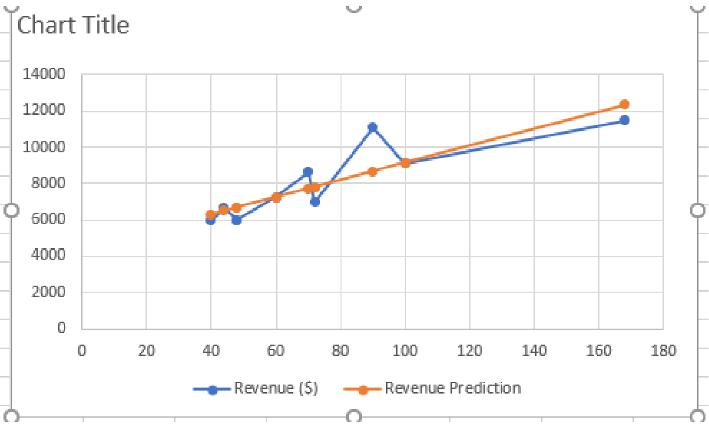
Sonny Desai

<u>HW #4</u>

1)

A)

			a=	47.070498
			b=	4435.083
Hours of Operation (X)	Revenue ($)	Revenue Prediction		
40	5958	6317.9029	-359.903	129530.1
44	6662	6506.184893	155.8151	24278.347
48	6004	6694.466887	-690.467	476744.52
48	6011	6694.466887	-683.467	467126.99
60	7250	7259.312868	-9.31287	86.729509
70	8632	7730.017852	901.9821	813571.8
72	6964	7824.158849	-860.159	739873.25
90	11097	8671.42782	2425.572	5883400.4
100	9107	9142.132804	-35.1328	1234.3139
168	11498	12342.9267	-844.927	713901.12
				9249747.6



$y = 47.0705x + 4435.08$

x=120, revenue is 10,083.50

b)

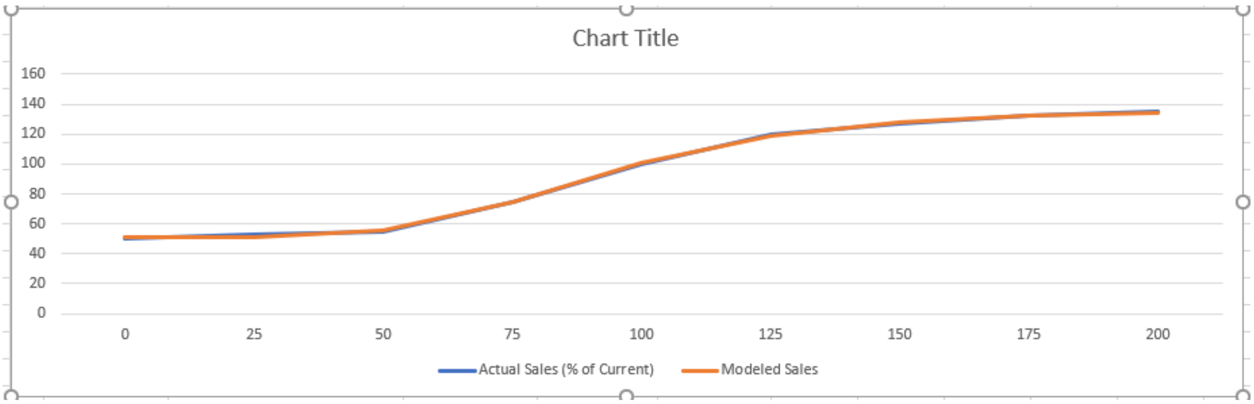
			a=	47.070498
			b=	4435.083
Hours of Operation (X)	Revenue ($)	Revenue Prediction		
40	5958	6317.9029	-359.903	129530.1
44	6662	6506.184893	155.8151	24278.347
48	6004	6694.466887	-690.467	476744.52
48	6011	6694.466887	-683.467	467126.99
60	7250	7259.312868	-9.31287	86.729509
70	8632	7730.017852	901.9821	813571.8
72	6964	7824.158849	-860.159	739873.25
90	11097	8671.42782	2425.572	5883400.4
100	9107	9142.132804	-35.1328	1234.3139
168	11498	12342.9267	-844.927	713901.12
				9249747.6

There is no need to develop further constraints because our sum of squares model solves the problem. However, a quadratic fit might be more accurate

2)

a)

Decision Variables:		**Effort (%)**	**Actual Sales (% of Current)**	Modeled Sales	Error	Error^2
a=	51.10496078	0	50	51.10496078	-1.104960783	1.220938331
b=	137.0075571	25	53	51.32515411	1.674845886	2.80510874
c=	4.526881404	50	55	55.90948247	-0.90948247	0.827158364
d=	828697644.8	75	75	74.36667537	0.633324632	0.401100089
		100	100	100.6964039	-0.696403857	0.484978333
Lower bounds		125	120	118.9239694	1.076030636	1.157841929
0		150	127	128.0226187	-1.022618713	1.045749033
0		175	132	132.2880725	-0.288072538	0.082985787
1		200	135	134.3631213	0.636878674	0.405614446
1000		Present Level				8.431475053
		500	200			
Upper Bounds						
200						
1000						
100						
9.13517E+17						



b) S = 61.84844

3)

Shipping Time	
Days	Prob
3	0.2
4	0.6
5	0.2
Total	1

Quantity Units	Demanded Prob
0	0.01
1	0.02
2	0.04
3	0.06
4	0.09
5	0.14
6	0.18
7	0.22
8	0.16
9	0.06
10	0.02
Total	1

Day	Beginning Inventory	Unites Received	Quantity Demanded	Demand Satisfied	Ending Inventory	Inventory Position	Order?	Lead Time	Order Arrives on Time
1	50	0	8	8	42	42	0	0	0
2	42	0	10	10	32	34	1	4	7
3	32	0	8	8	24	58	0	0	0
4	24	0	6	6	18	50	0	0	0
5	18	0	5	5	13	44	0	0	0
6	13	0	7	7	6	39	0	0	0
7	6	34	6	6	34	32	0	0	0
8	34	0	6	6	28	26	0	0	0
9	28	0	6	6	22	20	0	0	0
10	22	0	5	5	17	14	0	0	0
11	17	0	7	7	10	9	0	0	0
12	10	0	5	5	5	2	0	0	0
13	5	0	8	5	-3	-3	1	4	14
14	-3	34	3	3	28	26	0	0	0
15	28	0	7	7	21	23	0	0	0
16	21	0	9	9	12	16	0	0	0
17	12	0	8	8	4	7	0	0	0
18	4	0	4	4	0	-1	0	0	0
19	0	0	7	0	-7	-5	1	3	18
20	-7	0	6	-7	-13	29	0	0	0
21	-13	34	6	6	15	36	0	0	0
22	15	0	8	8	7	30	0	0	0
23	7	0	6	6	1	22	1	4	24
24	1	0	7	1	-6	50	0	0	0
25	-6	0	4	-6	-10	49	0	0	0
26	-10	0	7	-10	-17	55	0	0	0
27	-17	0	4	-17	-21	65	0	0	0
28	-21	34	3	3	10	82	0	0	0
29	10	0	6	6	4	79	0	0	0
30	4	0	8	4	-4	73	1	4	29

Decision vairables	
Reorder Point	40
Order Quantity	34

Reorder point 41, order quantity of 29 provides monthly maximum profit.

4)

Reservations	107
Prob of no show	0.05
Rooms Used	100
Revenue	$16,050
Vairable Costs	$3,000
Overbooking Costs	$0
Profit	$13,050
Expected Profit	$12,664

5)

	A	B	C	D	E	F
1				Min	Expected	Max
2		Investment	=PsiTriangular(D2,E2,F2)	3000000	4000000	6000000
3		No. of periods	=INT(PsiUniform(D3,F3))	3		8
4		Units sold per year	=PsiTriangular(D4,E4,F4)	50	250	350
5		Selling price	23000			
6		Yearly manufacturing cost	=PsiTriangular(D6,E6,F6)	12000	14000	18000
7		Unit contribution	=C5-C6			
8		Yearly net cash flow	=C7*C4			
9		Cost of capital	0.15			
10		PV of net cash flow	=-PV(C9,C3,C8)			
11		NPV of project	=C10-C2+PsiOutput()			

Expected Npv would be the mean value as per the graph i.e. 1586660.82 dollars.

There 27.8% chance that the NPV will be less than zero. And the rest 72.2% chance that it will generate a positive NPV.