

Home Work 4

ข้อที่ 1

หาเส้นทางที่ให้ต้นทุนต่ำที่สุด โดยมี Benefit \geq ที่กำหนดไว้ โดยใช้วิธีตัวคูณ ลากรางจ์

Min Cost = 177

Item	เส้นทาง
1	0-1-3-4
2	0-1-3-4
3	0-2-4
4	0-4

ได้คำตอบเหมือนการ
Run Solver

Benefit1	18.3026253	47.5533583	43.5288506	67.4207679	13.7590213	40.5032631	51.180875	21.0946521	29.4844312	19.8655597	78.6714481	=Total B.
Benefit2	17.2052135	25.6177573	39.7162624	52.0712178	17.3891543	23.7254393	37.0011274	18.1614681	32.8575287	16.2817591	57.2124119	
Benefit3	15.8631801	28.5050351	34.218318	45.1856508	15.0649958	18.5037915	31.5325867	19.4355261	32.9746605	14.1943887	48.5613604	
Benefit4	1.58569858	4.52142498	7.25099677	7.35481048	1.18105502	6.85751865	7.09300984	0.4791576	9.28028854	7.66882109	16.1120383	
Benefit5	21.9484778	54.9254302	45.1851525	60.5597217	22.8027672	34.968756	59.258667	33.2818316	42.7033271	34.9312044	91.8484381	
Value	1	0	0	0	-9.694E-27	1	0	0	0	1		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		9.6935E-27	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	12	24	36	48	11	21	35	15	28	14	41.465753	=Total C.
Lagrangean C.	11.1781502	21.7782409	33.2961495	44.6466668	10.384541	18.4602903	32.1293121	14.3431229	25.2278505	11.8273124		

Item1

วิชา มินิเสน รหัส 48850226

Benefit1	13.9594589	48.7084158	42.88645	52.3975406	15.8637426	29.5407508	52.0503485	31.8094139	40.9076621	30.9545802	74.547899	=Total B.
Benefit2	16.5585025	28.4648321	32.8611602	54.3294498	20.8931682	22.0046618	35.3246728	24.8115227	32.6937673	18.2203938	56.7835581	
Benefit3	15.9871259	24.934907	37.615927	46.1217604	22.9823024	18.5072716	37.6250907	23.1207395	32.8732509	18.322572	52.8169695	
Benefit4	6.52794217	7.09922186	9.23893497	0.05549624	1.43198264	8.50508426	1.64946126	7.83922286	8.35533465	7.81211512	22.8451415	
Benefit5	30.8393941	35.76054	38.9331078	92.6166662	29.3073483	35.9535411	52.0583818	24.077475	46.2596812	30.414194	97.2071291	
Value	1	1.1102E-16	0	0	0	1	0	0	0	1		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				4.4409E-12	0
Eq3		-1			-1			1	1		-1.11E-16	0
Eq4			-1			-1		-1		1	-1.11E-11	0
Eq5				1			1		1	1	1	1
Cost	11	25	32	45	15	19	33	17	27	17	40.1266681	=Total C.
Lagrangean C.	9.22799244	22.1928732	28.8849704	43.612688	14.2752655	16.3932886	31.2785901	14.4771121	24.1271669	14.5053871		

Item 2

Benefit1	22.0674905	30.7430556	32.5623475	90.7008309	20.090094	31.5125372	46.0243862	22.7682347	43.0089761	26.841674	73.7520317	=Total B.
Benefit2	27.1338975	23.8457696	39.2790165	56.865282	18.4518111	24.2482142	40.9162982	16.9793445	34.3220164	26.1975413	58.167786	
Benefit3	22.3892115	19.8608575	30.1428505	48.7272527	16.5472829	26.7882635	34.4710823	15.7952672	24.0132097	18.721169	43.8740673	
Benefit4	8.18606245	12.7267333	2.22760199	2.97487024	2.64939761	14.7388605	11.9689299	10.600292	14.501906	9.77614398	27.2286393	
Benefit5	33.4475015	54.6894538	72.7853233	64.7656875	30.3254061	29.9150155	49.6004169	23.1356251	39.1469186	27.0228845	93.8363724	
Value	0	1	4.9304E-32	0	0	1.2326E-32	0	0	1	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				1.2326E-32	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	-6.163E-32	0
Eq5				1			1		1	1	1	1
Cost	14	19	28	51	13	22	33	16	25	15	36.2012634	=Total C.
Lagrangean C.	11.6581428	15.4527277	26.6656382	47.9786827	11.9021968	17.9992803	29.2147837	13.1199193	20.7485356	12.190452		

Item3

Benefit1	20.7782091	46.7009838	63.4546478	60.2278356	16.8127059	22.41569	36.458488	19.6505924	28.4289826	23.2751802	60.2278356	=Total B.
Benefit2	9.64889337	18.4929046	32.5513419	43.4681263	14.8933128	24.7860394	43.3113186	15.418253	27.3153653	23.6308675	43.4681263	
Benefit3	9.20889852	21.9974057	29.7502323	42.7041861	11.5067964	24.8951045	44.7335053	12.1807503	28.6764589	20.3822227	42.7041861	
Benefit4	10.1962427	21.0225447	31.8226077	41.9760531	11.1088738	22.2600916	42.3425124	16.8411495	28.3116698	20.7361523	41.9760531	
Benefit5	10.7153197	21.3284281	29.3724602	40.8907546	13.9213452	20.313981	43.6470728	13.1213526	29.8926314	21.4356142	40.8907546	
Value	0	0	0	1	2.4652E-32	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				2.4652E-32	0
Eq3		-1			-1			1	1		-2.465E-32	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	9	18	29	39	10	20	40	12	25	19	28.3808536	=Total C.
Lagrangean C.	6.25915427	12.247607	20.4823858	28.3808536	7.16673622	14.6185946	29.9258602	7.85797673	18.1577331	13.9241675		

Item 4

Real Cost = 177

	Lhs	Rhs
Cons1	2	1
Cons2	1	1
Cons3	2	1
(เงื่อนไขยังไม่นำไปคิดรวม)		

Solver (Benefit)

		Overall C.	174.362943	Expected B.	Difference	New
Lag. Multi.1	-0.0262486	Overall B.1	287.106105	270	17.10611	0.110600233
Lag. Multi.2	0	Overall B.2	215.631882	210	5.631882	0.045055058
Lag. Multi.3	0	Overall B.3	187.956583	185	2.956583	0.023652666
Lag. Multi.4	-0.2153192	Overall B.4	108.161872	98	10.16187	-0.1340242
Lag. Multi.5	0	Overall B.5	323.782694	300	23.78269	0.190261554

Step length	0.008
-------------	-------

คำสั่ง VBA ใช้ในการ Run

```

Sub benefit()
  For i = 62 To 66
    Cells(i, 10).Value = 0
  Next i
  m = 5
  SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
    "$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
  SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, AssumeLinear:= _
    True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _
    IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True
  SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
    "$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
  SolverSolve
  a = 0.001
  Do Until (Cells(62, 14).Value > 0) And (Cells(63, 14).Value > 0) And (Cells(64, 14).Value > 0) And (Cells(65, 14).Value > 0) And
  (Cells(66, 14).Value > 0)
    'a = Application.InputBox("Enter Value of Step length", Type:=1)
    Cells(59, 16).Value = a
    For i = 62 To 66
      If Cells(i, 14).Value < 0 Then
        Cells(i, 10).Value = Cells(i, 15).Value
      End If
    Next i

    SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
      "$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
    SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, AssumeLinear:= _
      True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _
      IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True
    SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
      "$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
    SolverSolve
    a = a + 0.001

    'm = MsgBox("Do you want to stop!", vbYesNo)
  Loop
End Sub

```

ข้อที่ 2

หาเส้นทางที่ให้ต้นทุนต่ำที่สุด โดยไม่ให้เปลี่ยน Item ที่ปีเดียวกัน โดยใช้วิธีตัวคูณ ลากราจนจ์

Min Cost = 175

Item	เส้นทาง
1	0-4
2	0-4
3	0-3-4
4	0-4

ได้คำตอบเหมือนการ
Run Solver แต่คนละเส้นทาง

Value	0	0	0	1	0	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	12	24	36	48	11	21	35	15	28	14	48	=Total C.
Lagrangean C.	12	24	36	48	11	21	35	15	28	14		

Item1												
Value	0	0	0	1	0	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	11	25	32	45	15	19	33	17	27	17	45	=Total C.
Lagrangean C.	11	25	32	45	15	19	33	17	27	17		

Item 2												
--------	--	--	--	--	--	--	--	--	--	--	--	--

Value	0	0	1	0	0	0	0	0	0	1		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	14	19	28	51	13	22	33	16	25	15	43	=Total C.
Lagrangean C.	14	19	28	51	13	22	33	16	25	15		

Item3

Value	0	0	0	1	0	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	9	18	29	39	10	20	40	12	25	19	39	=Total C.
Lagrangean C.	9	18	29	39	10	20	40	12	25	19		

Item 4

Real Cost **175**

Solver (Year)

	Overall C.	173,959	Expected B.	Difference	New	
Lag. Multi.1	Overall B.1	239,4502	270	-30,5498	-6,10997	
Lag. Multi.2	Overall B.2	215,3454	210	5,345352	1,06907	
Lag. Multi.3	Overall B.3	182,8756	185	-2,12438	-0,42488	
Lag. Multi.4	Overall B.4	61,39011	98	-36,6099	-7,32198	
Lag. Multi.5	Overall B.5	293,8754	300	-6,12465	-1,22493	
Lag. Multi.6	1.041	Year1	0	1	-1	0.841
Lag. Multi.7		Year2	0	1	-1	-0.2
Lag. Multi.8	0.001	Year3	1	1	0	0.001

Step length 0.2

คำสั่ง VBA ใช้ในการ Run

```
Sub year()
m = 5
SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, AssumeLinear:= _
True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _
IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True
SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
```

```

"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverSolve
a = 0.1
Do Until (Cells(67, 14).Value < 0.1) And (Cells(68, 14).Value < 0.1) And (Cells(69, 14).Value < 0.1)
'a = Application.InputBox("Enter Value of Step length", Type:=1)
Cells(59, 16).Value = a
For i = 67 To 69
If Cells(i, 14).Value > 0 Then
Cells(i, 10).Value = Cells(i, 15).Value
End If
Next i

SolverOK SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, AssumeLinear:= _
True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _
IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True
SolverOK SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverSolve
a = a + 0.1

'm = MsgBox("Do you want to stop!", vbYesNo)
Loop

End Sub
    
```

ข้อที่ 3

หาเส้นทางที่ให้ต้นทุนต่ำที่สุด โดยมี Benefit \geq ที่กำหนดไว้ และห้ามเปลี่ยน Item ภายในปีเดียวกัน โดยใช้วิธีตัวคูณลากรางจ์

ได้คำตอบ Infeasible Solution

แต่การ Run โดยใช้ตัวคูณสามารถหาค่าที่ใกล้เคียงได้เป็น

Min Cost = 178

ได้คำตอบเหมือนการ Run Solver

Item	เส้นทาง
1	0-4
2	0-1-3-4
3	0-2-4
4	0-4

	Observe B.	Expected B.
Lag. Multi.1	275.8554251	270
Lag. Multi.2	210.4906881	210
Lag. Multi.3	184.5808737	185
Lag. Multi.4	99.40464439	98
Lag. Multi.5	292.4939779	300

ค่าที่ไม่ได้ ตามเป้าหมาย

วิชา ผลิต รหัส 48850226

Benefit1	18.30263	47.55336	43.52885	67.42077	13.75902	40.50326	51.18088	21.094652	29.48443	19.86556	67.42077	=Total B.
Benefit2	17.20521	25.61776	39.71626	52.07122	17.38915	23.72544	37.00113	18.161468	32.85753	16.28176	52.07122	
Benefit3	15.86318	28.50504	34.21832	45.18565	15.065	18.50379	31.53259	19.435526	32.97466	14.19439	45.18565	
Benefit4	1.585699	4.521425	7.250997	7.35481	1.181055	6.857519	7.09301	0.4791576	9.280289	7.668821	7.35481	
Benefit5	21.94848	54.92543	45.18515	60.55972	22.80277	34.96876	59.25867	33.281832	42.70333	34.9312	60.55972	
Value	0	-1E-25	0	1	0	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		1.02E-25	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	12	24	36	48	11	21	35	15	28	14	43.65247	=Total C.
Lagrangean C.	10.9638	21.16705	32.31599	43.65247	10.22489	17.53332	31.17051	14.278352	23.97338	10.79067		

Item1

Benefit1	13.95946	48.70842	42.88645	52.39754	15.86374	29.54075	52.05035	31.809414	40.90766	30.95458	74.45479	=Total B.
Benefit2	16.5585	28.46483	32.86116	54.32945	20.89317	22.00466	35.32467	24.811523	32.69377	18.22039	56.78356	
Benefit3	15.98713	24.93491	37.61593	46.12176	22.9823	18.50727	37.62509	23.12074	32.87325	18.32257	52.81697	
Benefit4	6.527942	7.099222	9.238935	0.055496	1.431983	8.505084	1.649461	7.8392229	8.355335	7.812115	22.84514	
Benefit5	30.83939	35.76054	38.93311	92.61667	29.30735	35.95354	52.05838	24.077475	46.25968	30.41419	97.20713	
Value	1	-9E-26	0	0	0	1	0	0	0	1		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		8.97E-26	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	11	25	32	45	15	19	33	17	27	17	37.03855	=Total C.
Lagrangean C.	8.345571	21.23323	27.63609	43.60519	14.0817	15.24361	31.05562	13.417437	22.99773	13.44938		

Item 2

วิชา ผลิต รหัส 48850226

Benefit1	22.06749	30.74306	32.56235	90.70083	20.09009	31.51254	46.02439	22.768235	43.00898	26.84167	73.75203	=Total B.
Benefit2	27.1339	23.84577	39.27902	56.86528	18.45181	24.24821	40.9163	16.979344	34.32202	26.19754	58.16779	
Benefit3	22.38921	19.86086	30.14285	48.72725	16.54728	26.78826	34.47108	15.795267	24.01321	18.72117	43.87407	
Benefit4	8.186062	12.72673	2.227602	2.97487	2.649398	14.73886	11.96893	10.600292	14.50191	9.776144	27.22864	
Benefit5	33.4475	54.68945	72.78532	64.76569	30.32541	29.91502	49.60042	23.135625	39.14692	27.02288	93.83637	
Value	0	1	0	0	0	2.47E-32	0	0	1	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				2.47E-32	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	-2.5E-32	0
Eq5				1			1		1	1	1	1
Cost	14	19	28	51	13	22	33	16	25	15	32.52061	=Total C.
Lagrangean C.	10.55158	13.73238	26.36452	47.57655	11.54406	16.00694	27.59687	11.687014	18.78823	10.86895		

Item3

Benefit1	20.77821	46.70098	63.45465	60.22784	16.81271	22.41569	36.45849	19.650592	28.42898	23.27518	60.22784	=Total B.
Benefit2	9.648893	18.4929	32.55134	43.46813	14.89331	24.78604	43.31132	15.418253	27.31537	23.63087	43.46813	
Benefit3	9.208899	21.99741	29.75023	42.70419	11.5068	24.8951	44.73351	12.18075	28.67646	20.38222	42.70419	
Benefit4	10.19624	21.02254	31.82261	41.97605	11.10887	22.26009	42.34251	16.84115	28.31167	20.73615	41.97605	
Benefit5	10.71532	21.32843	29.37246	40.89075	13.92135	20.31398	43.64707	13.121353	29.89263	21.43561	40.89075	
Value	0	0	0	1	0	0	0	0	0	0		
	x01	x02	x03	x04	x12	x13	x14	x23	x24	x34	lhs	rhs
Eq1	1	1	1	1							1	1
Eq2	-1				1	1	1				0	0
Eq3		-1			-1			1	1		0	0
Eq4			-1			-1		-1		1	0	0
Eq5				1			1		1	1	1	1
Cost	9	18	29	39	10	20	40	12	25	19	22.7067	=Total C.
Lagrangean C.	4.880867	9.405864	16.18073	22.7067	5.665083	11.60956	24.20217	5.5814579	14.33068	11.12114		

Item 4

Real Cost **178**

		Overall C.	177.354	Expected B.	Difference	New
	Lag. Multi.1	-0.02625	Overall B.1	275.8554	270	5.855425 0.366065
	Lag. Multi.2	0	Overall B.2	210.4907	210	0.490688 0.032876
	Lag. Multi.3	0	Overall B.3	184.5809	185	-0.41913 -0.02808
Solver (Benefit and Year)	Lag. Multi.4	-0.3505	Overall B.4	99.40464	98	1.404644 -0.25638
	Lag. Multi.5	0	Overall B.5	292.494	300	-7.50602 -0.5029
	Lag. Multi.6	2.278	Year1	1	1	0 2.278
	Lag. Multi.7		Year2	1	1	0 0
	Lag. Multi.8	2.214	Year3	1	1	0 2.214

Step length	0.067
-------------	-------

คำสั่ง VBA ใช้ในการ Run

Sub benefitandyear()

For i = 62 To 66

Cells(i, 10).Value = 0

Next i

m = 5

SolverOk SetCell:="\$L\$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _

"\$B\$6:\$K\$6,\$B\$21:\$K\$21,\$B\$36:\$K\$36,\$B\$51:\$K\$51"

SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, Assumelinear:= _

True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _

IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True

SolverOk SetCell:="\$L\$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _

"\$B\$6:\$K\$6,\$B\$21:\$K\$21,\$B\$36:\$K\$36,\$B\$51:\$K\$51"

SolverSolve

a = 0.001

Do Until (Cells(62, 14).Value > 0) And (Cells(63, 14).Value) > 0 And (Cells(64, 14).Value > 0) And (Cells(65, 14).Value > 0) And
(Cells(66, 14).Value > 0) And (Cells(67, 14).Value < 0.1) And (Cells(68, 14).Value < 0.1) And (Cells(69, 14).Value < 0.1)

'a = Application.InputBox("Enter Value of Step length", Type:=1)

Cells(59, 16).Value = a

For i = 62 To 66

If Cells(i, 14).Value < 0 Then

Cells(i, 10).Value = Cells(i, 15).Value

End If

Next i

```
For i = 67 To 69
  If Cells(i, 14).Value > 0 Then
    Cells(i, 10).Value = Cells(i, 15).Value
  End If
Next i

SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverOptions MaxTime:=100, Iterations:=100, Precision:=0.000001, AssumeLinear:= _
True, StepThru:=False, Estimates:=1, Derivatives:=1, SearchOption:=1, _
IntTolerance:=5, Scaling:=False, Convergence:=0.0001, AssumeNonNeg:=True
SolverOk SetCell:="$L$61", MaxMinVal:=2, ValueOf:="0", ByChange:= _
"$B$6:$K$6,$B$21:$K$21,$B$36:$K$36,$B$51:$K$51"
SolverSolve
a = a + 0.001

'm = MsgBox("Do you want to stop!", vbYesNo)
Loop
End Sub
```