

Systems of Equations

Systems of Equations Formative Assessment 1 - Working with Linear Equations

Cluster & Content Standards

What content standards can be addressed by this formative assessment?

NC.8.EE.8 *Analyze and solve a system of two linear equations in two variables in slope-intercept form.*

- *Understand that solutions to a system of two linear equations correspond to the points of intersection of their graphs because the point of intersection satisfies both equations simultaneously.*
- *Solve real-world and mathematical problems leading to systems of linear equations by graphing the equations. Solve simple cases by inspection.*

Mathematical Practice Standards

What practice standards can be addressed by this formative assessment?

MP 2 Reason abstractly and quantitatively

MP 3 Construct viable arguments and critique the reasoning of others

MP 4 Model with mathematics

Learning Targets

What learning targets will be assessed?

Students will be able to determine the number of solutions in a given system of equations.

Students will be able to explain that the solution to a system is the place where the graphs intersect.

Timing: Teachers might want to use this formative assessment after doing the Desmos Polygraph: Linear Systems and Investigation: Systems of Equations activity.

Anticipated Solutions and Possible Conceptions

1. For the first question students may graph the equation to determine if the points are on the line. They may substitute the values in the table into the equations to determine if they create true equations. Either strategy will work.
2. For the first question students may assume only one table satisfies the equation.
3. For the second question students may graph the first equation using the slope and y-intercept. It is in slope intercept form. The second equation is not in slope intercept form. Students may try to rewrite it in slope intercept form. This is not a part of 8th grade standards. They should be encouraged to use the table.
4. Students may not explain their answers. Discuss with students that there are several strategies that could be used. Which strategy did they use?
5. Students may not extend their lines far enough to find the intersection of the lines. Ask students if there are more solutions to their equations than their lines represent. How can they show more solutions?

Link to pdf file: https://drive.google.com/file/d/1HLvp0qrtrXyjBicq_A4pZABefpnFXiFZ/view?usp=sharing

Working with Linear Equations

x	-3	2	3
y	-3	7	9

A

x	0	2	4
y	5	7	9

B

x	-1	0	2
y	5	1	7

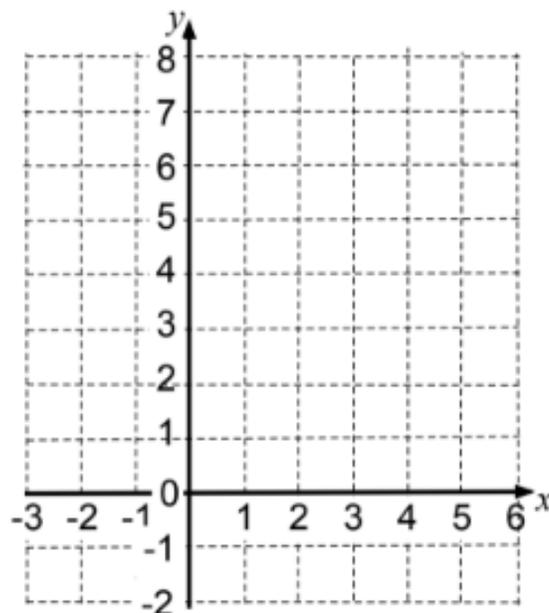
C

x	-1	0	2
y	1	3	7

D

- 1a. Which of these tables of values satisfy the equation $y = 2x + 3$? Explain how you checked.

- b. By completing the table of values, draw the lines $y = 2x + 3$ and $x = 1 - 2y$ on the grid.



$$y = 2x + 3$$

x	-2	0	
y			5

$$x = 1 - 2y$$

x	0		5
y		0	

- c. Do the equations $y = 2x + 3$ and $x = 1 - 2y$ have one common solution, no common solutions, or infinitely many common solutions? Explain how you know.

2. Draw a straight line on the grid that has no common solutions with the line $y = 2x + 3$. What is the equation of your new line? Explain your answer.

Systems of Equations Formative Assessment 2 - Jackson's Furnace	
<p>Cluster & Content Standards <i>What content standards can be addressed by this formative assessment?</i> Functional Reasoning/Systems Cluster NC.8.EE.8</p> <p><i>Analyze and solve a system of two linear equations in two variables in slope-intercept form.</i></p> <ul style="list-style-type: none"> • <i>Understand that solutions to a system of two linear equations correspond to the points of intersection of their graphs because the point of intersection satisfies both equations simultaneously.</i> • <i>Solve real-world and mathematical problems leading to systems of linear equations by graphing the equations. Solve simple cases by inspection.</i> 	<p>Mathematical Practice Standards <i>What practice standards can be addressed by this formative assessment?</i></p> <p>MP 1 Make sense of problems and persevere in solving them.</p> <p>MP 2 Reason abstractly and quantitatively</p> <p>MP 3 Construct viable arguments and critique the reasoning of others</p>
<p>Learning Targets <i>What learning targets will be assessed?</i></p> <p>Students will be able to use graphing to solve a real world problem.</p>	
<p>Timing: Teachers should use this formative assessment after the Swimming Pool problem or other tasks which have students solve problems in context.</p>	
<p>Anticipated Solutions and Possible Conceptions (Progression)</p> <ol style="list-style-type: none"> 1. Students may confuse rate of change and initial cost. Be sure and ask them what would make the cost change if the furnace company stayed longer. 2. Students may have difficulty graphing the equations. Consider using technology such as Desmos.com to have them graph. 3. Students may be unsure how to support their decision. Ask them how they could display the data other than as a graph. 4. Students may have difficulty determining what the intersections mean. Ask them to find points on each line and interpret these points. Ask them what the axes mean and how they relate to the points. <p>Solutions and further explanation available at: https://www.illustrativemathematics.org/content-standards/tasks/472</p>	

Jackson's Furnace

Jackson's furnace has quit working during the coldest part of the year, and must get fixed quickly. He decides to call several furnace specialists to see what it might cost him to have the furnace fixed. Jackson is unsure of the parts he needs so he compares the costs based only on service fees and labor costs. The price estimates for labor were given to him by three different companies. Each company has given the same time estimate for fixing the furnace.

- Anna's Furnace Company charges \$35 per hour to its customers.
- Bill's Furnace Company charges a \$20 service fee for coming out to the house and then \$25 per hour for each additional hour.
- Charlie's Furnace Company charges a \$45 service fee for coming out to the house and then \$20 per hour for each additional hour.

Determine which company Jackson should use based on different time estimates for fixing his furnace. Support your decision with sound reasoning and representations.