- For **problems 1 and 2,**

Use substitution or elimination to solve.

\*Remember, if you end up with both variables canceling out and a true statement, there are infinitely many solutions; if both variables cancel and you have a false statement, there are no solutions.

Substitution: <https://www.khanacademy.org/math/algebra/systems-of-linear-equations/solving-systems-of-equations-with-substitution/v/practice-using-substitution-for-systems>

Elimination: <https://www.khanacademy.org/math/algebra/systems-of-linear-equations/solving-systems-of-equations-with-substitution/v/practice-using-substitution-for-systems>

- For **problem 3**, use elimination with three variables to solve. Set up two different systems (1st and 2nd equation and 2nd and 3rd equation). Remember to eliminate the same variable first. Then you should have two new equations which form a system that you can solve for one variable. Use substitution again to solve for the other two variables, one at a time.

<https://www.khanacademy.org/math/algebra-home/alg-system-of-equations/alg-systems-with-three-variables/v/systems-of-three-variables-2>

<http://mhhe.com/math/devmath/streeter/ia/graphics/streeter5ia/ch05/others/strI_5.3.pdf>

- For **problem 4**, define your variables. Use the relationships to write two equations. Then solve the system.

<https://www.youtube.com/watch?v=gRntusF_tVI>

<http://boruchmath.weebly.com/unit-4-algebraic-systems1.html> “Applications, Problem 1 and Problem 2 Examples”

For **problems 5-8**,

Use slope intercept form y = mx + b where m is the slope (rise over run), and (0,b) is the y-intercept (starting point) or use the intercepts in the form (x, 0) and (0, y) and then connect them to create the line. Also remember that equations in the form x = a number are vertical, since the x-value is always the same, the y-value can be any number, and the slope is undefined, while equations in the form y = a number have 0 slope, and are thus horizontal, always having the same y-value no matter what the x-value is.

<https://www.youtube.com/watch?v=uk7gS3cZVp4>

For **problems 9 and 10**, use the same ideas as graphing the lines as #5-8, and then shade appropriately. For less/greater than or equal to, use a solid line; for < or > use a dashed line. Test a point, like (0,0), to see if it should be included in your shading or not.

<https://www.youtube.com/watch?v=lxTQrsUip9g>

For **problem 11**, find the axis of symmetry using x = -b/21, and then find the y-value of the vertex by using this as your x-value. Find another point, and reflect it over the axis of symmetry. You may use the y-intercept (when x is 0), or if possible, factor to find the two x-intercepts.

<https://www.youtube.com/watch?v=Z8mfBLp0JAs>

<http://boruchmath.weebly.com/uploads/5/7/4/0/57403331/graphex.pdf>

For **problem 12**, use the transformation rules based on the vertex form of the equation.

Remember if A is negative, the graph reflects over the x-axis, if B is negative it reflects over the y-axis. If any number is added inside the grouping, move left that amount of spaces, and if subtracted, move right. If any number is added outside of the grouping, move up that amount of spaces, and if it is subtracted, move down.

<https://www.khanacademy.org/math/algebra/quadratics/graphing-quadratic-functions/v/graphing-a-parabola-in-vertex-form>

Graphing Parabolas (multiple ways): <https://www.youtube.com/watch?v=eFZOnAcuVLM>