1. (ex. 1.1. in Vanderbei)

x_1 = # of tons to produce of bands

x_2 = # ——— " ——— coils

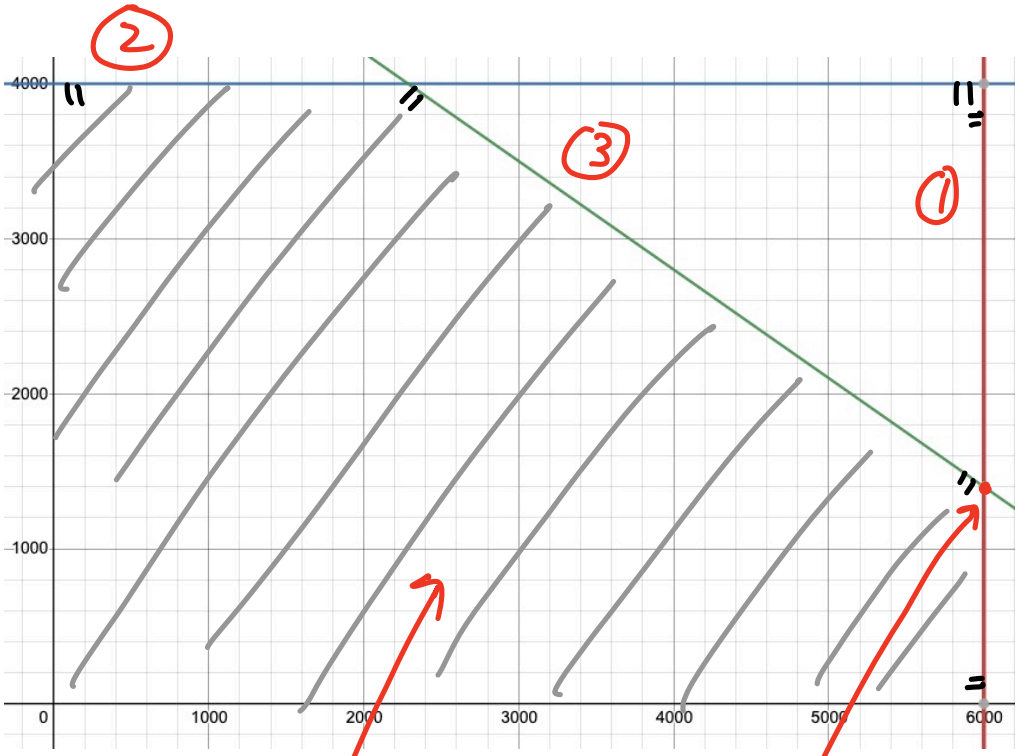
$$\max. \quad \varphi = 25x_1 + 30x_2$$

s.t.

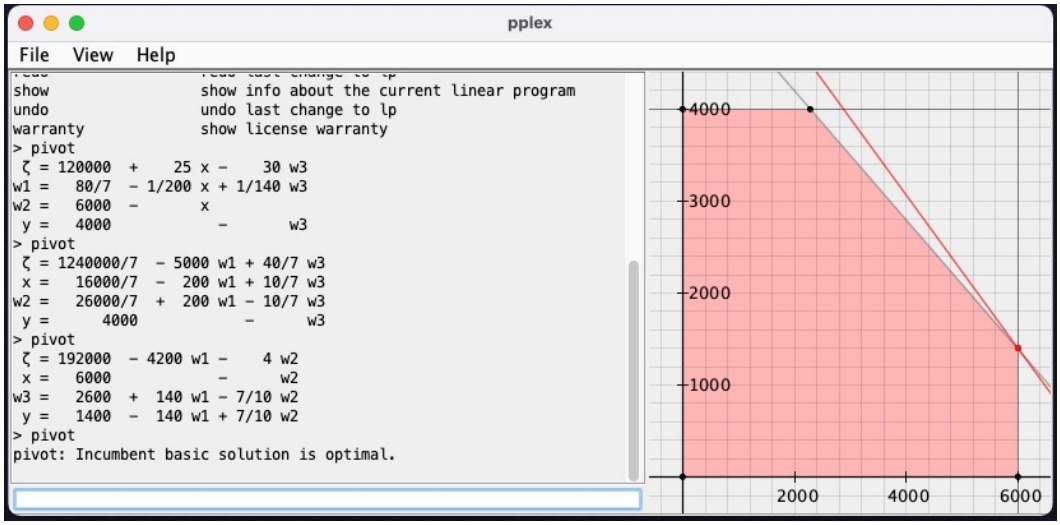
$$x_1 \overset{①}{\leq} 6000 \,, \quad x_2 \overset{②}{\leq} 4000 \quad \text{(demand)}$$

$$\frac{1}{200}x_1 + \frac{1}{140}x_2 \overset{③}{\leq} 40 \quad \text{(max. hours)}$$

$$x_1, x_2 \geq 0 \quad \text{(cannot produce neg. amount)}$$



2. pplex version:



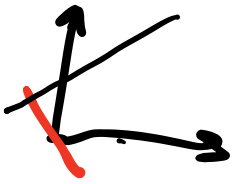
3.

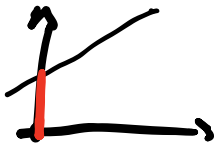
a) $c = (1,1)$: yes

$c = (1,0)$: yes

$c = (0,1)$: yes

$c = (-1,-1)$: no

b) $c = (1,1)$: yes 

$c = (1,0)$: no 

$c = (0,1)$: no 

(infinitely many optimal solutions)

c)

$c = (1, 0)$ Bounded set of optimal solutions.

$c = (0, 1)$ Unbounded set of optimal solutions.

4. Basis $A = (a_1 \dots a_n)$

$$= \begin{bmatrix} a_1^1 \\ \vdots \\ a_n^1 \end{bmatrix} \begin{bmatrix} a_1^2 \\ \vdots \\ a_n^2 \end{bmatrix} \begin{bmatrix} a_1^n \\ \vdots \\ a_n^n \end{bmatrix}$$

$$y = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = x_1 a^1 + \dots + x_n a_n$$

$Ax = b$

as many constraints as there are dimensions.