

4.1: Linear Inequalities in two variables.

ex1: Graph  $y \geq 4x - 5$

1st: Graph  $y = 4x - 5$

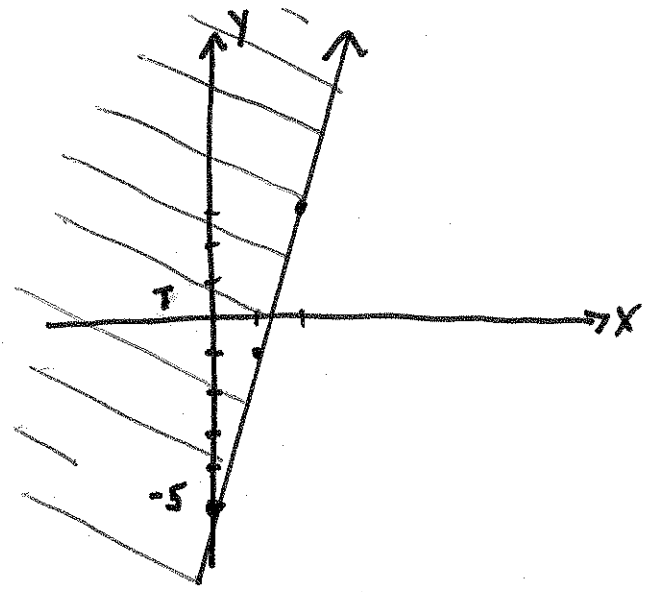
2nd: line ———

3rd: Test points.

Test  $(0, 0)$

$$0 \geq 4(0) - 5 \text{ True}$$

4th: shade truth



ex 2: Graph  $5 > 4x - y$

1st: Graph  $5 = 4x - y$

$\Rightarrow y = 4x - 5$

2nd: line style

case 1:  $\geq$  or  $\leq$

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case 2:  $>$  or  $<$

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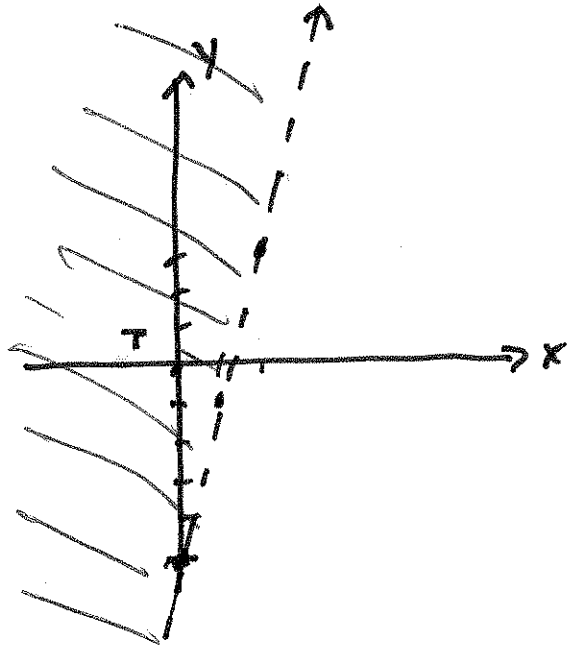
line - - - -

3rd: Test

$(0,0)$

$5 > 4(0) - 0 \quad T$

4th: shade truth



ex 3: Graph  $2(x-y) > y+3$ .

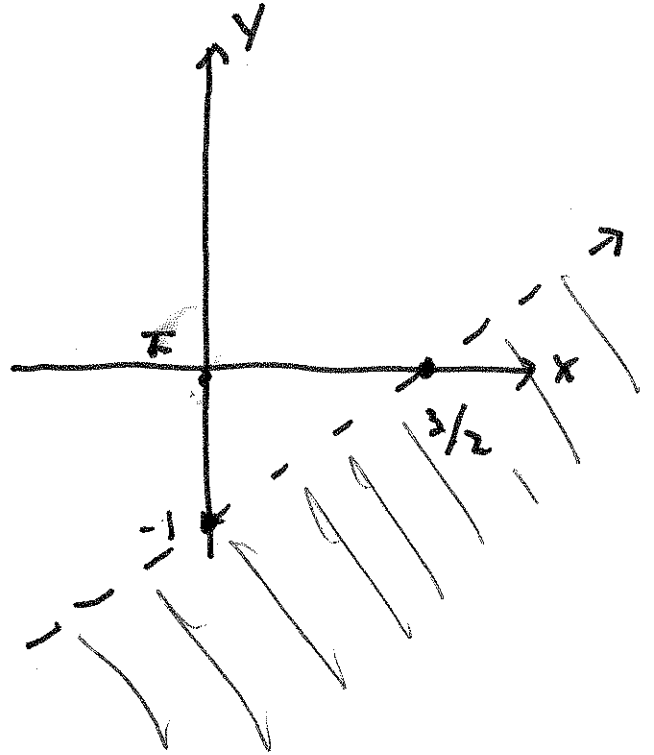
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1st: Graph  $2(x-y) = y+3$

$$\Rightarrow 2x - 2y = y + 3$$

$$\Rightarrow 2x - 3y = 3$$

x	y
0	-1
$\frac{3}{2}$	0



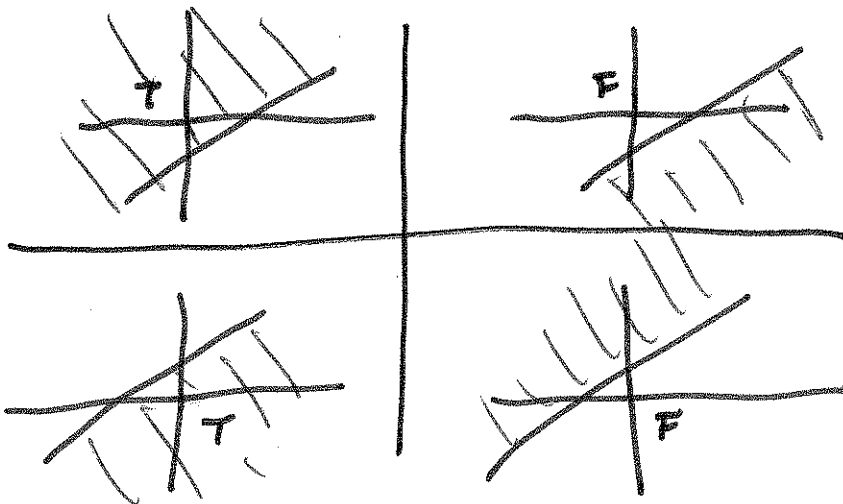
2nd: line -----

3rd: Test  $(0,0)$ .

$$2(0-0) > 0+3$$

4th: shade truth.

4 shading cases



ex 4: Graph

$$\begin{cases} 4x - y < 4 & \textcircled{1} \\ 3x - y \geq -3 & \textcircled{2} \end{cases}$$

①  $4x - y = 4$

x	y
0	-4
1	0

Test (0,0)  
T

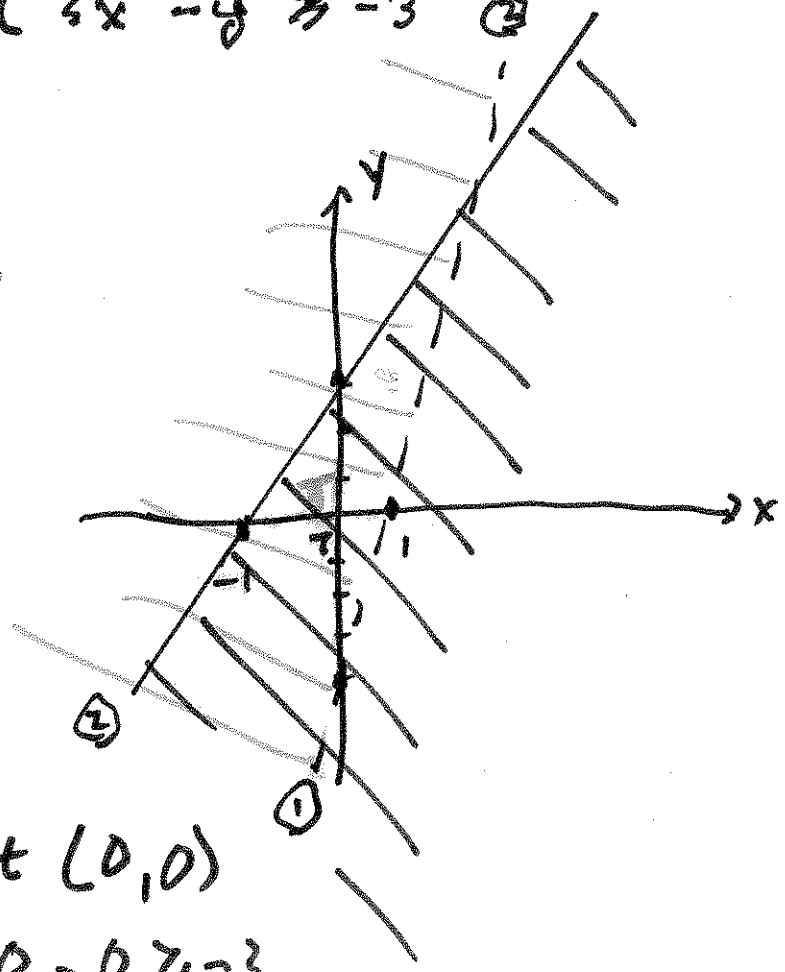
line: -----

②  $3x - y = -3$

x	y
0	3
-1	0

Test (0,0)

line: \_\_\_\_\_ 0 - 0 > -3  
T



ex 5: Graph

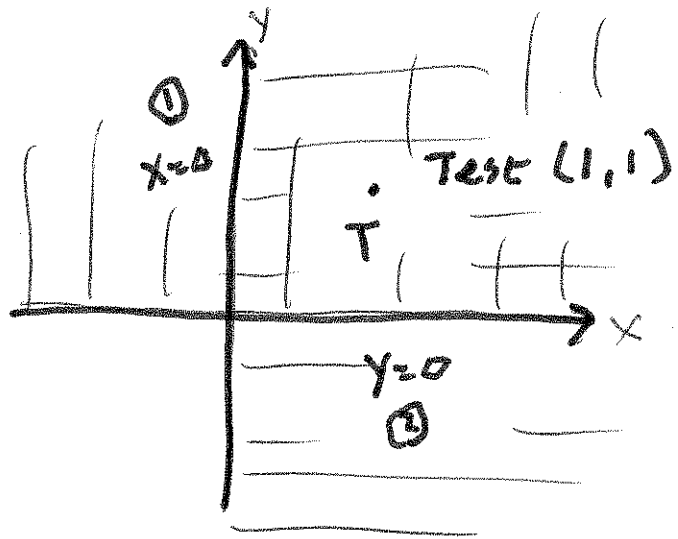
$$\left. \begin{array}{l} x > 0 \quad \textcircled{1} \\ y > 0 \quad \textcircled{2} \end{array} \right\} \begin{array}{l} \text{1st} \\ \text{quadrant.} \end{array}$$

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Graph

①  $x = 0$

②  $y = 0$



ex: 
$$\begin{cases} 4x + 3y \leq 240 & \textcircled{1} \\ 5x - y \leq 110 & \textcircled{2} \\ x \geq 0; y \geq 0 \end{cases}$$

①  $4x + 3y = 240$

x	y
0	80
60	0

Line: \_\_\_\_\_

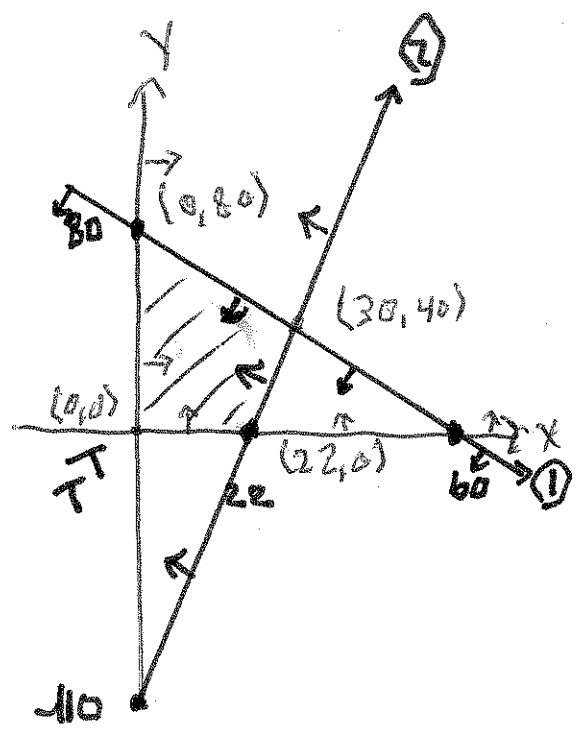
Test  
(0,0)  
T

②  $5x - y = 110$

x	y
0	-110
22	0

Line: \_\_\_\_\_

Test  
(0,0)  
T



solve 
$$\begin{cases} 4x + 3y = 240 \\ 5x - y = 110 \end{cases} \Rightarrow \begin{bmatrix} 4 & 3 & | & 240 \\ 5 & -1 & | & 110 \end{bmatrix} \Rightarrow \begin{matrix} x = 20 \\ y = 40 \end{matrix}$$

ex7: Graph the solution

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$$\begin{cases} x + 3y \geq 6 & \textcircled{1} \\ 2x + 4y \geq 10 & \textcircled{2} \\ 3x + y \leq 5 & \textcircled{3} \\ x \geq 0; y \geq 0 \end{cases}$$

①  $x + 3y = 6$

x	y
0	2
6	0

Line: \_\_\_\_\_

②  $2x + 4y = 10$

x	y
0	2.5
5	0

Line: .....

③  $3x + y = 5$

x	y
0	5
5/3	0

Line: \_\_\_\_\_

