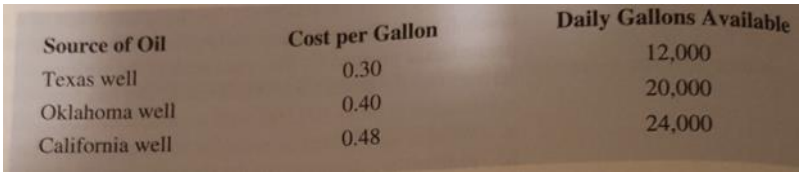


Source of Oil	Cost per Gallon	Daily Gallons Available
Texas well	0.30	12,000
Oklahoma well	0.40	20,000
California well	0.48	24,000

	i	Xi (# gallons from well i to produce Blend A)	Yi (# gallons from well i to produce Blend B)
	1	X1	Y1
	2	X2	Y2
	3	X3	Y3

i	BlendA	BlendB	
1	35%	20%	
2	50%	30%	
3	15%	40%	
Price	3.10	3.20	
Requirement	20000	20000	

Problem: We want to know how many gallons from well i is used to produce each type of oil blend that maximizes profit.

Decision variable:

Xi = # gallons from well i used in blend A
Yi = # gallons from well i used in blend B

Define:
A = # gallons of blend A that is produced
B = # gallons of blend B that is produced

Revenue = 3.10*A + 3.20*B

Cost = .30*(X1 + Y1) + .4*(X2+Y2) + .48*(X3+Y3)

X1 + Y1 = # gallons from well # 1
X2 + Y2 = # gallons from well # 2
X3 + Y3 = # gallons from well # 3

Objective function:

Max Profit = Revenue - Cost

Profit = 3.10*A + 3.20*B - [.30*(X1 + Y1) + .4*(X2+Y2) + .48*(X3+Y3)]

A = X1 + X2 + X3
B = Y1 + Y2 + Y3

Max Profit = 3.10*(X1+X2+X3) + 3.20*(Y1+Y2+Y3) - [.30*(X1 + Y1) + .4*(X2+Y2) + .48*(X3+Y3)]

By choosing **X1, X2, X3, Y1, Y2, Y3**

Subject to:

.35/.65=0.5385
.15/.85 = 0.1765

X1 + Y1 <= 12000 (TX supply constraint)
X2 + Y2 <= 20000 (OK supply constraint)
X3 + Y3 <= 24000 (CA supply constraint)

X1 / A >= 35% --> X1 >= .35*(X1 + X2 + X3) --> X1 >= .35X1 + .35X2 + .35X3
--> .65X1 >= .35X2 + .35X3 -->
--> X1 >= 0.5385 X2 + 0.5385 X3

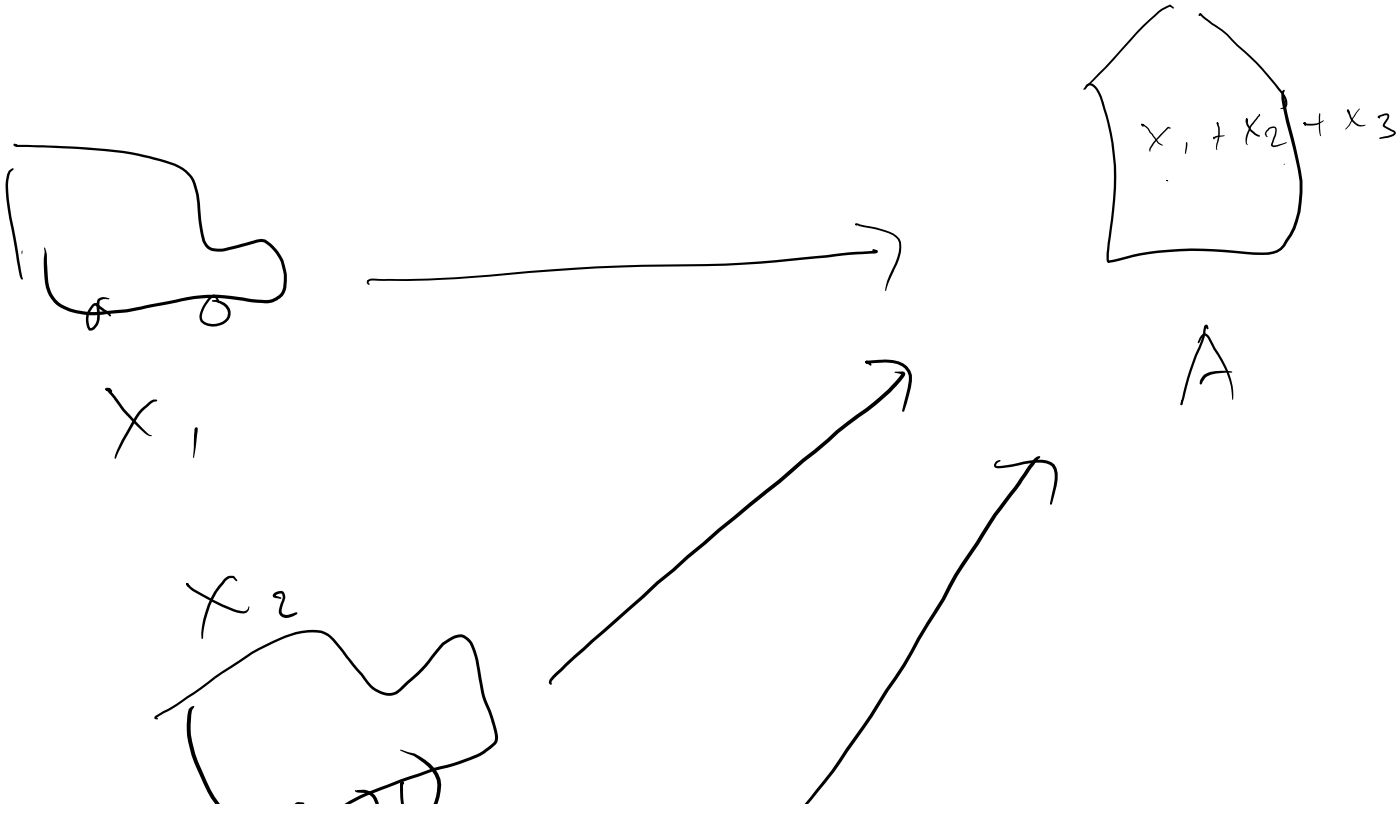
.3/.7=0.4286

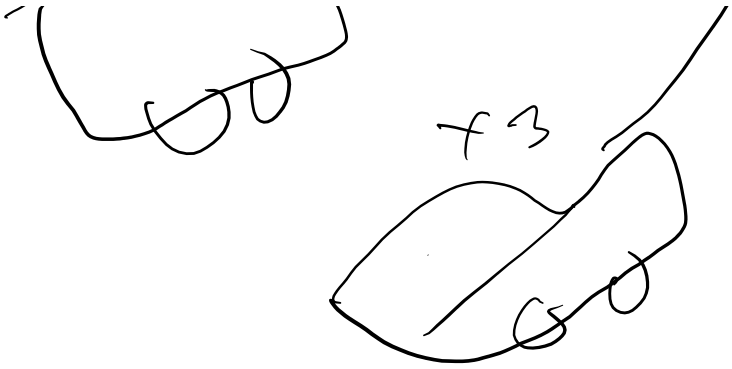
X2/A <= 50% --> X2 <= .5*(X1 + X2 + X3) --> .5X2 <= .5X1 + .5X3
--> **X2 <= X1 + X3**
X3/A >= 15% --> X3 >= .15*(X1+X2+X3) --> .85 X3 >= .15X1 + .15 X2
--> **X3 >= .1765 X1 + .1765 X2**

Y1/B >= 20% --> Y1 >= .20*(Y1+Y2+Y3) --> .80 Y1 >= .20Y2 + .20 Y3
--> Y1 >= .25 Y2 + .25 Y3
Y2/B >=30% --> Y2 >= .30*(Y1+Y2+Y3)
--> Y2 >= .4286 Y1 + .4286 Y3
Y3/B <=40% --> Y3 <= .40*(Y1+Y2+Y3)
--> Y3 <= .6666Y1 + .6666Y2

A>= 20000 --> X1+X2+X3 >= 20000
B>= 20000 --> Y1+Y2+Y3 >= 20000

Xi, Yi >= 0

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