Graphical Inequalities
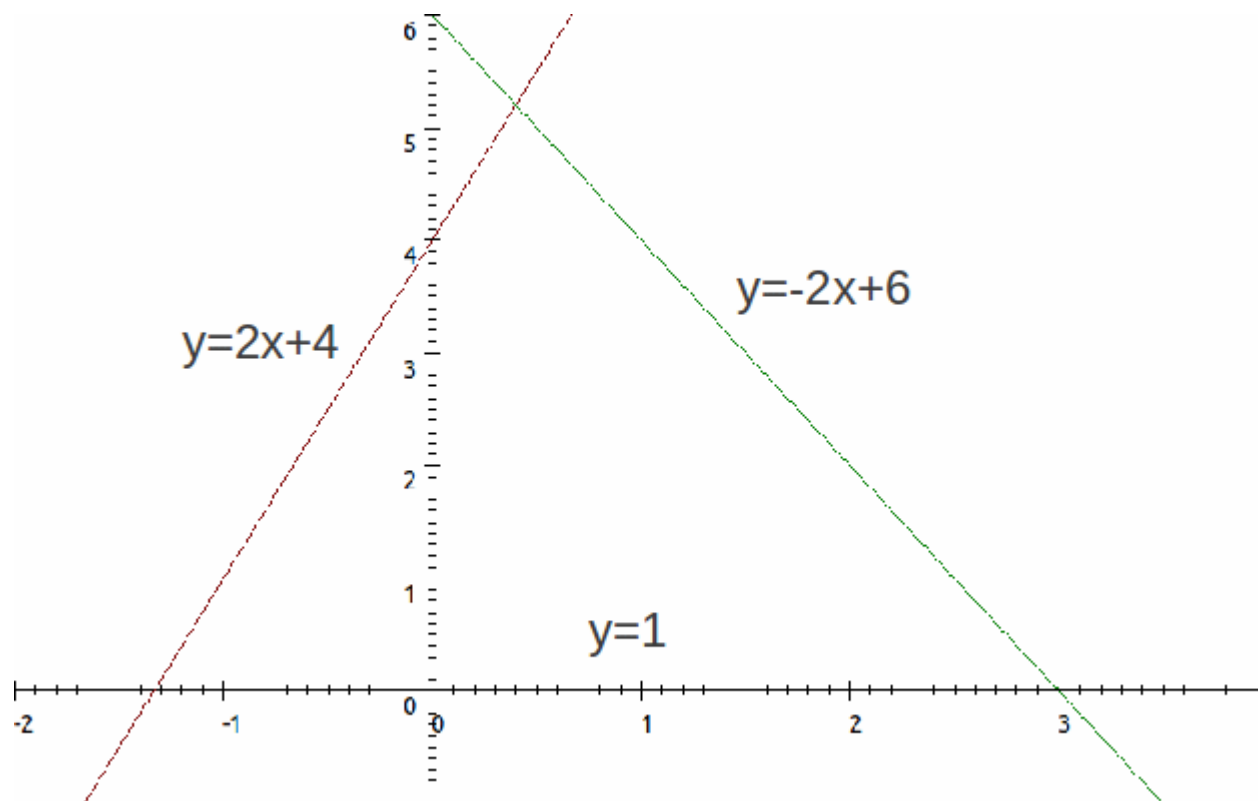
Often we have to solve simultaneously equations of the form $y \geq 1, y \leq 3x+4 \ y \leq -2x+6.$

We start be sketching the lines $y=1, y=3x+4, y=-2x+6.$ The result is shown below.

We want the region

where $y \geq 1.$ This is above the line $y=1.$

Where $y \leq -2x+6.$ This is below the line $y=-2x+6.$

Where $y \leq 3x+4.$ This is below the line $y=3x+4.$

The result is the two regions labelled R in the diagram below, which satisfies all three inequalities.

$y=2x+4$

$y=-2x+6$

R

R

$y=1$