Solve linear equation

A system of linear equations is a set of *n linear equations in which* each equation contains up to *n variables or 'unknowns'. A simple* example might be to find *x and y given:*

$$2x + 3y - 3 = 0$$
$$3x + 2y - 5 = 0$$

Open excel work sheet and insert the data as shown below:

	A	B	C	D
6	Vaiables	Guess	Equations	squares
7	x	0	-3	9
8	y	0	-5	25
9			sum=	34

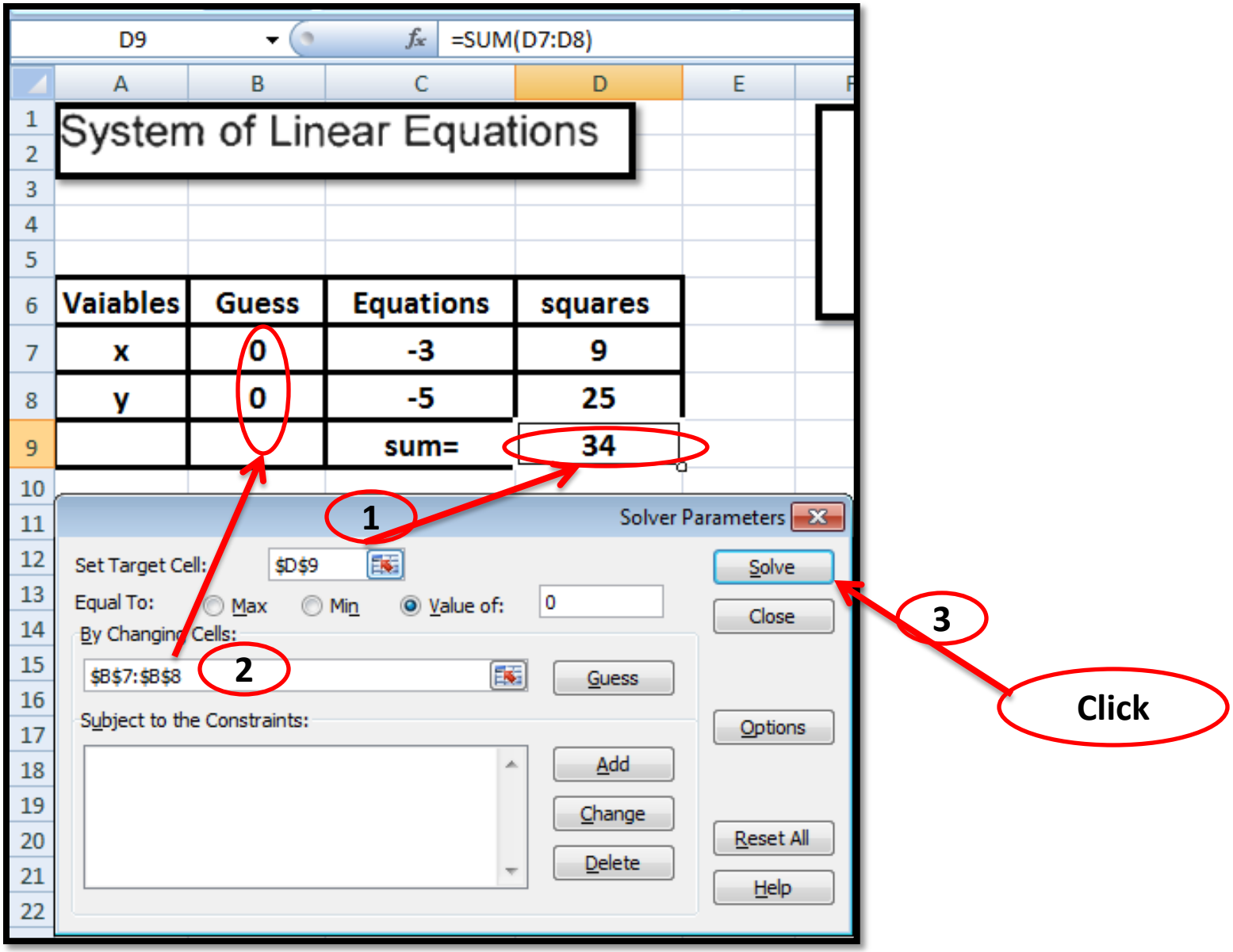
C7=2*B7+3*B8-3

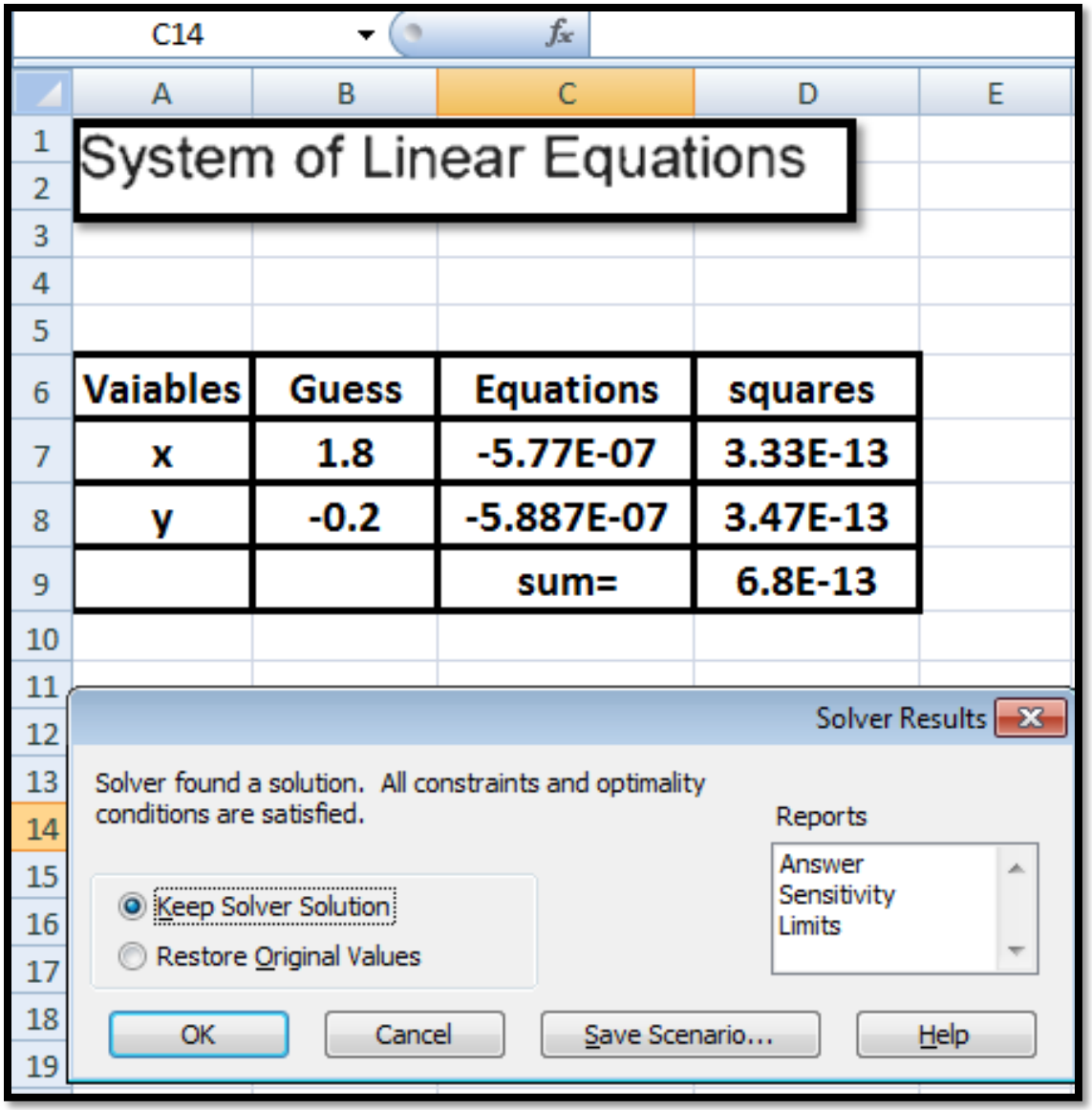
C8=3*B7+2*B8-5

D7=C7^2

D8=C8^2

D9=SUM(D7:D8)


D9
=SUM(D7:D8)
System of Linear Equations
Vaiables
Guess
Equations
squares
x
0
-3
9
y
0
-5
25
sum=
34
Solver Parameters
Set Target Cell:
$D$9
Solve
Equal To:
Max
Min
Value of:
0
Close
By Changing Cells:
$B$7:$B$8
Guess
Subject to the Constraints:
Options
Add
Change
Reset All
Delete
Help
1
2
3
Click


C14
System of Linear Equations
Vaiables
Guess
Equations
squares
x
1.8
-5.77E-07
3.33E-13
y
-0.2
-5.887E-07
3.47E-13
sum=
6.8E-13
Solver Results
Solver found a solution. All constraints and optimality conditions are satisfied.
Reports
Answer
Sensitivity
Limits
Keep Solver Solution
Restore Original Values
OK
Cancel
Save Scenario...
Help

H.W. Solve the following system equation using Solver function.

$$
\begin{aligned}
2x + 4y + 5z - 33 &= 0 \\
6x + 6y + 7z - 70 &= 0 \\
3x - 6y + 4z + 71 &= 0
\end{aligned}
$$

Non - linear Simultaneous Equations Solver

Non-linear systems of equations are far more difficult to solve with paper and pencil, requiring a knowledge of calculus. Let's see if Solver is capable of coming to our aid. We will solve the nonlinear simultaneous equations:

$$x^2 + 2y^2 - 22.0 = 0$$
$$-2x^2 + xy - 3y + 11.0 = 0$$

	A	B	C	D	E
1	System of Non-linear Equations				
2					
3	$x^2 + 2y^2 - 22.0 = 0$				
4	$-2x^2 + xy - 3y + 11.0 = 0$				
5					
6					
7	**Variables**	**Guess**	**equations**	**square**	
8	**x**	**0**	**-22**	**484**	
9	**y**	**0**	**11**	**121**	
10			**sum=**	**605**	

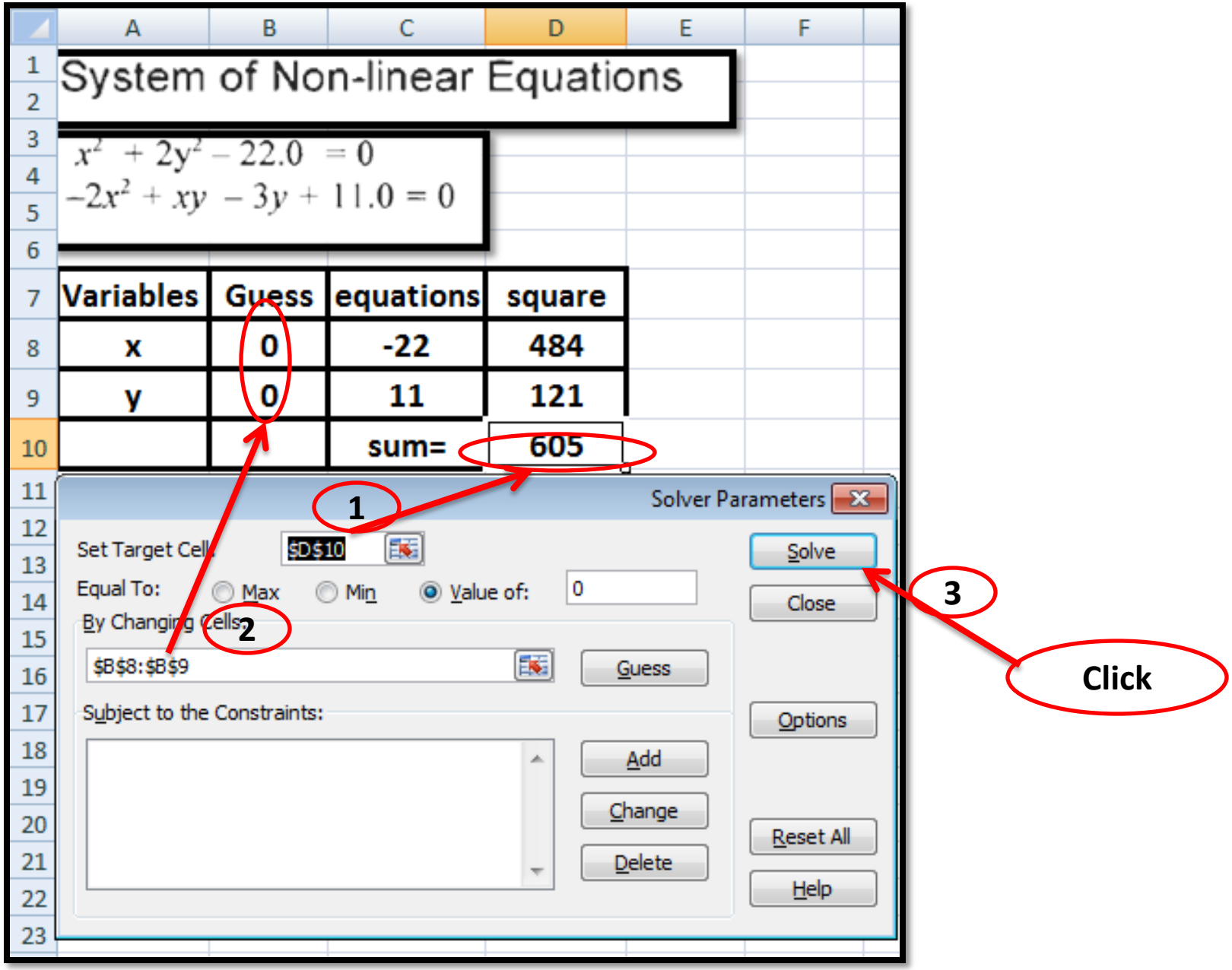
C8=1*B8^2+2*B9^2-22

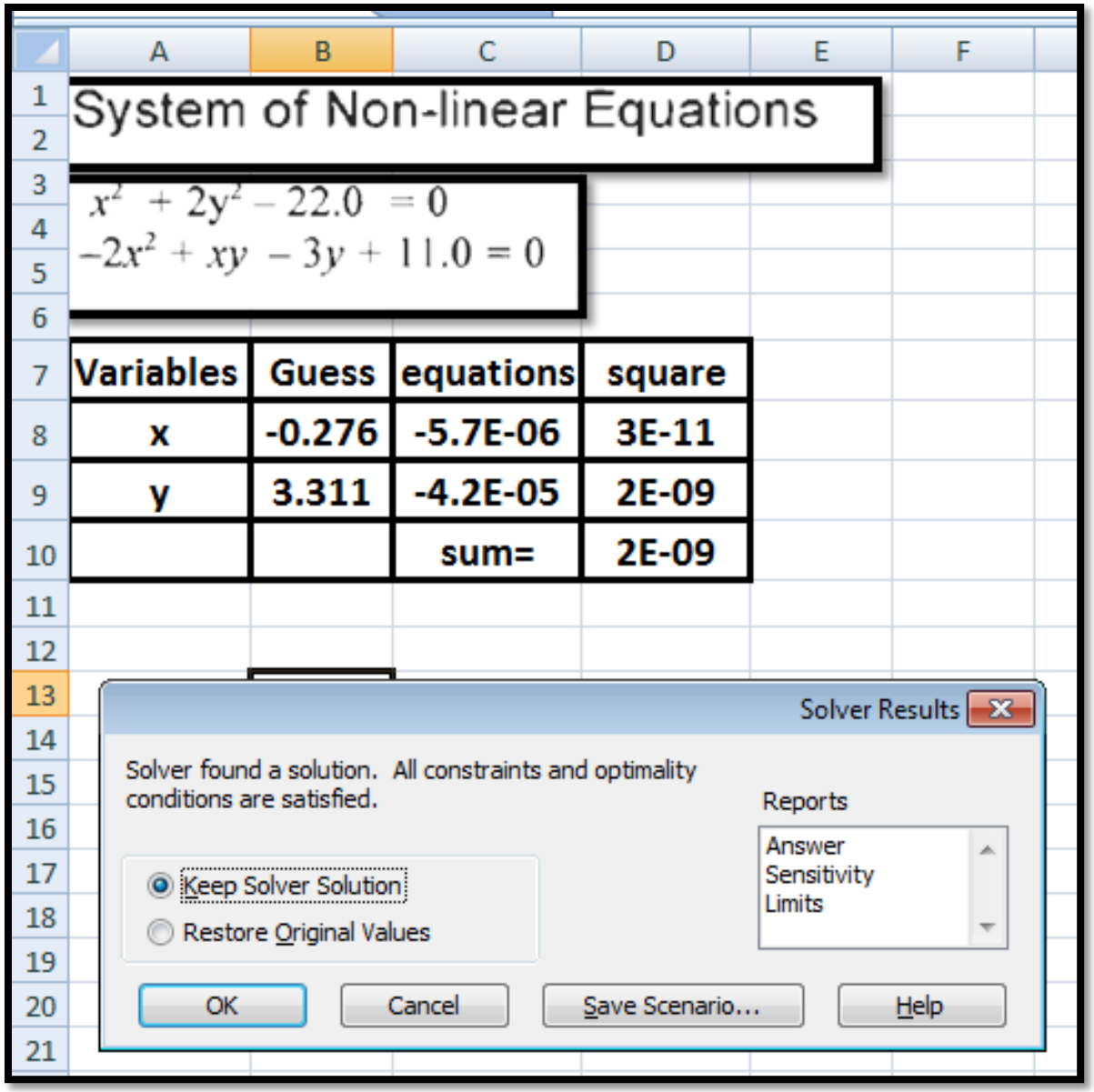
C9=-2*B8^2+B8*B9-3*B9+11

D8=C8^2

D9=C9^2

D10=SUM(D8:D9)


System of Non-linear Equations
$x^2 + 2y^2 - 22.0 = 0$
$-2x^2 + xy - 3y + 11.0 = 0$
Variables
Guess
equations
square
x
0
-22
484
y
0
11
121
sum=
605
1
2
3
Click
Solver Parameters
Set Target Cell:
$D$10
Equal To:
Max
Min
Value of:
0
By Changing Cells:
$B$8:$B$9
Guess
Subject to the Constraints:
Add
Change
Delete
Solve
Close
Options
Reset All
Help


A
B
C
D
E
F
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
System of Non-linear Equations
$x^2 + 2y^2 - 22.0 = 0$
$-2x^2 + xy - 3y + 11.0 = 0$
Variables
Guess
equations
square
x
-0.276
-5.7E-06
3E-11
y
3.311
-4.2E-05
2E-09
sum=
2E-09
Solver Results
Solver found a solution. All constraints and optimality conditions are satisfied.
Reports
Answer
Sensitivity
Limits
Keep Solver Solution
Restore Original Values
OK
Cancel
Save Scenario...
Help

With starting values of 1 for both variables Solver suggests an approximate solution with x = 1.99994 and *y = 3.00004.* The function evaluate to values somewhat larger than 0. Experimentation shows *x = 2 and y = 4 is an exact solution. Of* course, since the equations contain *2 and?, multiple solutions are* possible. Starting with 0 for each variable, Solver reported x = 0.2763 and *y = 3.3 109 as a solution.*

H.W. : Try that with starting with guess values of 1,1