

# 1 Introduction

Inequality problems take the form

$$4x - 3y > 2 \quad (1-1)$$

The idea is to find the region of the  $xy$ -plane that contains the solution. An easy way to do this is to solve two problems

$$4x - 3y = 2 \quad (1-2)$$

$$4x - 3y = a \quad (1-3)$$

where  $a > 2$ . This second equation will produce a line parallel to the first line in the correct region for the solution.

A trick for working with inequalities. With equalities you can always multiply both sides by  $-1$ .

$$a = b \quad (1-4)$$

$$-a = -b \quad (1-5)$$

When you do this with inequalities you must flip the direction of the inequality. This is easy to understand if we look at

$$5 > 3 \quad (1-6)$$

If we multiply both sides by  $-1$

$$-5 > -3 \quad (1-7)$$

we get a wrong equation! If we flip the inequality from greater than to less than

$$-5 < -3 \quad (1-8)$$

the equation is correct.

## 2 Problems

### 2.1 Problem 1

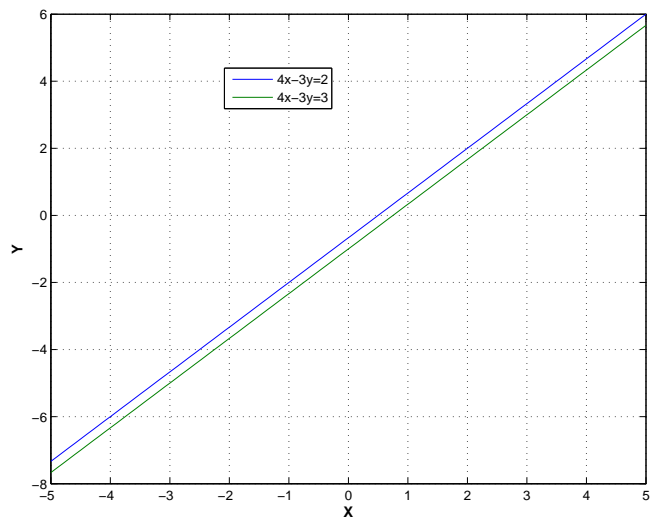
Find the region for

$$4x - 3y > 2 \quad (2-9)$$

Plot the two linear equations

$$4x - 3y = 2 \quad (2-10)$$

$$4x - 3y = 3 \quad (2-11)$$



The region where  $4x - 3y = 3$  (the green line) is the solution. This is the lower section below and to the right of the blue line.