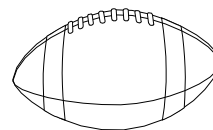


The Game of Algebra



Algebra is a game, playing with ideas.

Like football or chess or any other game, algebra can be fun, or it can be torture.

A game is fun if:

You are in shape.

You know the rules.

You have a well-matched opponent
who makes the game a challenge,
so that winning is sweet.

A game is torture if:

You are out of condition.

You don't know how to play.

Your opponent is much too weak,
so the game is tediously boring.

Your opponent is much too strong,
so the game is impossible.

For the rest of this semester, we are going to focus on learning some basic rules of the game of algebra.

Rule #1: Substitution

Plain English version:

This = that
means
this can be traded for *that*
or
that can be traded for *this*
whenever we want.

Algebra version:

If $a = b$, then
 a can be traded for b
and
 b can be traded for a
in any mathematical
expression or equation.

This may look too simple to even talk about. Most games have very simple rules. Think of football: "Get the ball. Take it down the field. Carry it across the goal line." Very simple in theory, infinite variation in practice—and hard enough to do it well that people who are good at it get paid mega-money. I don't know if anyone will pay you mega-money for algebra, but I do know that you will still be learning new ways to apply the rule of substitution when you study calculus.

Vital Vocabulary

Knowing the correct words will help you think clearly!

Expression = some algebra thingies added/subtracted/multiplied/divided without an equal sign.

Evaluate an expression = find out how much the expression is worth if the variables have certain number values. Substitute the number given for each variable, and then simplify.

Equation = two expressions with an equal sign between them.

Verify an equation = show that the equation is true, that the two expressions really are equal to each other. Do this by evaluating the two expressions. If they both come out equal to the same number, then the equation has been verified.

LHS and RHS = left-hand side and right-hand side of the equal sign. This is used to keep track of the two expressions when you are verifying an equation.

○ ○ **Three dots or circles in a triangle shape** = "Therefore," used to mark the conclusion of a mathematical proof. When you verify an equation, you are performing a proof of equality.