

Hello, welcome to Algebra 1 standard US curriculum. 

This PDF is part 1 of a bird eye view of the course material.

We'll focus on variables and some of the rules of algebra. Think of algebra as the grammar of math. It's mostly rules on how to string together formulas and ideas.

Geometry, the next course, is more like actually math, where you connect formulas and ideas together so to build a bigger idea.

Writing math “proofs” is the construction of a formal language in a *dry* setting. What's the logic of the argument you would like to make?

How can you connect the dots in front of you and apply your head knowledge in an operating room?

Variables



Can we compare apples to oranges?

So we have seen numbers before, of course.

Natural numbers:

1, 2, 3,

Integers:

..., - 3 , -2 , -1 , 0 , 1 , 2 , 3 ,

Rational Numbers:

... , - 2 , ... -1 , ... $-(\frac{1}{2})$, ... $-(\frac{1}{3})$, ... $-(\frac{1}{4})$, 0 , ... 1 , ... 1.5 ,

(Worry about a formal definition for the Rational numbers later in life.)

We also have Real numbers, all the numbers that you know and love, including π and e .

Worry about the Complex number system later in life.

$$i = \sqrt{(-1)}$$

However, a *variable*, varies. What do I mean?

Consider: **$y = 2 * x$** .

This is a *function*, we will define a function more formulally later.

This of a function as a “gum ball” machine. Coin comes in, but a certain gum ball comes out.

So a coin labeled \$1 goes in, a gum ball labeled 2 comes out.

A coin labeled \$2 goes in, a gum ball labeled 4 comes out.

A coin labeled \$3 goes in, a gum ball labeled 6 comes out.

A coin labeled - \$1 , that's *negative* one dollar, goes into this gum ball machine. A gum ball labeled -2 comes out.

The variable y varies, and is *dependent* on the coin inserted into the X .

X is technically *independent* of y or anyone else in this world.

X varies too, by the way, based on your decision making. You choose the X , and your choice affects the value of y .

This later segways into the practice of plotting test points on an XY graph. More on that later in life.

Also consider the following equation:

$$r^2 = x^2 + y^2 .$$

This is technically the *equation* of a *circle*. Just keep in mind that all these letters or *variables* are like separate slots, where you insert a value of your choosing, except for r . In this equation, r is like an exit for gum balls.

You can't combine like terms any further. The letters can't be combined any further. More on this later.