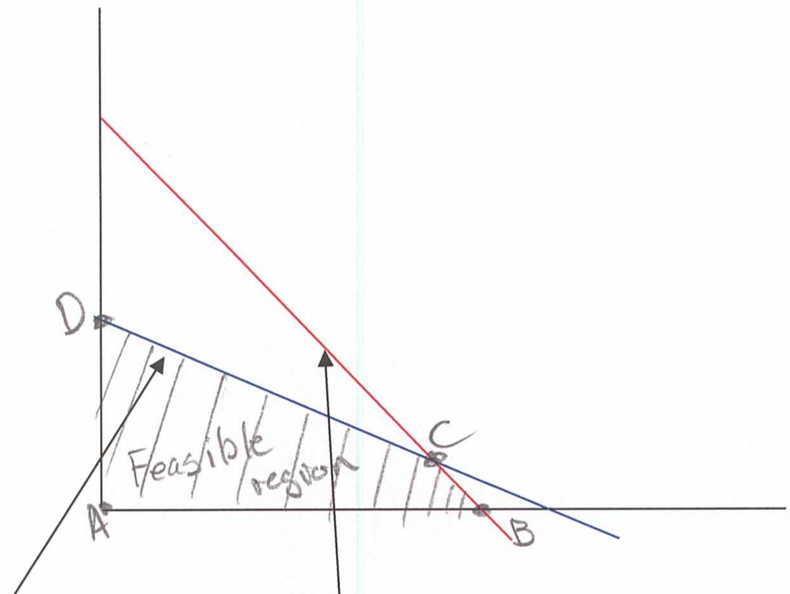
HW: Graph the following feasible region, find the coordinated of the corner points.

x1+2x2 <= 40

4x1+3x2 <=120

All variables are non-negative



Blue line = x1+2x2=40

Red line = 4x1+3x2=120

Corner points	***X1***	***X2***
a	0	0
b	30	0
c	24	8
d	0	20

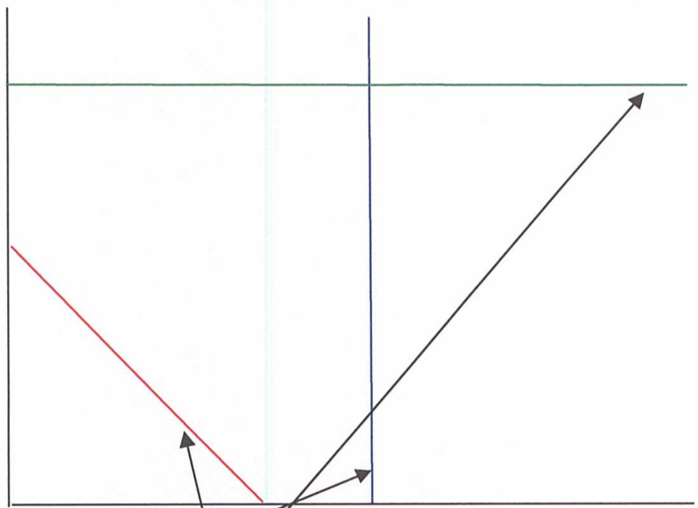
What about this problem?

$x1>=4$

$4x1+2x2<=8$

$x2>=6$

All variables are non-negative



Blue line = x1=4

Red line = 4x1+2x2=8

Green line = x2=6

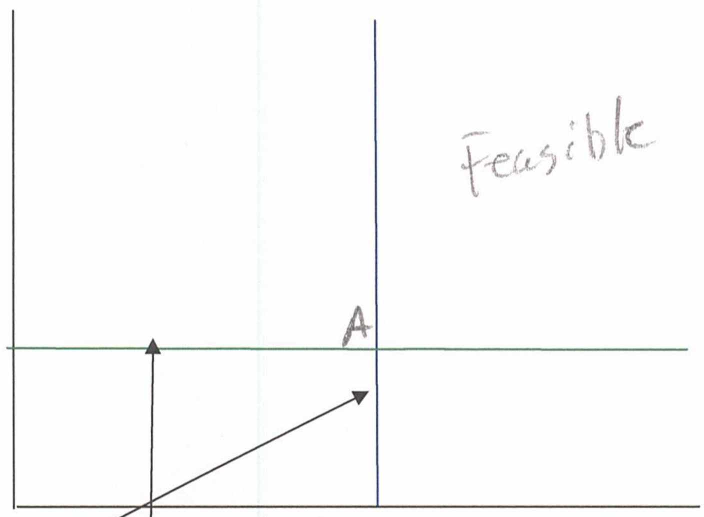
no feasible region

What about this problem?

$x1 >= 4$

$x2 >= 2$

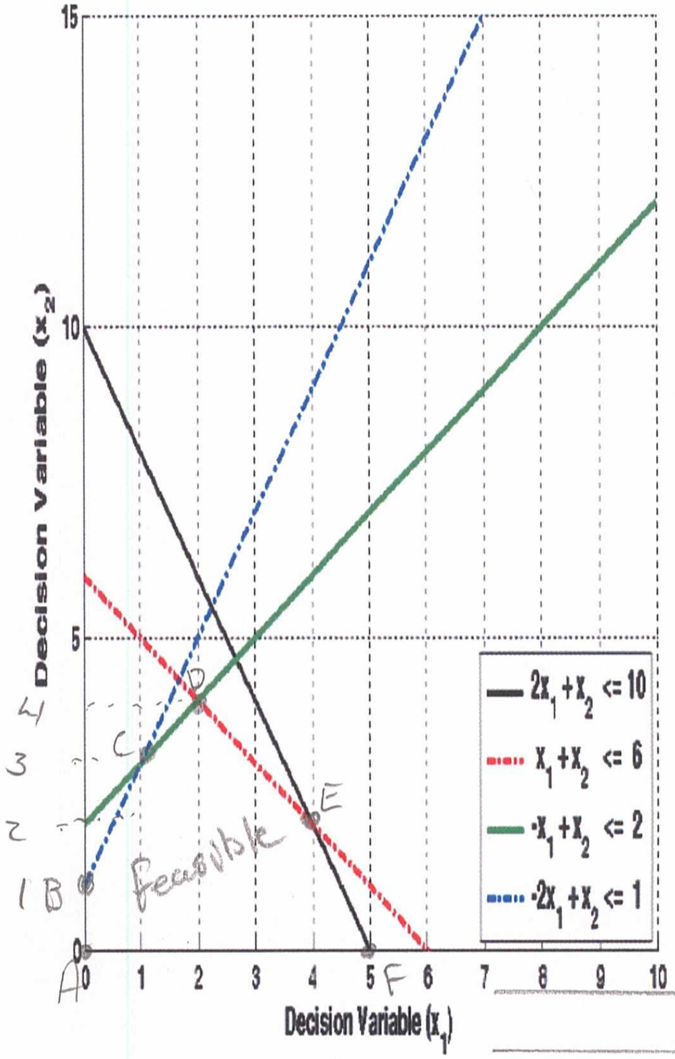
All variables are non-negative



Blue line = x1=4

Green line = x2=2

	x_1	x_2
A	4	2



	X_1	X_2
A	0	0
B	0	1
C	1	3
D	2	4
E	4	2
F	5	0

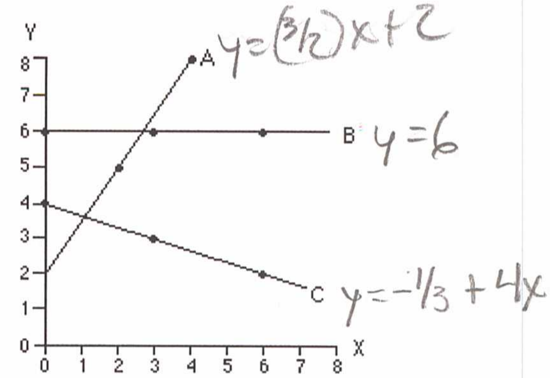
Max X1 + 2X2

Subject to: 2X1 + X2 ≤10
X1 + X ≤ 6
-X1 + X2 ≤ 2
-2X1 + X2 ≤ 1
X1 ≥ 0, X2 ≥ 0

By trying all feasible vertices we will find that, the optimal solution occurs at vertex X1 = 2, X2 = 4, with optima value of X1 + 2X2 = 10, y=mx+b

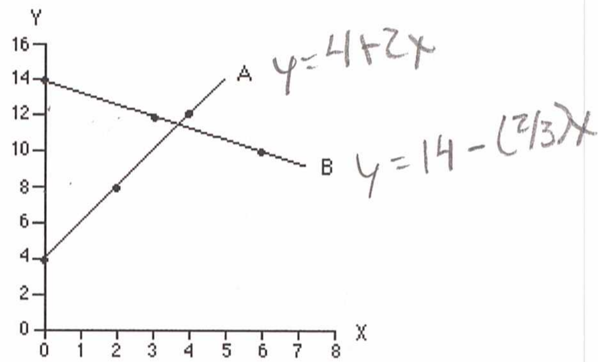
Homework I

1. $y = 4 + (1/3)\,x$
2. $y = 6$
3. $y = -1/3 + 4\,x$
4. $y = x + 6$
5. $y = 4 - (1/3)\,x$
6. $y = (3/2)x + 2$



Homework II: Consider the graph containing two lines, which of the following equations matches the lines A and B.

1. $y = 4 - 2\,x$
2. $y = (2/3)x + 14$
3. $y = 1/2\,x + 4$
4. $y = 4 + 2\,x$
5. $y = 14 - (3/2)\,x$
6. $y = 14 - (2/3)\,x$



Sketching the Solution Set of a Linear Inequality

To sketch the region represented by a linear inequality in two variables:

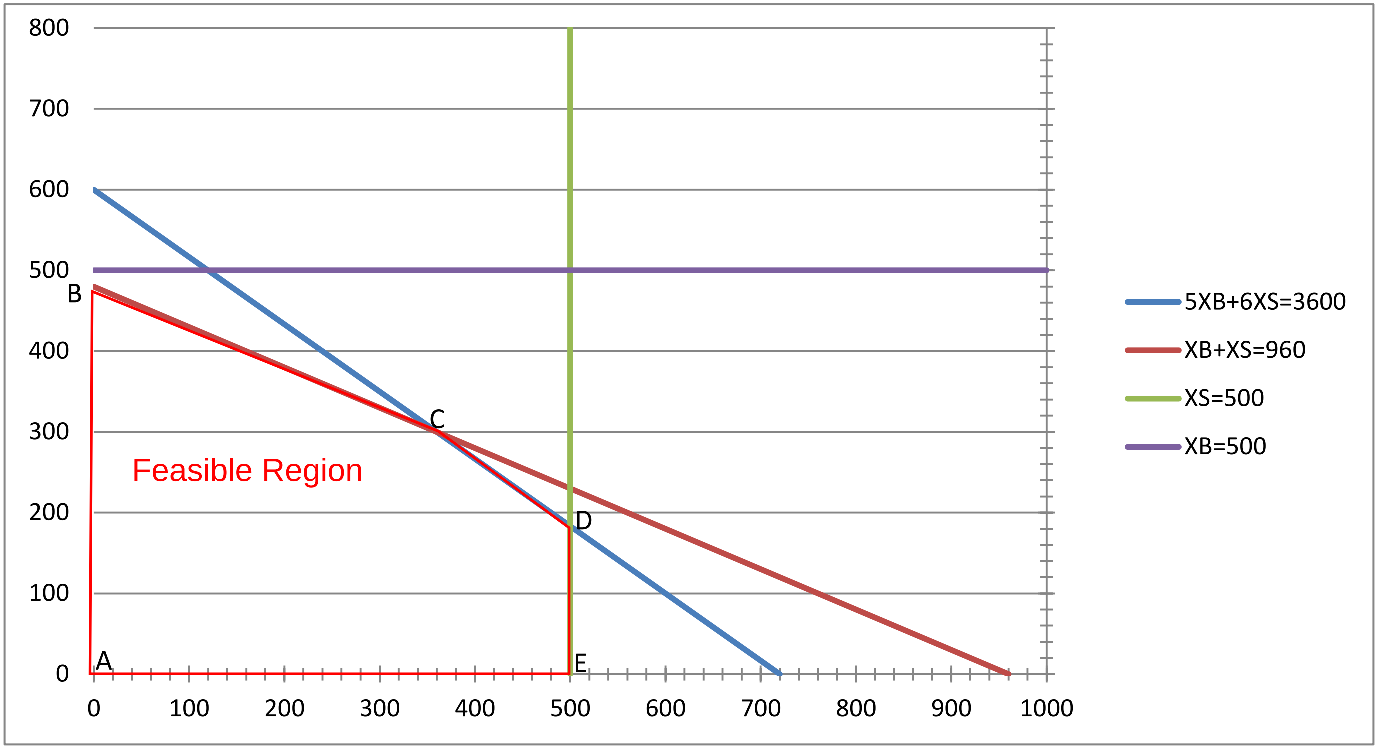
A. Sketch the straight line obtained by replacing the inequality with equality.

B. Choose a test point not on the line ((0,0) is a good choice if the line does not pass through the origin, and if the line does pass through the origin a point on one of the axes would be a good choice).

C. If the test point satisfies the inequality, then the set of solutions is the entire region on the same side of the line as the test point. Otherwise it is the region on the other side of the line. In either case, shade out the side that does not contain the solutions, leaving the solution region showing.

Example

To sketch the linear inequality



0
800
500
500

5XB+6XS=3600

XB	XS
0	600
720	0

XB+2XS=960

XB	XS
0	480
960	0

Corners	**X**	**Y**
A	0	0
B	0	480
C	360	300
D	500	183
E	500	0

$$-5\ \left\{\begin{array}{l} 5XB+6XS=3600 \\ XB+2XS=960 \end{array}\right.$$

$5XB+6XS=3600$
$\underline{-5XB-10XS=4800}$

$-4XS=-1200$
$XS=300$

$XB+2(300)=960$
$XB+600 = 960$
$XB=360$

The Mathematical Model

XB= number of dozen baseballs produced daily
XS= number of dozen softballs produced daily

Subject to:

	Max	$7XB+10XS$	(Objective Function)
	ST	$5XB + 6XS \leq 3600$	(Cowhide)
		$XB + XS \leq 960$	(Production time)
500		$XB \leq 500$	(Production limit of baseballs)
500		$XS \leq 500$	(Production limit of softballs)
1000		$XB, XS \geq 0$	(Non-negativity)
0			