Chapter 7: Systems of Equations

7.1 Linear and nonlinear systems of equations

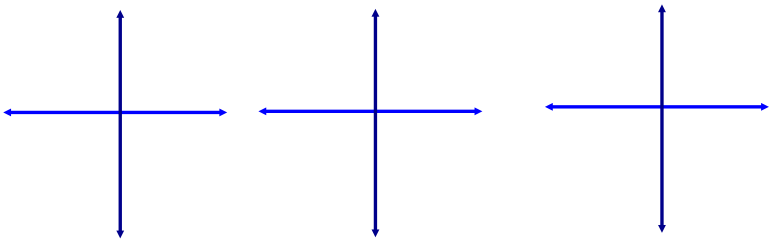
In section 7.1 you will learn to

- Use the method of substitution to solve systems of linear and non linear equations in two variables.
- Use a graphical approach to solve a system of equations in two variables and understand the limitations of such an approach.
- Model and solve real-life problems by setting up a system of equations in two variables.

Linear and non-linear systems of equations

A system of equations is simply a set of two or more equations in two or more variables that we solve simultaneously.

A system of linear equations in two variables has three possible outcomes:

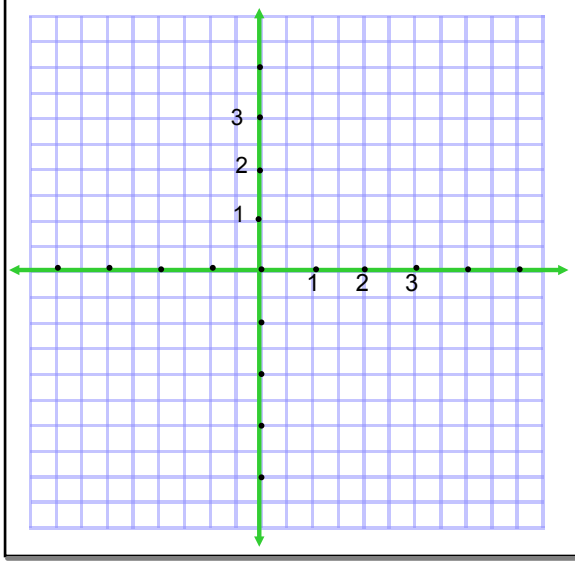


You already know two strategies to solve two equations in two unknowns.

1. Graphically - Not reliable, but useful.
2. Substitution - A method that will always work.

1) Solve this set of linear equations using both of the methods.

$x - y = -4$
$x + 2y = 5$

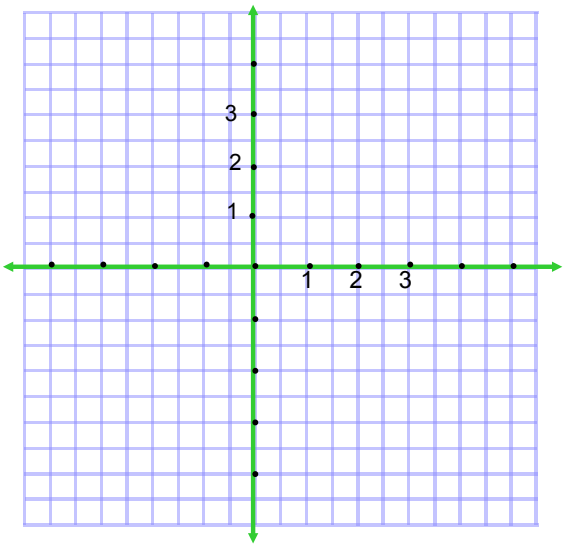


2) Solve using substitution.

$$3x + y = 2$$
$$x^3 - 2 + y = 0$$

3) Solve by graphing.

$$2x-y+3 = 0$$
$$x^2+y^2-4x=0$$



4) Solve

$$y =(x+1)^3$$
$$y = \sqrt{x-1}$$

5) Solve

$y = x^3 - 2x^2 + x - 1$

$y = -x^2 + 3x - 1$