# Linear Equations

A linear equation is an equation of a straight line, written in one variable. The only power of the variable is 1. A linear equation in one variable can be written in the form

where and are real numbers, .

The goal of solving a linear equation is to find the value of the variable that will make the statement (equation) true.

## Steps to Solving Linear Equations

The following steps are used to manipulate an equation and isolate the unknown variable. These are the steps we generally follow (but it will depend on what you are given):

1)

2)

3)

4)

Examples: For each problem below, solve for . Remember, you can **CHECK** your answer by simply plugging the value you got back in!

1)

2)

3)

4)

## Solving Linear Equations with Fractions

If the equation contains fractions, use a common denominator to eliminate all the fractions! The result will be a linear equation!

Examples: For each problem below, solve for . Remember, you can **CHECK** your answer by simply plugging it back in!

1)

2)

3)

## Classifying Linear Equations

Different types of linear equations may yield different solutions. We can classify linear equations in one variable as one of three types:

| Type of Linear Equation | Solution Set |
| --- | --- |
| Identity Equation: |  |
| Conditional Equation: |  |
| Inconsistent Equation: |  |

Examples: Identify the following equations as having no solution, one solution, or infinitely many solutions. If it has one solution, give the value of the variable.



# Rational Equations

A rational equation contains a fraction where the variable appears in at least one of the denominators.

## Solving a Rational Equation

Our goal is to perform algebraic operations so that the variables appear in the numerator (i.e. eliminate the denominators). We can do this by following these steps:

1)

2)

3)

4)

5)

6)

Examples: First, identify the restrictions. Then, solve the equation. Remember, you can **CHECK** your answer by simply plugging the value you got back in!