Solve the system of equations shown below graphically.

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

$$y = -\frac{1}{4}x + 5$$



Exercise #6: A table of values for two linear functions is shown below. What is the solution to this system of equations? How can you tell from the table?

x	0	1	2	3	4	5	6	7
y_1	17	15	13	11	9	7	5	3
y_2	-1	3	7	11	15	19	23	27



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SYSTEMS OF EQUATIONS (REVISITED)
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FLUENCY

1. Which point below is a solution to the equation $2x + y = 12$?

(1) $(4, 2)$ (3) $(8, -1)$

(2) $(3, 6)$ (4) $(0, 6)$

2. Which of the following is a solution to the system made up by $x + y = 27$ and $y = 2x$?

(1) $x = 7$ and $y = 20$ (3) $x = 5$ and $y = 10$

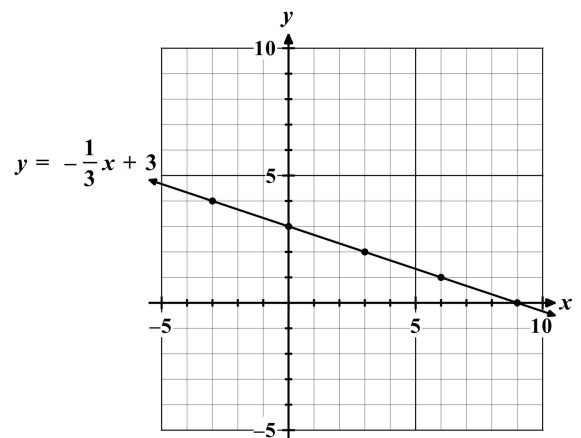
(2) $x = 10$ and $y = 17$ (4) $x = 9$ and $y = 18$

3. Is the point $(-2, 5)$ a solution to the system shown below? Justify your answer.

$$2x + 3y = 11$$

$$-4x + y = 13$$

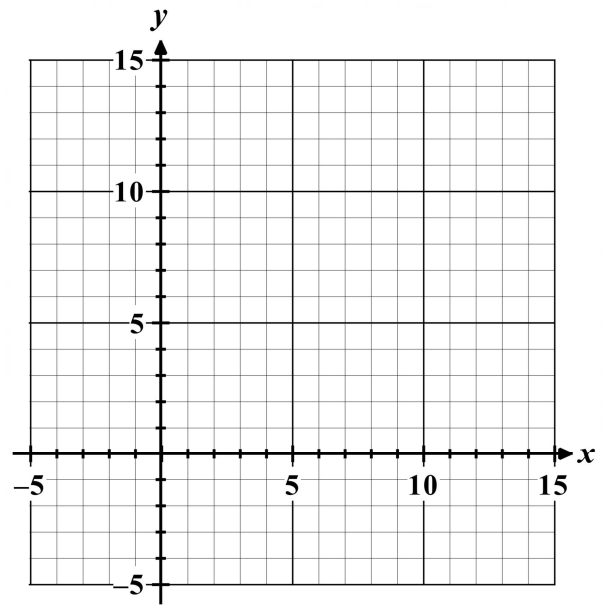
4. The equation $y = -\frac{1}{3}x + 3$ is shown graphed below. If the equation $y = 2x - 4$ was added to this one to form a system, what would be its solution? Justify your answer.



5. Solve the system of equations shown below graphically. Make sure to label each line that you graph with its equation.

$$y = -x + 14$$

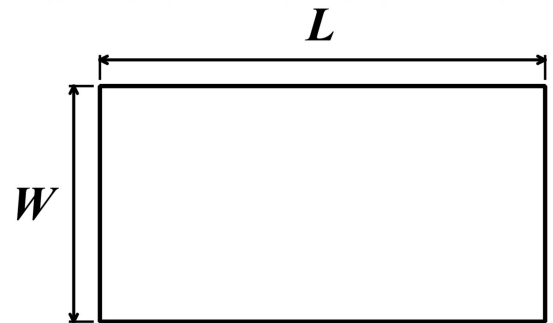
$$y = \frac{2}{3}x - 1$$



USING YOUR MATH

6. A rectangle has dimensions given by the variables W and L , for width and length. The rectangle has a perimeter of 34 feet and an area of 60 square feet.

- (a) Write a system of two equations involving L and W based on the perimeter and area information.



- (b) Do the values $W = 5$ ft and $L = 12$ feet solve this system? Justify.

REASONING

7. Explain why the system comprised of the equations $y = 2x + 7$ and $y = 2x - 3$ will not have any solutions.

