Example

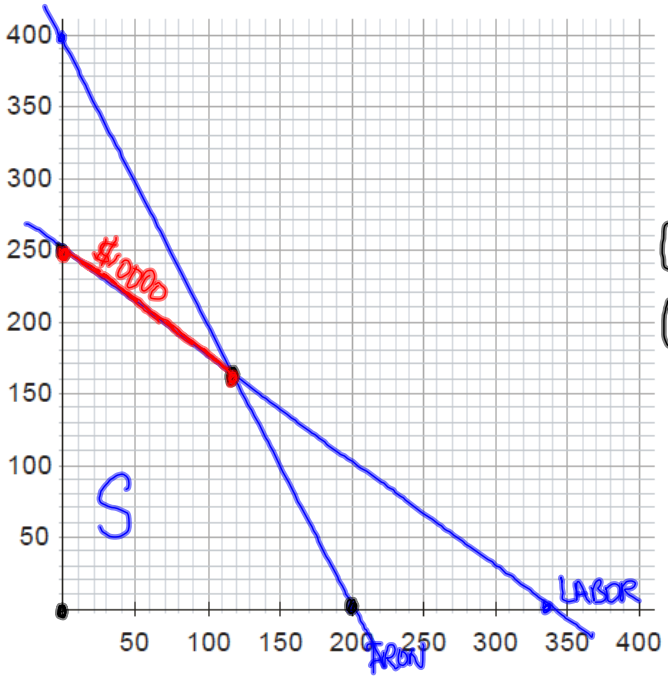
A company produces handmade skillets in two sizes, big and giant. (…) how many each size skillet should be made to maximize profits if big skillets have a profit of \$30 each and giant skillets have a profit of \$40 each?

x = the number of big skillets produced
y = the number of giant skillets produced
P = the profits (in \$) from selling skillets
OBJECTIVE: Maximize $P = 30x + 40y$
SUBJECT TO:

$3x + 4y \leq 1000$ Pounds of iron

$6x + 3y \leq 1200$ Minutes of labor

$x \geq 0, y \geq 0$



Vertex	$P = 30x + 40y$
(0,0)	0
(0,250)	10000
(120,160)	10000
(200,0)	6000

max of 10000 at

$P = 30x + 40y = 10000 \Rightarrow y = -\frac{3}{4}x + 250$

$0 \leq x \leq 120$

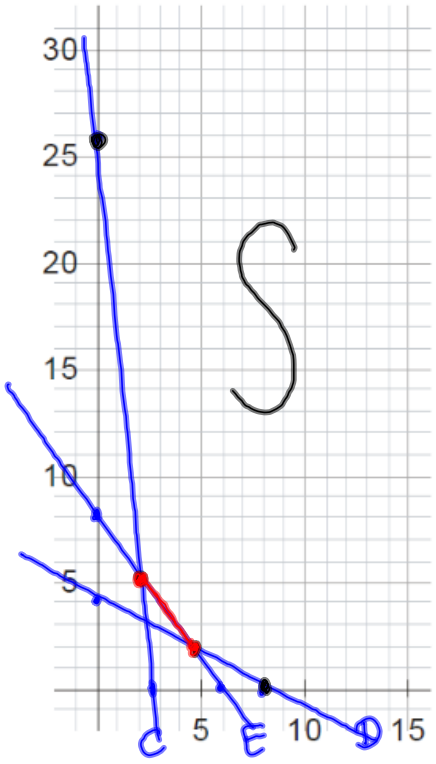
The max profit is \$10,000 when $x = 0, 4, 8, \ldots 120$ big skillets and $y = -3/4x + 250$ giant skillets

Example

A dietitian is to prepare two foods in order to meet certain requirements. (…) How many ounces of each type of food should be used in order to minimize the cost if an ounce of food I costs 20 cents and an ounce of food II costs 15 cents?

x = the number of ounces of food I
y = the number of ounces of food I
C = the cost (in \$) for the food
OBJECTIVE: Minimize $C = 0.20x + 0.15y$
SUBJECT TO:

$100x + 10y \geq 260$ Units of Vit. C
$40x + 80y \geq 320$ Units of Vit. D
$20x + 15y \geq 120$ Units of Vit. E
$x \geq 0, y \geq 0$



vertex	$C = .2x + .15y$
(0, 26)	3.9
(8, 0)	1.6
(48, 1.6)	1.2 } tie
(27/13, 68/13)	1.2 } tie

$C = \underbrace{.2x + .15y = 1.2}$
$y = -4/3x + 8$ with $27/13 \leq x \leq 48$ has the min $C = 1.2$

The min cost of \$1.20 occurs when $y = -4/3x + 8$ or of food II and $27/13 \leq x \leq 4.8$ oz of food I is used.