**2-18.**colds=200,colds and exercise=45,colds and no exercise=155,employees=1000,exercixe=500

(a)P(colds)=200/1000=0.2 (b)P(colds|exercise)=P(colds∩exercise)/P(exercise)=[(200/1000)\*(45/200)]/[500/1000]=0.09.

(c)P(colds|noExercise)=P(colds∩noExercise)/P(noExercise)=[(200/1000)\*(155/200)]/[(500/1000)]=0.31.

(d)P(colds|exercise)=0.9<>P(colds)=0.2, Exercising and getting a cold is dependent

**2-21.**P(Abu∩B)=(1/2)\*(20/40)=0.25, P(Abu∩F)=(1/2)\*(20/40)=0.25, P(EI∩B)=(1/2)\*(32/40)=0.4, P(EI∩F)=(1/2)\*(8/40)=0.1,

P(Abu|B)=P(Abu∩B)/P(B)=0.25/(0.25+0.4)=0.3846, P(EI|B)=P(EI∩B)/P(B)=0.4/(0.25+0.4)=0.61538.

**2-22.**P(2B∩Abu)=(1/2)\*(20/40)\*(20/40)=0.125,P(2B∩EI)=(1/2)\*(32/40)\*(32/40)=0.32,P(EI|2B)=(0.32)/(0.125+0.32)=0.719.

**2-26.**(a) P(D∪S)=(0.9+0.95)-(0.9\*0.95)=0.995,(b)P(D∩S)=0.9\*0.95=0.855,(c)Yes,assumed events are independent,

P(D∩S)=P(D)\*P(S) **2-40** μ=457000,90%接近2倍σ，所以以95%查Z值，查詢Z(1.64)=0.9495,Z(1.65)=0.9505，P=0.9499接近0.95,

Z=1.64485,因為Z=(X-μ)/σ，所以σ=(X-μ)/Z=(460000-457000) /1.64485 = 1823.87.

**2-44.**Possion distribution,λ=5 per day,P(x)=[( λ^x)\*(e^-λ)]/(x!) =[( 5^x)\*(e^-5)]/(x!) =[( 5^x)\*(0.0067)]/(x!)

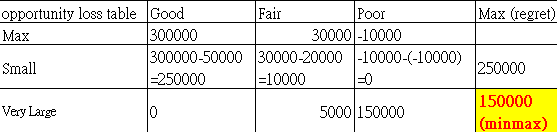
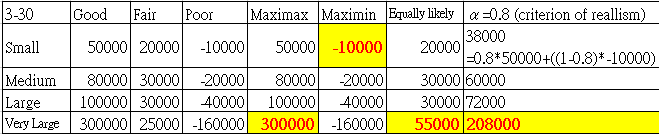
P(0)=0.0067\*(5^0/0!) = 0.0067, P(1)=0.0067\*(5^1/1!) = 0.0335, P(2)=0.0067\*(5^2/2!) = 0.08375, P(3)=0.0067\*(5^3/3!) =0.13958,

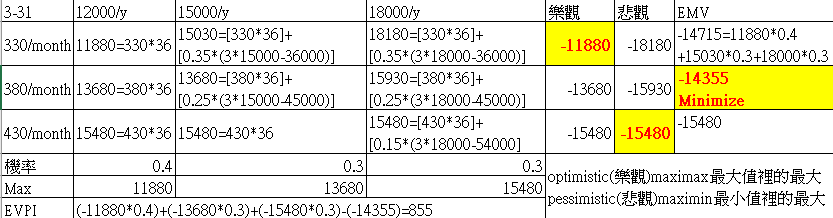
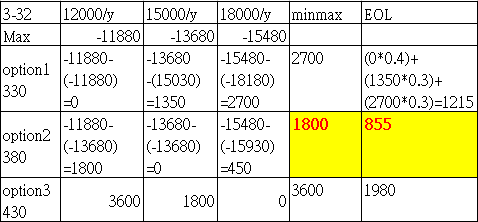
所以P(x>3)=1-[P(0)+P(1)+P(2)+P(3)]=0.73647 **2-48.**Win-right 80% : P(W∩right)=(1/2)\*(80/100)=0.4(Win), Win-wrong 20% : P(W∩wrong)=(1/2)\*(20/100)=0.1(Lose)。Lose-right 90% : P(L∩right)=(1/2)\*(90/100)=0.45(Lose), Lose-wrong 10% : P(L∩wrong)

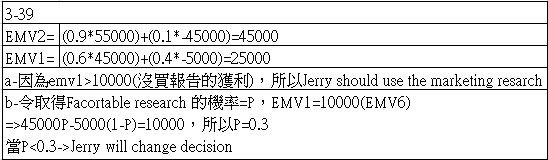
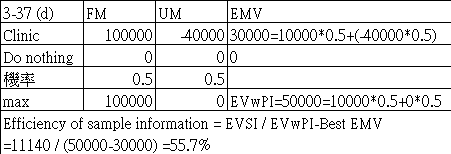
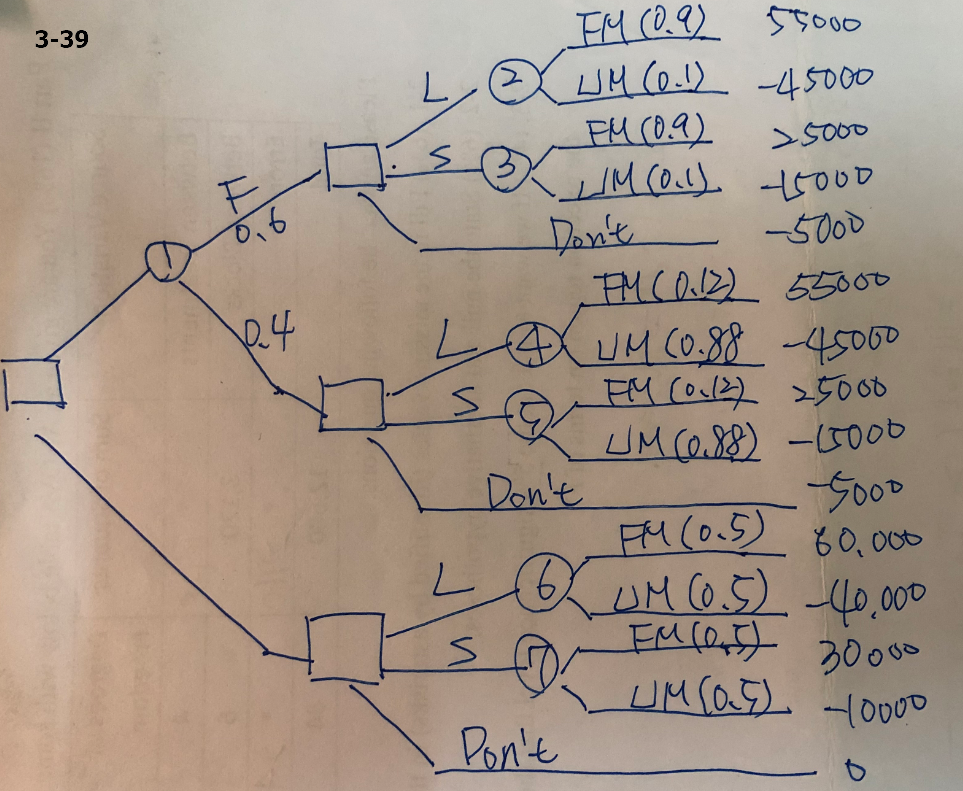
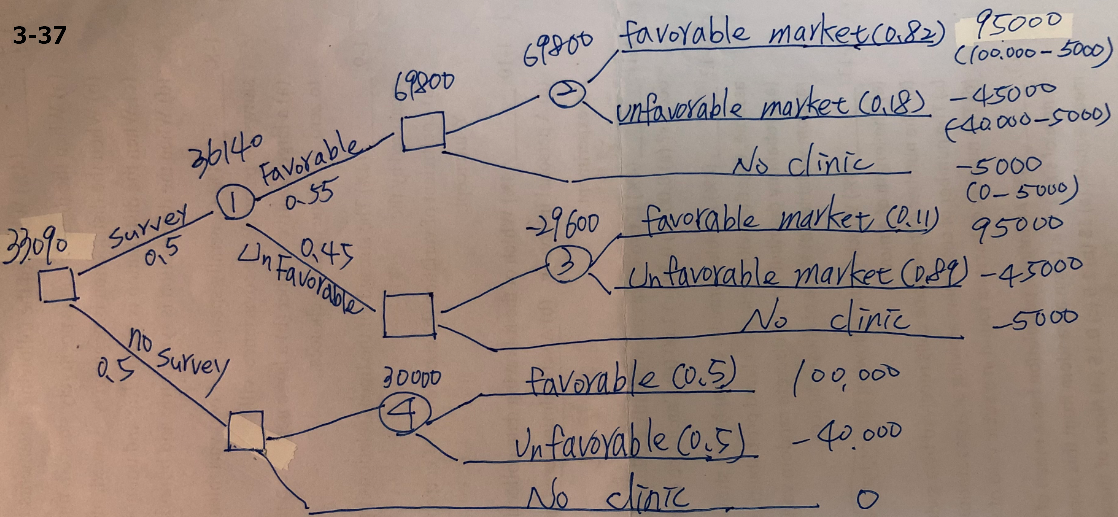
=(1/2)\*(10/100)=0.05(Win)。結論P(win|Predictd Win)=0.4/(0.4+0.05) = 0.89, P(Lose|Predictd Lose)=0.45/(0.1+0.45) = 0.82。

**2-55.** 1 call 4 min =>1/4 call per min,Exponential distribution, μ=1/4 permin,P(X<=t)=1-e^ (-μt)=1-e^(-t/4),(a)P(X<=3)=1-e^(-3/4)=0.528,

,(b)P(X<=4)=1-e^(-4/4)=0.632, (a)P(X<=5)=1-e^(-5/4)=0.713,P(X>5)=1-P(X<=5)=1-0.713=0.287.

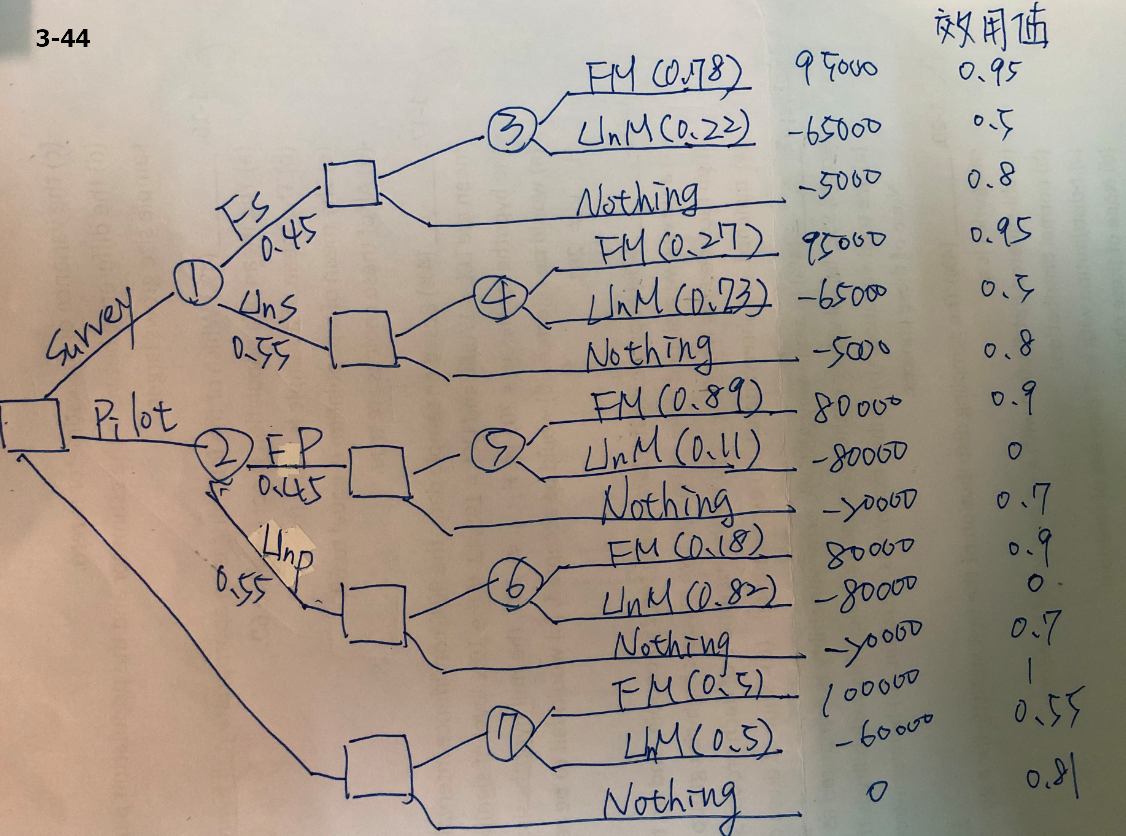
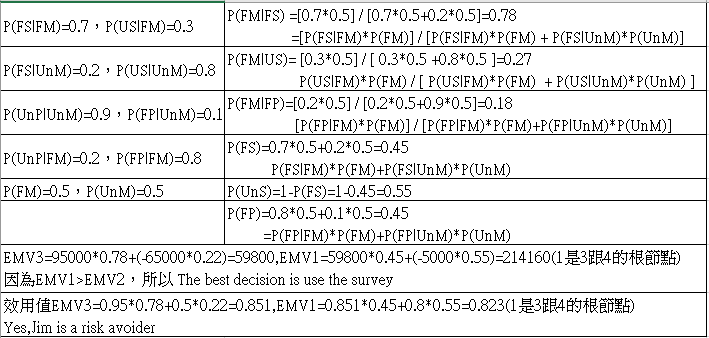




**3-37-**(b)-EMV1=(0.55\*69800)+(0.45\*-5000)=36140。如果取得Favorable study，會選擇favorable market。如取得unfavorable study，則會選擇不要開診所。有買study，獲利會比沒買study高。

(c)-ESVI=[(EVA1)36140]+5000(成本)-30000=11140。買報告的預算金額為11140元。

**5-35**-(B)Seasonal index Q1=Sum(Seasonal ratio Q1)/3,0.882+0.885+0.88/3=0.882,Q2=Sum(Seasonal ratioQ2)/3,0.987+0.985+0.973/3=0.982

Q3=Sum(Seasonal ratioQ3)/3,0.969+0.983+0.962/3=0.971,Q4=Sum(Seasonal ratioQ4)/3,1.156+1.142+1.173/3=1.157。

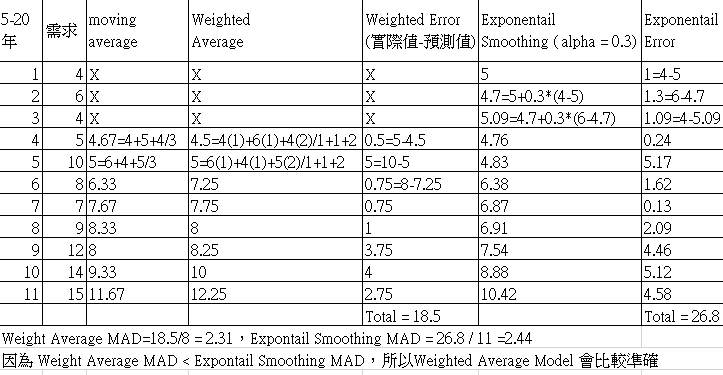
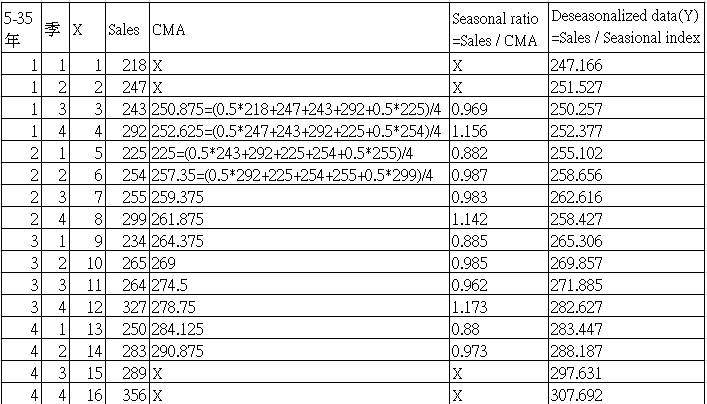
(C)令X=number of periods,Y=Deseasonalized data，Y=b0+b1X,X bar=8.5，Y bar=268.993，Σ(X-Xbar \* Y-Ybar )=1245.762，

Σ(X-Xbar)^2=340,b1=Σ[(X-Xbar)\*(Y-Ybar)] / Σ(X-Xbar)^2=1245.762/340=3.664

b0=Ybar - b1\*Xbar=268.993-3.664\*8.5=237.779，Y=237.779+3.664X

(D)(Y5,Q1)=237.779+3.664\*17=300.067\*0.882=264.66,(Y5,Q2)=237.779+3.664\*18=303.73\*0.982=298.26

(Y5,Q3)=237.779+3.664\*19=307.395\*0.971=298.48,(Y5,Q4)=237.779+3.664\*20=311.059\*1.157=359.9

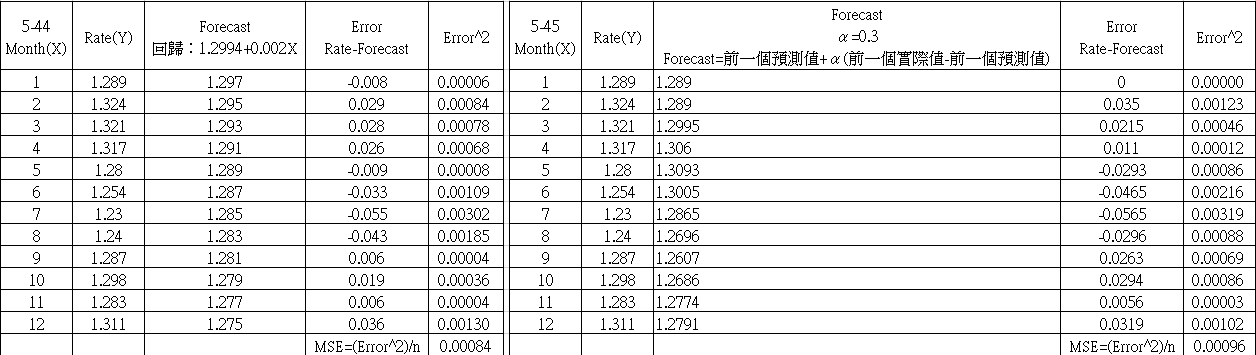
 

**5-37.** (a) Y=bo+b1X,令X=period,Y=Sales，經計算X bar=8.5,Y bar=194.75,Σ[(X-X bar)^2]=340,Σ(X-X bar)\*(Y- Y bar)=-114,代入b1公式，b1=-114/340=-0.335,b0=194.75-(-0.335)\*8.5=197.598,Y=197.598-0.335X。

Y5Q1=197.598-0.335\*17=191.903,Y5Q2=197.598-0.335\*18=191.568,Y5Q3=197.598-0.335\*19=191.233,Y5Q4=197.598-0.335\*20=190.898

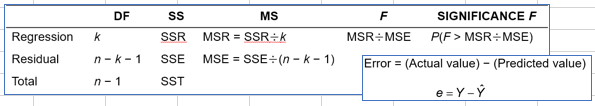
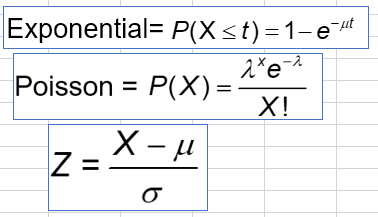
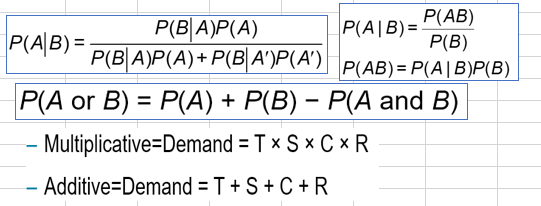
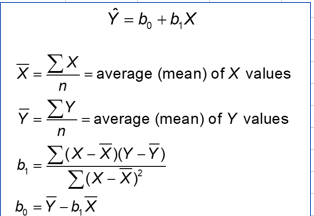
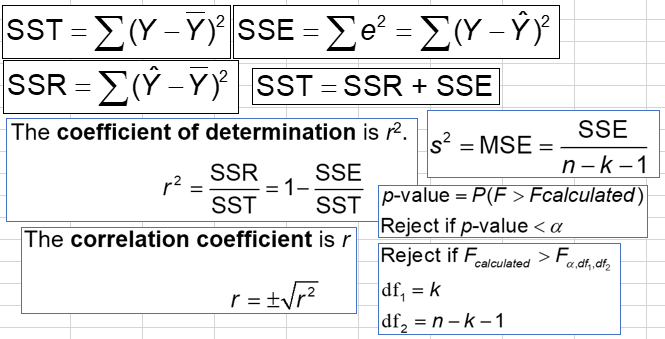
結論：由斜率趨勢線得知，銷售趨勢漸漸(b)Y1=b0+b1X，令X=period,Y1=Deseasonalized data，經計算 X bar=8.5，Y1 bar=195.458，b1=747.301/340=2.198,b0=195.458-2.198\*8.5=176.775,Y1=176.775+2.198X，由斜率趨勢線得知，銷售趨勢逐漸上升。

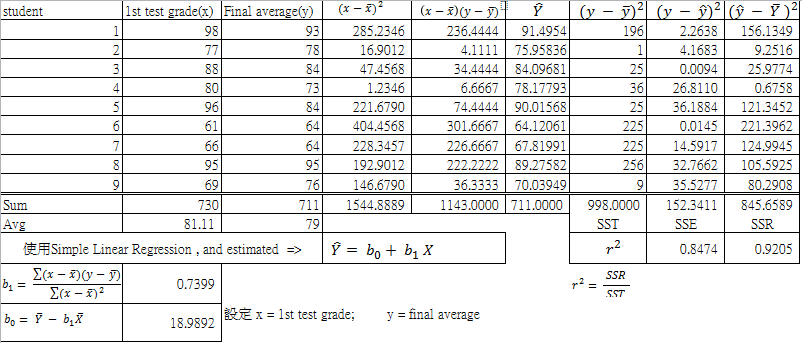
(c) a 與 b的趨勢線最大差異於a結果是受季節性影響，b是去除季節性因素的結果。



**5-44.** regress model=1.2992+(-0.0020)X，2010年-Jane=>X=13，y預估=1.2732。2010年-Feb=>X=14，y預估=1.2712。

**5-45.** Simple liner regression之MSE為0.00084，Exponential Smoothing之MSE為0.00095，因Simple liner regression之MSE較小，所以預測方式比較好。



**4-13.** (a)迴歸=18.979+0.74X。

(b)X=83，代入公式，Y的預估值=80.399。

(c)r square=0.8474，基於迴歸方程式中Y解釋84.7%的變異程式。

**4-14.**alpha=0.05,k=1,n=9。MSR=SSR/K=845.982

，MSE=SSE/n-k-1=21.763。F=MSR/MSE=38.872

假設檢定H0:B1=0，H1:B1<>0。

查表：F0.05,1,7=5.59，

38.872(計算值)>5.5(查表)，所以reject Ho，there is a relationship between lst and final avergae。

* Weighted average = α(best in row)+ (1−α)(worst in row)
* Minimax Regret =Based on opportunity loss or regret
* EVPI = EVwPI − Best EMV
* EVSI= (EV with SI + cost) − (EV without SI)