Setting up and Solving in Excel

Here is a good way to organize the power distribution problem. I've used one array of constants for the costs, and reserved space for the array of variables (x_{ij}). Then we keep track of the supplies down the last column (sums), and the demands across the bottom row. The total cost is then a "dot product" between the cost array and variable array (as shown in the formula boxes). (NOTE: To type an equal sign and not have a formula, type a blank space first). You can download this from our class website as a template.

	A	B	C	D	E	F	G	H	I	J
1	**Power Distribution Problem (Example from Text, 7.1)**									
2										
3		**Unit Cost**								
4				**City A**	**City B**	**City C**	**City D**			
5			**Plant 1**	8	6	10	9			
6			**Plant 2**	9	12	13	7			
7			**Plant 3**	14	9	16	5			
8										
9										
10		**Distribution**								
11		**(KwH)**		**City A**	**City B**	**City C**	**City D**	Total Sent		Supply
12			**Plant 1**					=SUM(D12:G12)	=	35
13			**Plant 2**					=SUM(D13:G13)	=	50
14			**Plant 3**					=SUM(D14:G14)	=	40
15			Total Received	=SUM(D12:D14)	=SUM(E12:E14)	=SUM(F12:F14)	=SUM(G12:G14)			
16				=	=	=	=			Total Cost:
17			Demand	45	20	30	30			=SUMPRODUCT(D5:G7,D12:G14)

To set up the solver:

- We want to **minimize** cell `J17`
- The conditions are that the column sums (in cells D15 to G15) are equal to the demand (in cells D17 to G17), and the row sums (in cells H12-H14) are equal to the supply (in cells J12-14). All told, there are then 4+3=7 equality constraints.

The solver should give you the following result:

	A	B	C	D	E	F	G	H	I	J
1	**Power Distribution Problem (Example from Text, 7.1)**									
2										
3		**Unit Cost**								
4				City A	City B	City C	City D			
5			Plant 1	8	6	10	9			
6			Plant 2	9	12	13	7			
7			Plant 3	14	9	16	5			
8										
9										
10		**Distribution**								
11		**(KwH)**		City A	City B	City C	City D	Total Sent		Supply
12			Plant 1	0	10	25	0	35	=	35
13			Plant 2	45	0	5	0	50	=	50
14			Plant 3	0	10	0	30	40	=	40
15			Total Receive	45	20	30	30			
16				=	=	=	=			Total Cost:
17			Demand	45	20	30	30			1020