ASSIGNMENT1_ Econometrics

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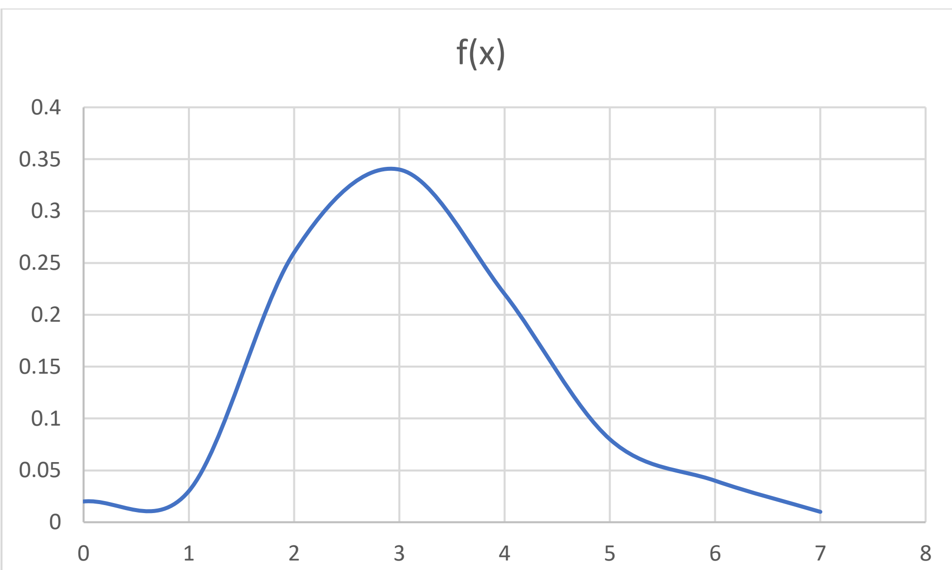
P4.

a) Rep in northern / total size in Northern = 0.18 /0.6 = 0.3
   There is a chance of 30% that we will choose a republican. Given that we choose randomly from Northern City
b) political affiliation and region of residence are statistically dependent random variables because The conditional probability of choosing a republican or democrat from a region is different than choosing them from the full set.
c) Expected value of PA = P(R=0) + P(I=2) + P(D=5)
   P(Rep) = 0.42
   P(Indep) = 0.16
   P(Democ) = 0.42
   Mathematical expectation of PA = (0.42*0) + (0.16*2) +(0.42*5) = 0.32 + 2.1= 2.42
d) E(Ax+b) = a.E(X) + b
   X = 2PA + 2PA^2 = 2(2.42) + 2(2.42^2) = 4.84 + 11.71 = 16.55

P12.



b) f(2) + f(3) +f(4) = 0.26 + 0.34 + 0.22 = 0.82 or 82% chance

c) probability that more than 3 students are absent on Monday

1 – [f(0) + f(1) + f(2) +f(3)]

1- [0.02 + 0.03 + 0.26 + 0.34]

1-0.65 = 0.35 or 35% chance .

d)E(X) = summation (x*f(x)) = 3.16

This means that If we repeat this experiment many times, the values the arithmetic average of all the numerical values will approach 3.16 as the number of draws becomes large. The key point is that the expected value of the random variable is the average value that occurs in many repeated trials of an experiment.

e) Variance = x^2.f(x) – (E(X)) ^2
   = 11.58 – (3.16) ^2
   = 1.594
   Standard deviation = sqrt (1.594)
   = 1.26

f) Y=7X+3
   E(Ax+b) = a.E(X) + b
   Expected value of Y = 7(3.16) +3 = 25.12

   Var(Ax+b) = A^2.var(X)

   Var = 7^2.(1.594)
   Variance in Y = 78.106

P.13

Mean = 5.00 std dev = 4.0

Z = X – mean/ std dev

a) Probability for negative value
   Z= 0-5/4 = -1.25
   P – value from table1 is 0.1056 so there less than 10.56% chance that return could be negative.
b) Exceed 15%
   Z= 15 – 5 / 4 = 10/4 = 2.5
   P- value from table 1 is 0.9798 so 1-0.9798 = 0.0202
   There is a chance of 2.00% that returns will exceed 15%
c) Mean = 7% and std dev 7%
   Probability for negative value :
   Z = 0-7/7 =-1.00
   P value from table1 is 0.1587
   So there is a probability of 15.87% that return could be negative

Probability that return could exceed 15%
Z = 15-7 / 7 = 1.14
P value from table1 is 0.8729
1 – 0.8729 = 0.1271
So there is a 12.71 % chance that returns could exceed 15%

I would advise to stick with 5% return with 4% deviation for customers who are not pro risk and looking for modest returns. And give plan 7% return with 7% deviation to customers who are willing to take more risk but also looking for aggressive returns.

P.14

Stock A --- mean = 4% and stdev = 8%

Stock B --- mean = 8% and stddev = 12%

P = 0.25A + 0.75B

a) Expected value of the portfolio is
E(Ax + BX +c)= A.E(X) + B. E(X) +c
= 0.25*4 + 0.75*8 +0
= 1 +6 = 7% return is expected
b) Var(Ax + By) = A^2var(X) + B^2var(Y) + 2AB. Cov(X,Y)
St dev = sqrt (var(X))

Perfect Positive correlation

VAR = 0.25^2 . (8^2) + 0.75^2 .(12^2) + 2(8*12)

= 4 + 81 + 192

= 277

ST DEV = 16.64 %

C) Var(Ax + By) = A^2var(X) + B^2var(Y) + 2AB. Cov(X,Y)

St dev = sqrt (var(X))

CORRELATION is 0.5

VAR = 0.25^2 . (8^2) + 0.75^2 .(12^2) + 2(8*12)* 0.5

VAR = 4 + 81 + 96

= 181

STD DEV = 13.45 %

D) Var(Ax + By) = A^2var(X) + B^2var(Y) + 2AB. Cov(X,Y)

St dev = sqrt (var(X))

Correlation is 0

VAR = 0.25^2 . (8^2) + 0.75^2 .(12^2) + 2(8*12)* 0

VAR = 4 + 81

= 85

STD DEV = 9.2 %

P.18

	X	x- Xmean	(x-Xmean)^2	x^2	mean	3
	1	-2	4	1		
	3	0	0	9		
	5	2	4	25		
	3	0	0	9		
SUMMATIONS		0	8	44		

a) 3
b) 0
c) 8
d) 44 – 4(3^2) = 44 – 36 = 8

E) HANDWRITTEN and pasted below

P. 18 (e)

$$\sum_{i=1}^{n} (x_i - \bar{x})^2 = \left(\sum_{i=1}^{n} x_i^2\right) - n\bar{x}^2$$

$$\sum_{i=1}^{n} (x_i^2 - 2x_i\bar{x} + \bar{x}^2) = \left(\sum_{i=1}^{n} x_i^2\right) - n\bar{x}^2$$

$$\cancel{\left(\sum_{i=1}^{n} x_i^2\right)} - 2\bar{x}\sum_{i=1}^{n} x_i + \sum_{i=1}^{n} \bar{x}^2 = \cancel{\left(\sum_{i=1}^{n} x_i^2\right)} - n\bar{x}^2$$

$$-2\bar{x}\sum_{i=1}^{n} x_i + n\bar{x}^2 = -n\bar{x}^2$$

$$\frac{\cancel{+2}\,\cancel{\bar{x}}\sum_{i=1}^{n} x_i}{\cancel{\bar{x}}} = \frac{\cancel{+2}\,n\bar{x}^{\cancel{2}}}{\cancel{\bar{x}}}$$

$$\frac{\sum_{i=1}^{n} x_i}{n} = \bar{x}$$

p.19

P.19

$$\sum_{i=1}^{n} (x_i-\bar{x})(y_i-\bar{y}) = \sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y}$$

$$\sum_{i=1}^{n} (x_i y_i - \bar{y}x_i - \bar{x}y_i + \bar{x}\bar{y}) = \sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y}$$

$$\cancel{\sum_{i=1}^{n} x_i y_i} - \bar{y}\sum_{i=1}^{n} x_i - \bar{x}\sum_{i=1}^{n} y_i + \sum_{i=1}^{n} \bar{x}\bar{y} = \cancel{\sum_{i=1}^{n} x_i y_i} - n\bar{x}\bar{y}$$

$$-\bar{y}\sum_{i=1}^{n} x_i - \bar{x}\sum_{i=1}^{n} y_i + n\bar{x}\bar{y} = -n\bar{x}\bar{y}$$

$$\frac{-\bar{y}\sum_{i=1}^{n} x_i}{n} - \frac{\bar{x}\sum_{i=1}^{n} y_i}{n} = \frac{-2\cancel{n}\bar{x}\bar{y}}{\cancel{n}}$$

$$-\bar{y}\,\bar{x} - \bar{x}\,\bar{y} = -2\bar{x}\bar{y}$$

$$\cancel{-}2\bar{x}\bar{y} = \cancel{-}2\bar{x}\bar{y}$$