# 5.2. Systems of linear Inequalities in 2 variables

Goals: (1) Solve system of linear inequalities by graphing

(2) Solve application problems

E.g. $x + y > 6$

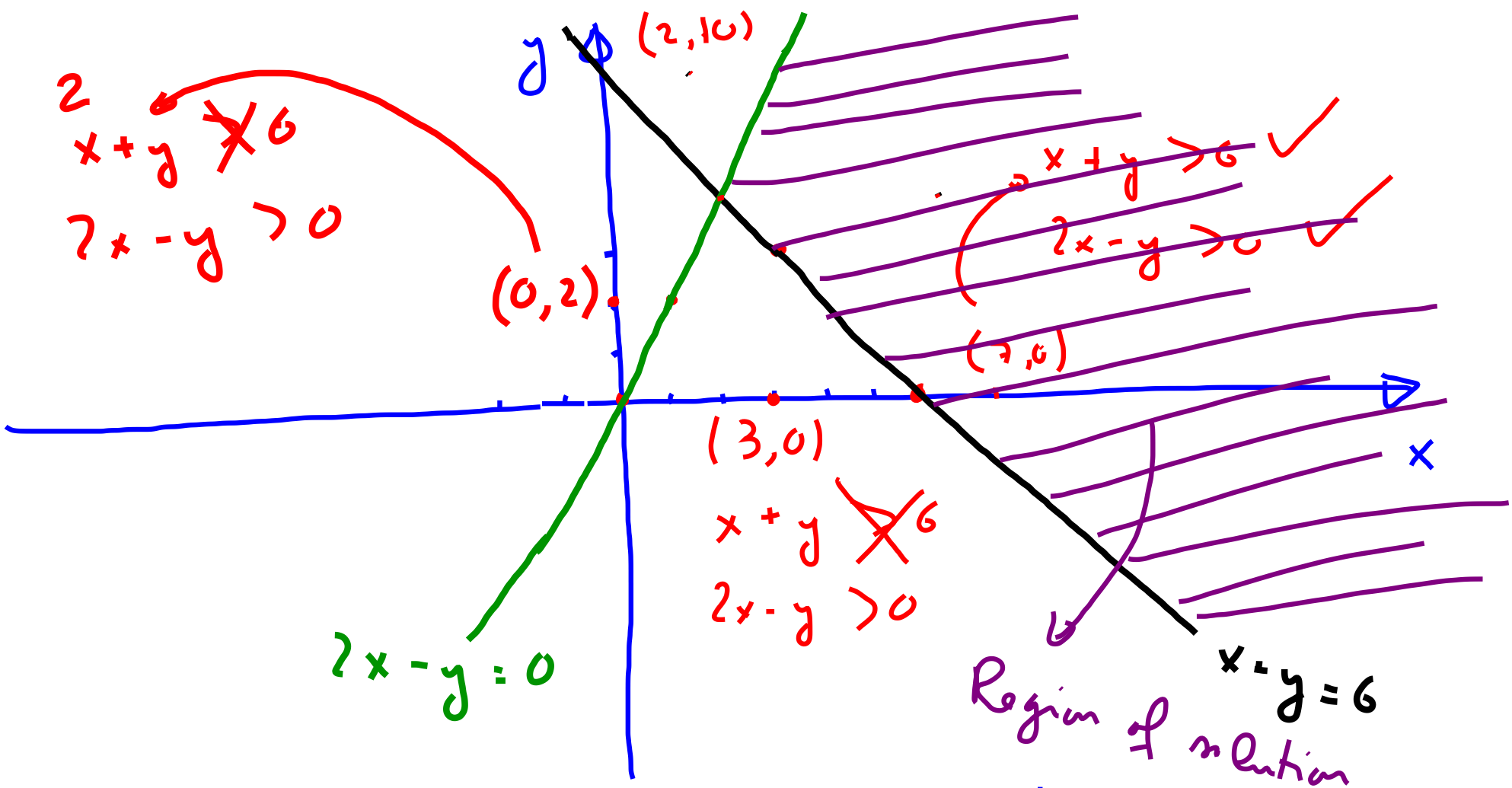
$2x - y > 0$

(1) Graph the equalities: $x + y = 6$

$2x - y = 0$

| x | y | |
|---|---|---|
| 0 | 6 | → (0, 6) |
| 3 | 3 | → (3, 3) |

| x | y | |
|---|---|---|
| 0 | 0 | → (0, 0) |
| 1 | 2 | → (1, 2) |




② 2 lines divide the plane into 4 regions.

Choose test points in each region to see which one satisfies the 2 inequalities

# Using calculator:

(1) Get $y$ by itself

$x + y > 6 \longrightarrow \boxed{y > 6 - x}$

$2x - y > 0 \longrightarrow -y > -2x \longrightarrow \boxed{y < 2x}$

(2) Input into calculators. Using above / below function

Note: The feasible region in this example is unbounded.
(region of solutions)

E.g. Ski manufacturer

2 types of ski: trick ski, slalom ski

Each trick ski: 8 hours of design work, 4 hours of finishing

Each slalom ski: 8 hours of design work, 12 hours of finishing

Total # of hours allocated for design work is at most 160

Total # of hours for finishing at most 180.

# trick skis produced is at most 15

x : # of trick skis produced

y : # of slalom skis produced.

Construct a system of inequalities for this problem and graph the feasible region.

$x \geq 0$

$y \geq 0$

$x \leq 15$

$8x + 8y \leq 160$

$4x + 12y \leq 180$

(1) $8x + 8y = 160$

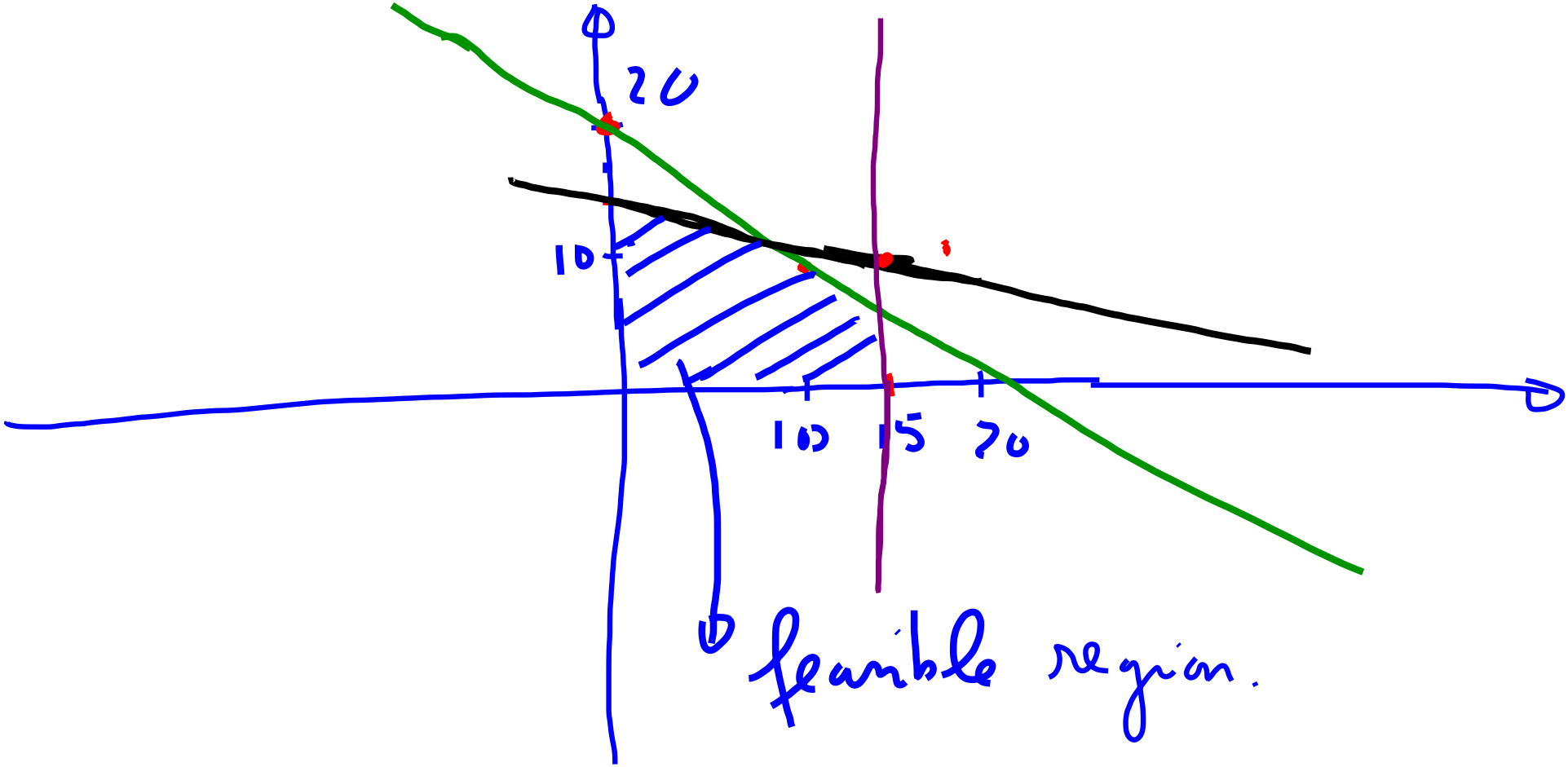
$x + y = 20$

| | x | y |
|---|---|---|
| (0,20) | 0 | 20 |
| (10,0) | 10 | 0 |

$4x + 12y = 180$

$x + 3y = 45$

| x | y | |
|---|---|---|
| 0 | 15 | (0,15) |
| 15 | 10 | (15,10) |


20
10
10
15
20
feasible region.