Linear Programming Using Excel

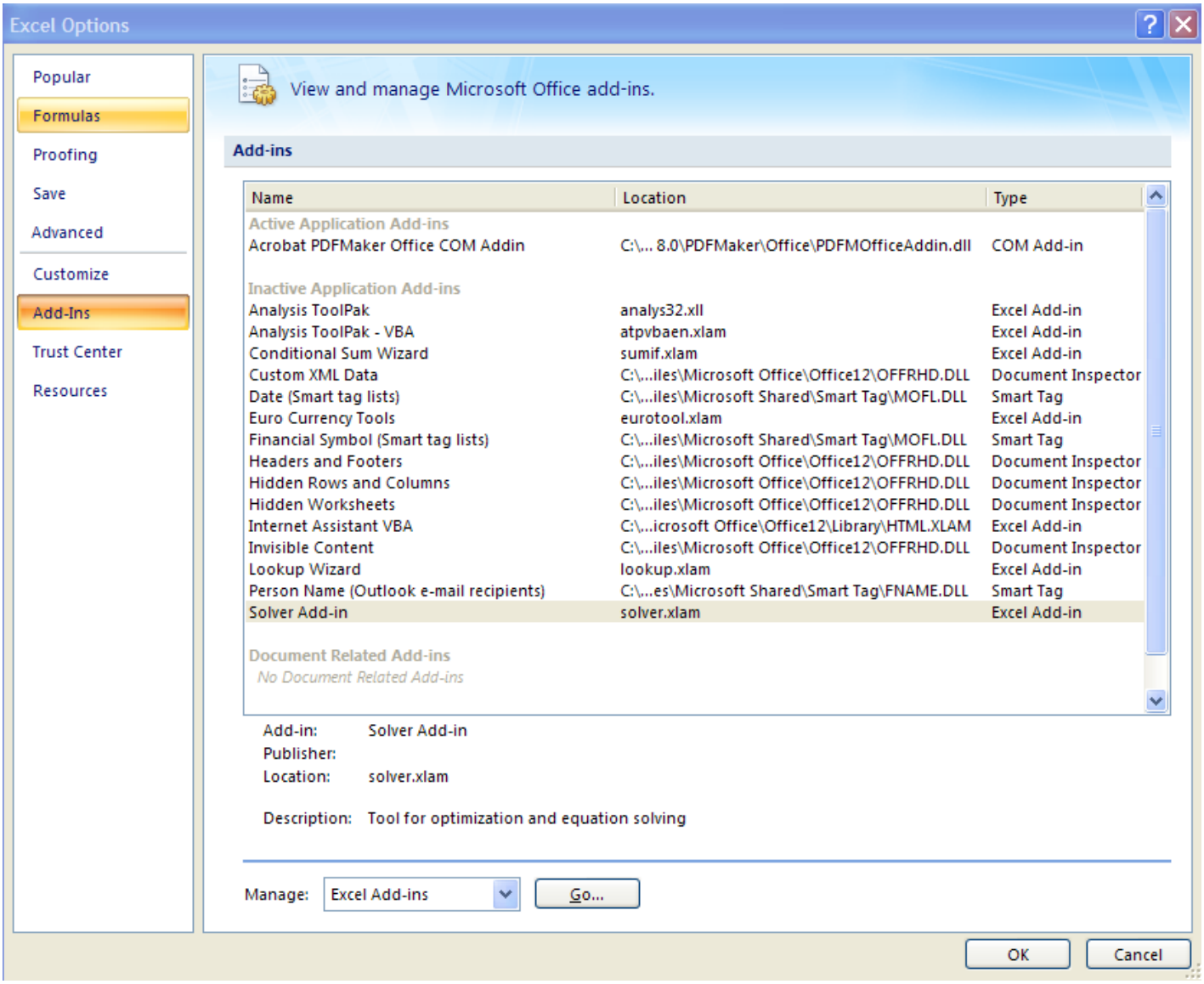
Subject: Linear Programming using Excel

Application: Microsoft Excel 2007

Task: Solving a Linear Program Using Excel

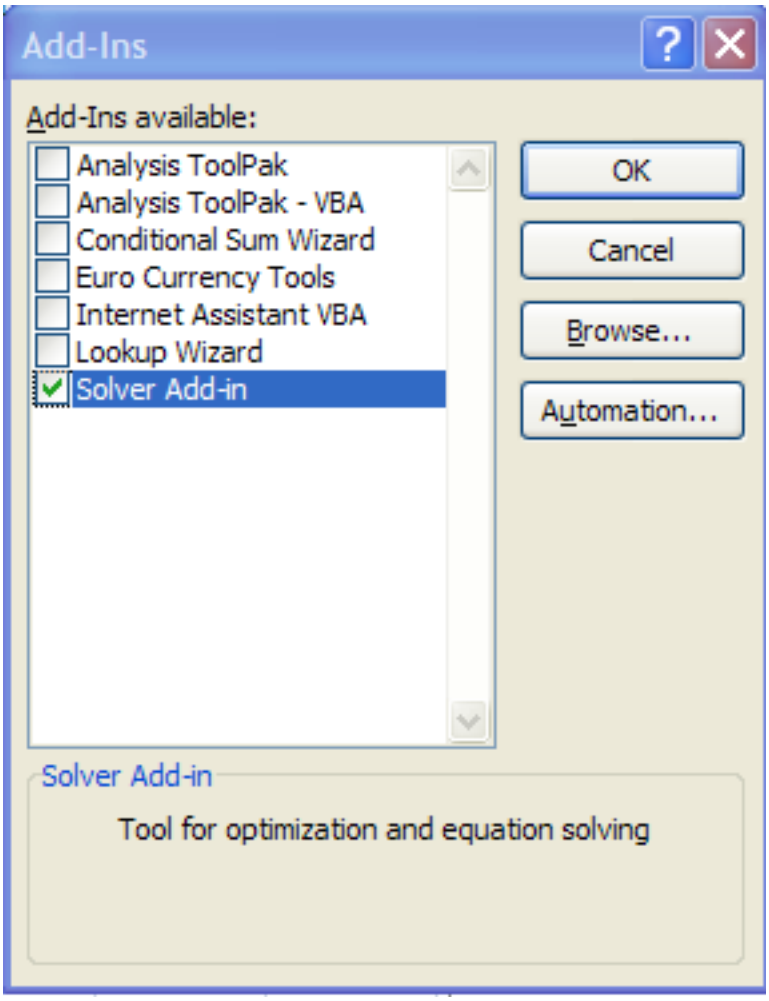
Tutorial Date: 25th February, 2010 by Nathan Smith

Install the Solver Add-In



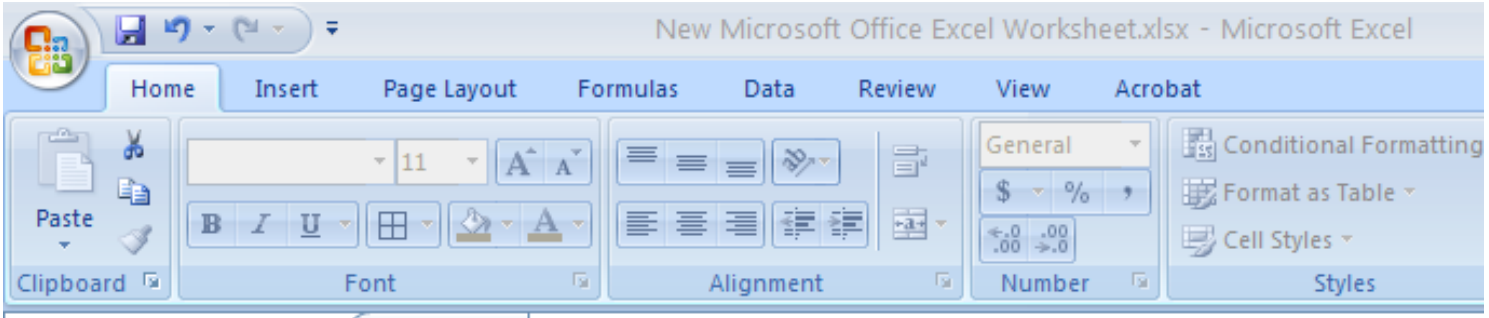
1. In the Microsoft Office button, go to excel options to click Add-ins
2. In the Add-Ins box, select Solver Add-In and click Go...

Install the Solver Add-In (continue)



3. In the Add-Ins available box, check the Analysis ToolPak and then OK

Setting Up the Problem on the Spreadsheet



	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4				**Variables**	**X**	**Y**				
5				**Coefficients**	6	7				
6				**Solutions**						
7				**Z**	=SUMPRODUCT(E5:F5,E6:F6)					
8										
9				**Constraints 1**	2	6	>=	10		
10				**Constraints 2**	5	3	>=	10		
11										
12					**LHS**	**RHS**				
13				**Constraints 1**	0	10				
14				**Constraints 2**	0	10				
15										
16										
17										
18										

Example

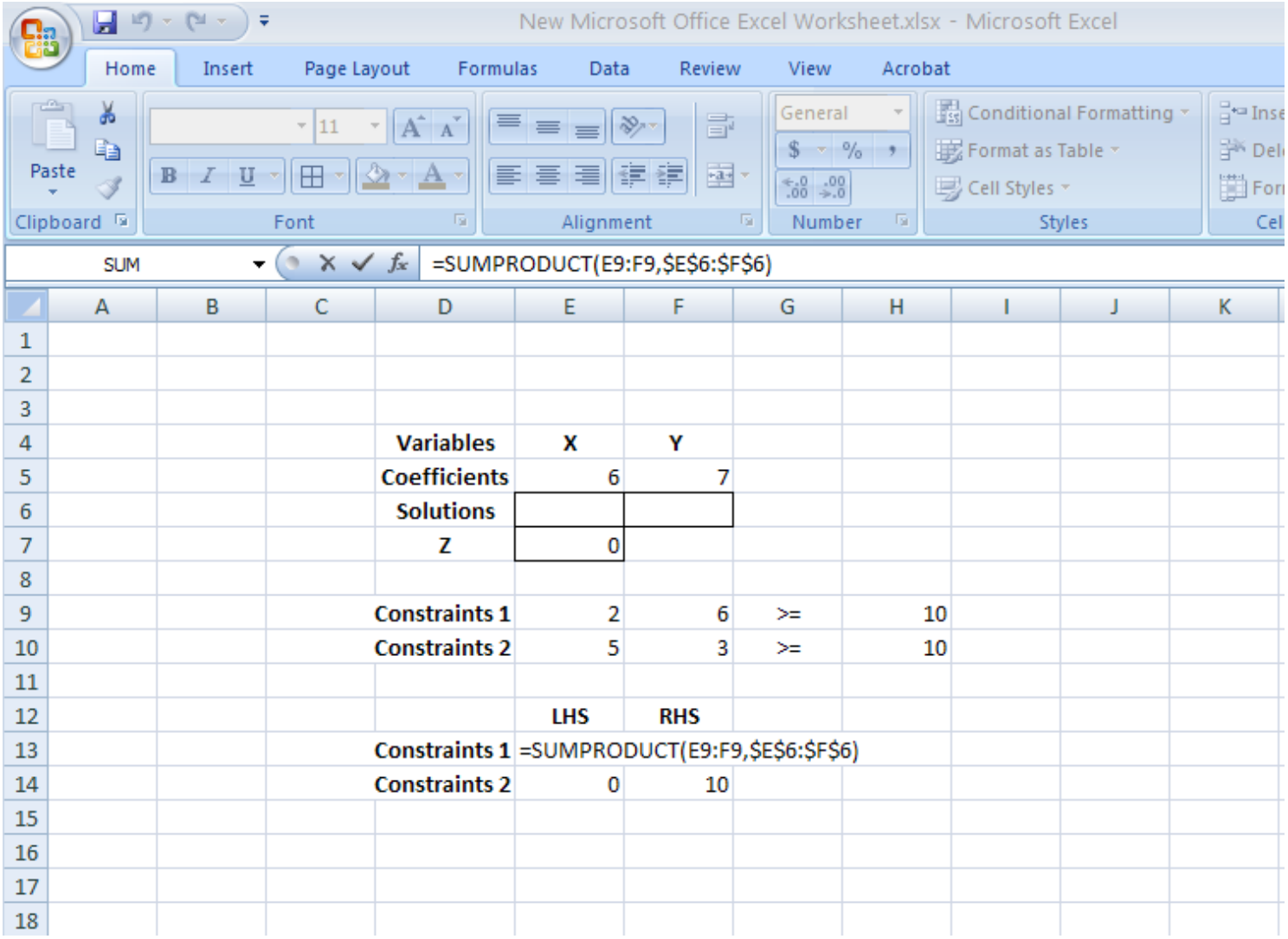
Min Z = 6X + 7Y

s.t 2X + 6Y â‰¥ 10

5X + 3Y â‰¥ 10

X,Y â‰¥ 0

(continued)



	A	B	C	D	E	F	G	H	I	J	K
1											
2											
3											
4				**Variables**	**X**	**Y**					
5				**Coefficients**	6	7					
6				**Solutions**							
7				**Z**	0						
8											
9				**Constraints 1**	2	6	>=	10			
10				**Constraints 2**	5	3	>=	10			
11											
12					**LHS**	**RHS**					
13				**Constraints 1**	=SUMPRODUCT(E9:F9,$E$6:$F$6)						
14				**Constraints 2**	0	10					
15											
16											
17											
18											

1. Enter the coefficients of the objective function Z i.e., (6, 7) in cells E5 and F5.
2. Enter the coefficients of the Constraint-1 i.e., (2,6) and RHS value 10 in cells E9, F9 and H9 respectively
3. Enter the coefficients of the Constraint-2 i.e., (5,3) and RHS value 10 in cells E10, F10 and H10 respectively

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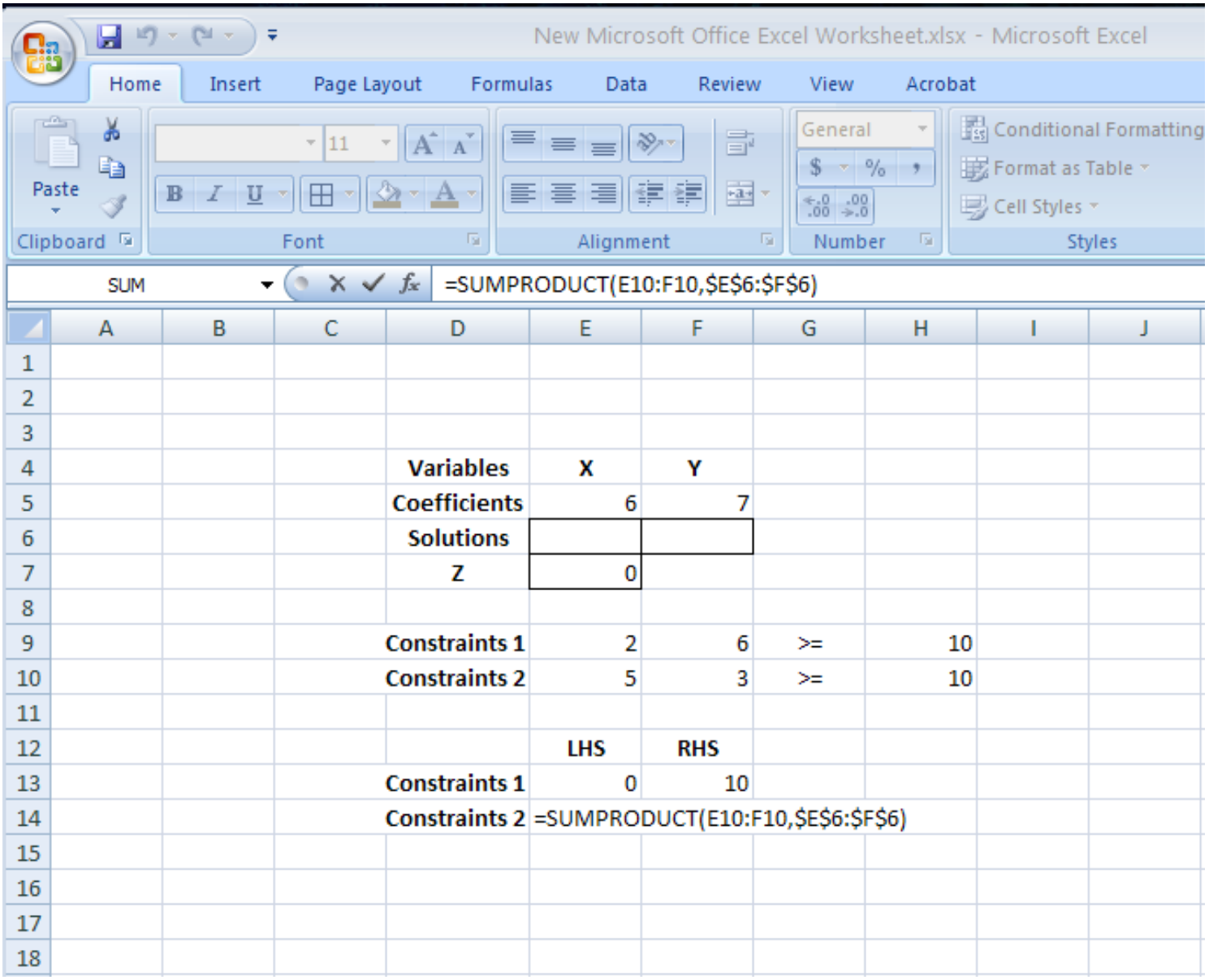
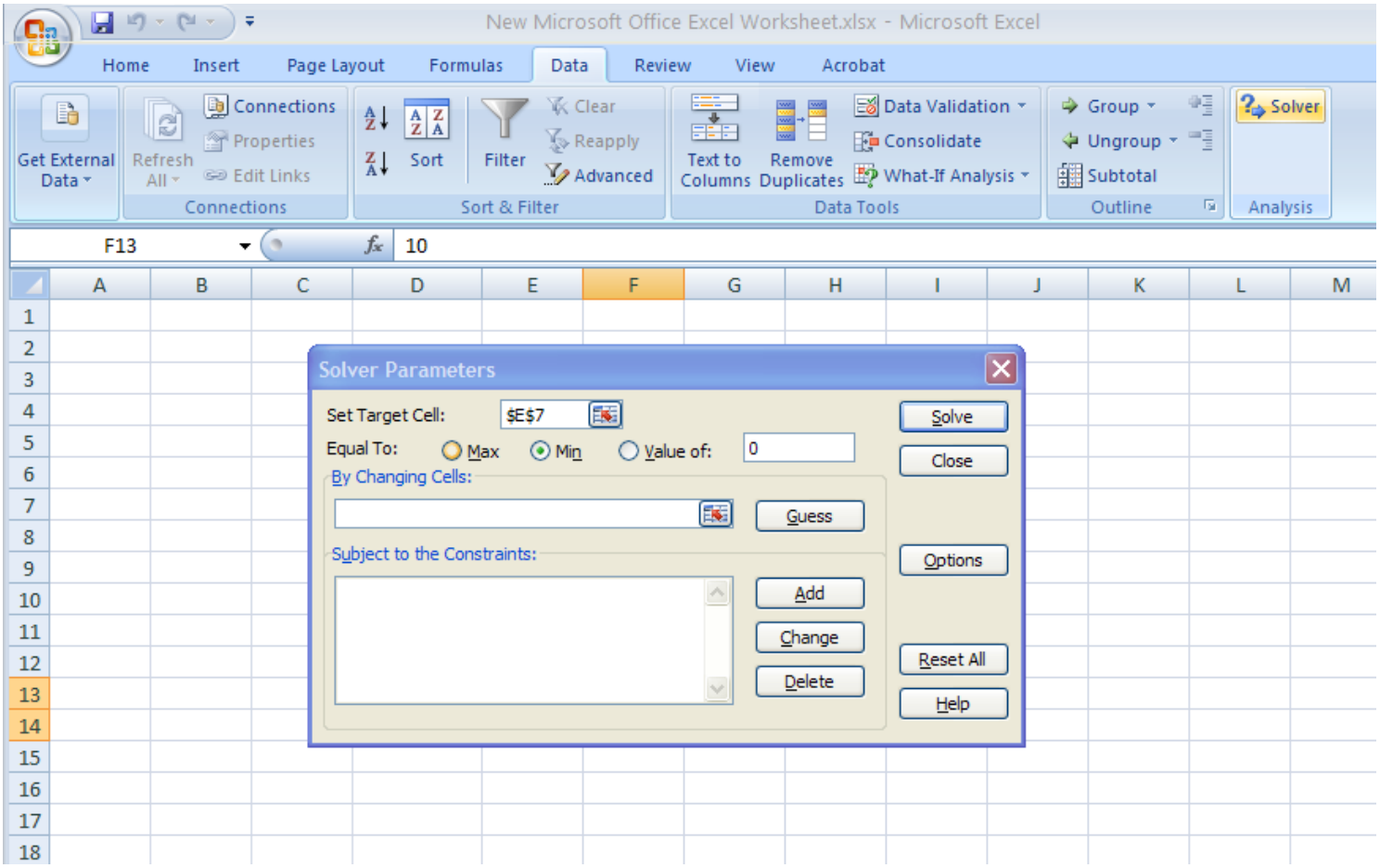


	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4				**Variables**	**X**	**Y**				
5				**Coefficients**	6	7				
6				**Solutions**						
7				**Z**	0					
8										
9				**Constraints 1**	2	6	>=	10		
10				**Constraints 2**	5	3	>=	10		
11										
12					**LHS**	**RHS**				
13				**Constraints 1**	0	10				
14				**Constraints 2**	=SUMPRODUCT(E10:F10,$E$6:$F$6)					
15										
16										
17										
18										

1. For the Objective function value, enter the formula for computing Z = **SUMPRODUCT(E5:F5,E6:F6)**. This formula uses the coefficient values and also the solution values for variables X and Y, which are supposed to be solved.

2. Similarly enter the formula for LHS of the Constraints 1 & 2 i.e., **SUMPRODUCT(E9:F9,$E$6:$F$6) & SUMPRODUCT(E10:F10,$E$6:$F$6)** respectively



Now Excel Solver will be used, in the Data tab click Solver.
The solver box appears as follows.

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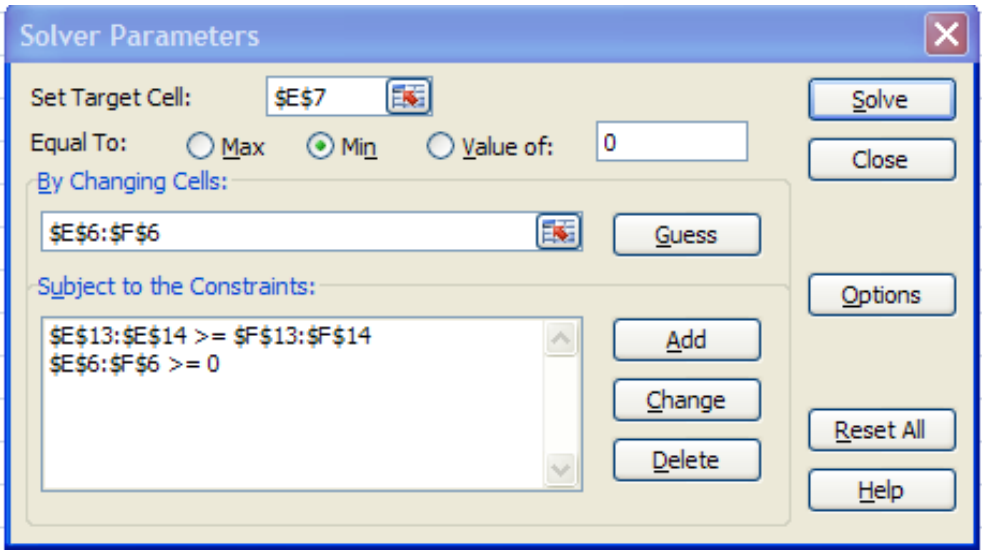

1. Set the Target Cell for the Objective Function Z value i.e., $E$7
2. Check the Equal to Min i.e., Minimum Option.
3. For Changing Cell, select the solution values of the variables X & 7 i.e., $E$6:$F$6

4. For subject to the constraints, LHS >=RHS i.e., click on the Add option and select $E$13:$E$14 >= $E$13:$E$14
5. Also all the solution values needs to be positive, select $E$6:$F$6 >= 0
6. Now click the Solve button.

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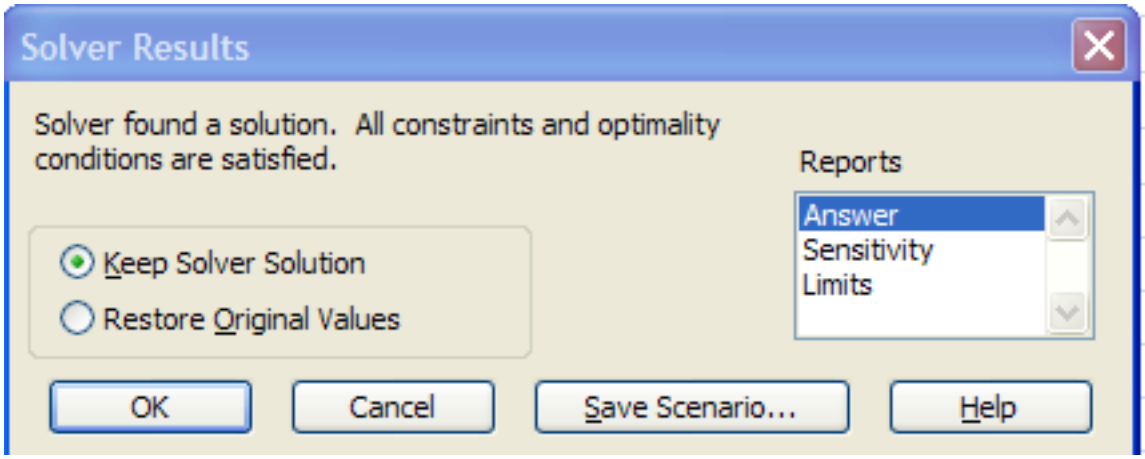

After selecting the solve button the solver results appears a window, the default option has a keep solver solution and click on the Answer in the Reports Section on the Right hand side. Finally click the the OK Button to get the results.

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Variables	X	Y			
Coefficients	6	7			
Solutions	1.25	1.25			
Z	16.25				
Constraints 1	2	6	>=	10	
Constraints 2	5	3	>=	10	
	LHS	RHS			
Constraints 1	10	10			
Constraints 2	10	10			

Finally the Excel Solver gives the solution values for variables X & Y and for the objective function Z.