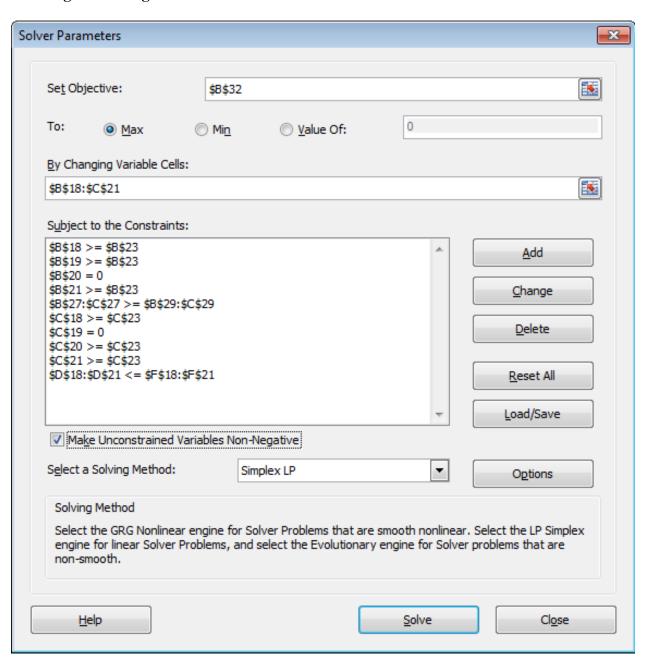# Example: Mixing Drinks at Club Fever

We are asked by Club Fever to come up with the optimal plan to mix drinks for a Thursday night. Excel file "Mixing Drinks.xlsx"

Set up the Mixing Drinks model in Excel for Solver:

	A	B	C	D	E	F
1	**Mixing Drinks**					
2						**Notes: Recipe (1 cup = 6 ounces)**
3	**Monetary inputs**	Sex on the Beach	Cosmopolitan			**1 Cup of Sex on the Beach**
4	Selling price/cup	$5.00	$7.00			>= 1 ounce of Vodka
5						>= 1 ounce of Peach Schnapps
6	**Alcohol percentage of ingredients**					>= 1 ounce of Fruit Juice
7	Vodka	0.40				**1 Cup of Cosmopolitan**
8	Peach Schnapps	0.21				>= 1 ounce of Vodka
9	Triple Sec	0.30				>= 1 ounce of Triple Sec
10	Fruit Juice	0.00				>= 1 ounce of Fruit Juice
11						
12	**Required alcohol percentage**					
13		Sex on the Beach	Cosmopolitan			
14		0.12	0.30			
15						
16	**Blending plan**					
17		Sex on the Beach	Cosmopolitan	Ounces used		Available ingredients (ounces)
18	Vodka			=sum(B18:C18)		1200
19	Peach Schnapps			↓	≤	600
20	Triple Sec					500
21	Fruit Juice					3000
22	Ounces produced	=sum(B18:B21) →				
23	Cups sold	=B22/6	→			
24						
25	**Constraints on alcohol percentage**					
26		Sex on the Beach	Cosmopolitan			
27	Alcohol obtained (ounces)	=sumproduct($B7:$B10,B18:B21) →				
28		≥				
29	Alcohol required (ounces)	=B14*B22 →				
30						
31	**Objective to maximize**					
32	Revenue	=sumproduct(B4:C4,B23:C23)				

Entering the Mixing Drinks model into Solver:

Solution to the Mixing Drinks model:

	A	B	C	D	E	F
1	**Mixing Drinks**					
2						**Notes: Recipe (1 cup = 6 ounces)**
3	**Monetary inputs**	Sex on the Beach	Cosmopolitan			**1 Cup of Sex on the Beach**
4	Selling price/cup	$5.00	$7.00			>= 1 ounce of Vodka
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10	Fruit Juice	0.00				>= 1 ounce of Fruit Juice
11						
12	**Required alcohol percentage**					
13		Sex on the Beach	Cosmopolitan			
14		0.12	0.30			
15						
16	**Blending plan**					
17		Sex on the Beach	Cosmopolitan	Ounces used		Available ingredients (ounces)
18	Vodka	765	435	1200 <=		1200
19	Peach Schnapps	600	0	600 <=		600
20	Triple Sec	0	290	290 <=		500
21	Fruit Juice	2235	145	2380 <=		3000
22	Ounces produced	3600	870			
23	Cups sold	600	145			
24						
25	**Constraints on alcohol percentage**					
26		Sex on the Beach	Cosmopolitan			
27	Alcohol obtained (ounces)	432	261			
28		>=	>=			
29	Alcohol required (ounces)	432	261			
30						
31	**Objective to maximize**					
32	Revenue	4,015				

Questions:

1. With the above optimal mixing, Club Fever will obtain a revenue of $4,015.

2. If Club Fever need to produce at least 200 cups of Cosmopolitan, how should we modify the model? How would the revenue change as a result of this modification?

    Add a constraint: C23 $\geqslant$ 200. Revenue would decrease to $3,942.

3. Based on the original model, how much is Club Fever willing to pay for 2 additional handles (60 ounces each) of Peach Schnapps?

    Increase the available Peach Schnapps to 720 (= 600 + 2 * 60).
    Revenue would increase to $4,258.
    Maximum willingness to pay = $4,258 − $4,015 = $243.