Sections 9.1 & 9.3 Lecture Notes

Section 9.1: Solving Systems of Equations in Two Variables

Recall: Any system of linear equations in two variables can be written in the following form:

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

where the a's, b's, and c's are constants.

Brainstorm: You should have learned how to solve a system like the one above in a previous class. What methods of solving did you learn?

Recall: There are three possible situations when it comes to solving a system of linear equations in two variables:

- There is one solution that can be written as an ordered pair (x, y)
- There are no possible solutions
- There are an infinite number of solutions

Exercises Solve the following systems of equations:

(1) $x - y = -4$
$3x - 6y = -12$

(2) $x - y = 3$
$2x + 3y = 6$

(3) $y = 2x - 3$
$3y = 6x - 9$

(4) $y = x - 1$
$x + 4y = 6$

Section 9.3: Systems of Linear Equations in Three Variables

Note: When solving a system of linear equations in three variables, it is common to use the variables x, y, and z. We can extend what we know about solving systems in two variables to help us solve systems in three variables. Similar to the previous section, there may be one solution, no solution, or an infinite number of solutions.

Standard method for solving:

(1) Eliminate one variable from two of the equations.

(2) Solve the resulting two equations using substitution or elimination.

(3) Substitute your values into one of the equations to find the remaining variable.

Exercises Solve the following systems of equations:

(1) $x - y + 2z = 6$
$2x + y - 2z = -3$
$-x - 2y + 3z = 7$

(2) $2x + y + z = 9$
$x + 2y + z = 8$
$3x + 3y + 2z = 18$

(3) $x + y - z = -2$
$x + 2y - 2z = -3$
$y - z = -1$