ACTIVITY: Selecting Systems of Linear Equations

Below is a set of eight equations. Take a moment to verify that they are linear (How do you know?) and to notice the different forms of the equations (e.g., slope-intercept form, general form, simplified, not simplified).

A)	$5x - 2y = 8$	E)	$4y = 2x$
B)	$2x = 12$	F)	$y = -\frac{x}{2} + 2$
C)	$-2x + 4y = 12$	G)	$3x + 2y = 0$
D)	$y = -3$	H)	$9x + 6y = 0$

Part 1

For problems 1–3, be prepared to discuss **why** you chose the equations you did and **whether you would make different choices** if you had a second chance.

1. Substitution. Choose two equations from the set to form a system of equations. Solve this system of equations using *substitution*.

2. Combination. Choose two of the remaining equations to form a new system of equations. Solve this system of equations using *combinations*.

3. Graphing. Choose two of the remaining equations to form a new system of equations. Solve this system of equations using *graphing*.

Part 2

4. You have now selected six of the eight equations in the set. What is it about the two leftover equations that led to you not picking them in Part 1?

5. Imagine that someone selected the equations C and E and was trying to decide on a solution method to use. What would you say to this person? What answer would you expect them to reach if they used that method?

6. Are there any pairs of equations that you could solve in your head (without having to use any of the methods above)? If so, explain how you thought through the solution.

Extensions

7. What would it mean for an ordered pair (a, b) to be a solution to a system of *three equations*? Is it possible to have a solution to a system of three equations? Support your answer.

8. A set of distinct lines—L, M, and N—can intersect in at most 3 different points (L & M, M & N, and N & L). What is the maximum number of intersection points there can be among 8 distinct lines? What about among n distinct lines? Are there any relationships between lines that could reduce the number of intersection points?

Teacher's Monitoring Sheet: Selecting Systems of Linear Equations

	Strategic Choices	Different Choices
1. Substitution	• D and F are solved for y; • E is nearly solved for y; • B is nearly solved for x.	• A, C, G and H require several steps to solve for a single variable.
2. Combination	• H is 3 times G; • B and C contain $2x$ and $-2x$; • A and G contain $-2y$ and $2y$.	• B and D contain different variables; • E and H do not combine easily.
3. Graphing	• B is vertical; • D is horizontal; • F is in slope-intercept form.	• A, C, G, and H are difficult to graph without first putting into slope-intercept form.
Other Notes