NOVEMBER 2018 PROFESSIONAL EXAMINATIONS
QUANTITATIVE TOOLS IN BUSINESS (PAPER 1.4)
CHIEF EXAMINER'S REPORT, QUESTIONS AND MARKING SCHEME

EXAMINER'S GENERAL COMMENTS

The Quantitative Tools in Business, Paper 1.4, written in November was well written and the questions adequately covered the Level One Syllabus and the ICAG Manual.

STANDARD OF THE PAPER

The standard of the Paper was a little higher than the May 2018 diet, and the format and style were similar to previous Papers (November 2017, May 2017, November 2016, May 2016). There were no identifiable ambiguities or typing errors in the paper The marking scheme was well- drawn up; every sub-question had marks duly allocated, and the marks were adequate for each question. The marking scheme was straight forward and candidates were rewarded for any meaningful attempts made.

PERFORMANCE OF CANDIDATES

The general performance of candidates can be described as below average. Majority of the candidates who wrote the paper at centres across the country performed poorly, with many scoring below 45%. A few candidates scored below 20%. There were no traceable copying by candidates, except that some candidates did not number their answers very well, which made some examiners have challenges trying to separate answered questions for marking and scoring. Many candidates attempted the recommended five question, but scored very low marks on two or more of the five questions. Per the scripts submitted for marking in this year's November Examination diet, one will conclude that candidates' preparation for the paper was inadequate as compared to previous diets, and this is reflected in the general performance of the candidates. However, some students could still manage 20/20 on one or two questions, and a couple of candidates could manage marks as high as 75% .

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NOTABLE STRENGTHS & WEAKNESSES OF CANDIDATES

Candidates' notable strengths in the performance were on Forecasting (QUESTIONS ONE & ,SIX), Calculus (QUESTION TWO) and Statistics (QUESTION SEVEN). Majority of the candidates could easily form a frequency table and do simple calculations of/on the summary statistics (mean, mode, draw the ogive) and could use the calculator very well in the QUESTIONS, ONE, SIX & SEVEN. The less patronized questions were QUESTIONS, THREE & FOUR. I suggest ICAG encourage the teaching of the subjects: Mathematical Finance & Probability in all the regional capitals).

Candidates' main weaknesses were: lack of basic knowledge of concepts and inadequate preparation by some candidates for the exams. This is reflected in their inability to explain simple terms such as correlation coefficient and to give

properties of the normal distribution.. Many candidates could not interpret the figures after they had calculated them. This weakness was widespread among most candidates.

Refer to the detailed question-by-question analysis of performance below for more on these and other weaknesses:

QUESTION ONE

a) Explain the term ***Coefficient of Correlation*** in forecasting. **(3 marks)**

b) The study time in minutes and the number of errors on a mock examination paper made by ten (10) ICAG students are given below:

Student	1	2	3	4	5	6	7	8	9	10
Study Time (minutes)	90	100	130	150	180	200	220	300	350	400
Number of errors	25	28	20	20	15	12	13	10	8	6

Required:

i) Determine how many errors a student would make in the examination if he studied for 280 minutes. **(8 marks)**

ii) Determine the expected change in number of errors if there is 1 minute change in study time. **(2 marks)**

iii) Compute Pearson Product Moment Correlation coefficient between study time and number of errors made. **(5 marks)**

iv) Compute the coefficient of determination between study time and number of errors made and comment on your results. **(2 marks)**

(Total: 20 marks)

QUESTION TWO

a) What is a ***Stationary Point*** of a differentiable function of one variable? **(2 marks)**

b) Renes Trading Company sells q kente strips per month at p Ghana Cedis per Kente strip. The demand function for kente strips is given by $\boldsymbol{p=300-0.02q}$. The kente strips cost GH¢30 per strip to manufacture. There are fixed costs of GH¢9,000 per month.

Required:

i) Determine the price per kente strip that will maximize revenue. **(4 marks)**

ii) Determine the quantity where profit is maximized. **(4 marks)**

iii) Calculate the maximum profit. **(2 marks)**

c) Due to changes in market conditions, the company finds the demand q, in thousands, for their kente strips to be $\boldsymbol{q=400-p^2}$ at a price of GH¢p (p Ghana Cedis).

Required:

i) Determine the elasticity of demand when the price is GH¢5 and when the price is GH¢15 per kente strip. **(6 marks)**

ii) Comment on your results in (i). **(2 marks)**

(Total: 20 marks)

QUESTION THREE

After the collapse of a Savings and Loans Company, depositors who were able to recover funds lodged with the company are seeking alternative avenues of investment. You have been called upon to advise the following clients on investment decisions they have to make.

a) Kwabena was able to recover GH¢150,000 out of GH¢200,000 invested in the Savings and Loans Company. How much money should he invest at a return of 6% per annum so as to earn an annual income of GH¢15,000 for a period of 10 years? **(10 marks)**

b) Kasuli, a Marketing Executive who could not recover any amount out of his investment decided to take a mortgage at an interest rate of 15% over a 20 year term. If his income is enough to enable him to pay GH¢1,400 per month, what is the maximum amount he can borrow? **(10 marks)**

(Total: 20 marks)

QUESTION FOUR

a) When is the mode preferred to the mean or the median as a measure of central tendency? **(5 marks)**

b) BomBo, a market researcher at a major African Automobile Company (African Moon) classified households by car ownership. The relative frequencies of households for each category of ownership are shown below:

Number of Cars Per Household	Relative Frequencies
0	0.10
1	0.30
2	0.40
3	0.12
4	0.06
5	0.02

Required:

i) Calculate the expected value of the random variable. **(4 marks)**

ii) Calculate the standard deviation of the random variable. **(4 marks)**

iii) Draw Relative Percentage Histogram for the data. **(4 marks)**

iv) Using (i)-(iii) comment on the distribution of the data. **(3 marks)**

(Total: 20 marks)

QUESTION FIVE

a) The normal distribution is a probability distribution which usually applies to continuous variables.

Required:

i) State **FOUR (4)** properties of the Normal Distribution. **(4 marks)**

ii) State **TWO (2)** examples of phenomena which closely follow a Normal Distribution. **(2 marks)**

b) In a study commissioned by Ofo Stores, the researcher examined the spending habits of the residents of Kojokrom. He found the spending habits to be normally distributed with mean of GH¢700 and standard deviation of GH¢70.

Required:

a) Determine the probability that a resident selected at random spends:

i) Less than GH¢620 **(3 marks)**

ii) More than GH¢1,000 **(3 marks)**

iii) Between GH¢800 and GH¢900 **(4 marks)**

b) Calculate the amount:

i) Above which 80% of the residents will spend in a week. **(2 marks)**

ii) Below which 30% of the residents will spend in a week. **(2 marks)**

(Total: 20 marks)

QUESTION SIX

a) State the **TWO (2)** main models of time series analysis. **(2 marks)**

b) Membership of Pro Amalion, a network of professional volunteers, has grown over the years but in the months of the second quarter there was always a decline. The table below shows membership records for a period of four years:

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Year 1	713	694	735	755
Year 2	767	733	766	780
Year 3	787	755	798	814
Year 4	816	790	826	843

Required:

i) Calculate the centred four-quarterly moving average of membership. **(4 marks)**

ii) Using a least squares trend equation base on (i) above, calculate the trend values. **(5 marks)**

iii) Using (ii) above, calculate the percentage seasonal variation and the average seasonal variation of membership. **(5 marks)**

iv) Determine the seasonally adjusted forecast of membership for each of the four quarters of Year 5. **(4 marks)**

(Total: 20 marks)

QUESTION SEVEN

a) Royal Driving School is considering investing in a profitable project. The school is given the following investment alternatives and percentage rates of return.

Investment	**Market Conditions**		
	Good	**Moderate**	**Poor**
Regular shares	8%	5%	2%
Risky shares	15%	7%	-5%
Property	20%	10%	-10%

Over the past 300 days, market conditions have been moderate for 150 days and good for 60 days.

Required:

i) Calculate the expected return for each type of investment. **(4 marks)**
ii) Determine the optimum investment strategy for Royal Driving School. **(3 marks)**

b) The number of errors made by 294 students of Royal Driving School in their first attempt at a driving test is grouped in the following frequency distribution:

Number of Errors	**Number of Students**
7 – 13	3
14 – 20	12
21 – 27	23
28 – 34	44
35 – 41	54
42 – 48	56
49 – 55	43
56 – 62	24
63 – 69	23
70 – 76	12

Required:

i) Compute an estimate of the mean and mode for the distribution. **(3 marks)**
ii) Construct an ogive for the distribution. **(4 marks)**
iii) Using the ogive in (ii) above estimate the median for the distribution. **(3 marks)**
iv) Use the ogive in (ii) above to estimate the percentage of errors within one standard deviation of the mean. **(3 marks)**

(Total: 20 marks)

SOLUTION TO QUESTIONS

QUESTION ONE

a)

A coefficient of correlation is a statistical measure of the degree to which changes to the value of one variable predict change to the value of another. In positively correlated variables, the value increases or decreases in tandem. In negatively correlated variables, the value of one increases as the value of the other decreases.

(3 marks)

b)

i)

Time of Study (X)	**Number of Errors (Y)**	**XY**	**X^2**	**Y^2**
90	25	2250	8100	625
100	28	2800	10000	784
130	20	2600	16900	400
150	20	3000	22500	400
180	15	2700	32400	225
200	12	2400	40000	144
220	13	2860	48400	169
300	10	3000	90000	100
350	8	2800	122500	64
400	6	2400	160000	36
2120	**157**	**26,810**	**550,800**	**2,947**

$y=a + bx$

$b = \frac{n\sum xy - \sum x\sum y}{n\sum x^2 - (\sum x)^2}$; $a = \frac{\sum y}{n} - \frac{b\sum x}{n}$

$b = \frac{10X26810 - 2120X157}{10X5508000 - 4494400} = \frac{-64740}{1013600} = -0.064$

$a = \frac{157}{10} - \frac{(-0.064X2120)}{10} = 15.7 + 13.57 = 29.27$

Thus the regression equation is Y = 29.27-0.064X

When X=280

Y= 29.27 -0.064(280) = 11.35

ie a student who studied for 280 minutes is expected to make 11 errors

(8 marks)

ii)

Expected change in number of errors if there is 1 minute change in study time is 0.064 minutes or 3.84 seconds.

(2 marks)

iii)

$$r = \frac{n\sum XY - \sum X\sum Y}{\sqrt{[n\sum X^2-(\sum X)^2][n\sum Y^2-(\sum Y)^2]}}$$

$$r = \frac{10X26810 - 2120X157}{\sqrt{[10X550800 - 2120^2][10X2947 - 1572]}}$$

$$\frac{-64740}{\sqrt{1013600X4821}} = -0.9261$$

(5 marks)

iv)

$r^2 = (-0.9261)^2 = 0.8577$

The coefficient of determination between study time and number of errors made is 85.77%

This means 85.77% of the variation in number of errors made is due to study time.

(2 marks)

(Total: 20 marks)

EXAMINER'S COMMENTS

This was the most popular question among candidates, and a few candidates who answered it scored extremely high marks 19/20, 20/20. However, many candidates performed extremely poorly/low on this question. i.e, 1 Mark, 2. Marks.

QUESTION TWO

a)

A stationary point of a differentiable function of one variable is a point (of the domain) of the function where the derivative is zero. Equivalently, the slope of the graph at that point is zero.

(2 marks)

b)

i) The demand function is given by $p=300-0.02q$

Thus the Total Revenue, $TR(q) = (300-0.02q)q = 300q-0.02q^2$

The critical points of revenue is obtained by taking the derivative of TR(q)

ie For maximum revenue, $\frac{dTR(q)}{dq} = 0$

$\frac{dTR(q)}{dq} = 300-0.04q$

$300-0.04q=0$

$q=7500$

and $\frac{dTR(q)}{dq} = -0.04 < 0$

Thus revenue is maximum at q=7500

Price that maximizes revenue is

p=300=0.02(7500) = 150 GH₵ **(4 marks)**

ii)

Since $p=300-0.02q$

And $R(q) = 300q-0.02q^2$

The cost function using the variable cost of GH₵ 30 per item, plus the fixed cost is:

TC(q)=9000+30q.

The Profit function is:

$P(q)=TR(q)-TC(q) = (300q-0.02q^2)-(9000+30q)$

$P(q)= -0.02q^2+270q-9000$

The critical points of Profit is obtained by taking the derivative of P(q)

ie $\frac{dP(q)}{dq} = -0.04q+270$

$\frac{dp(q)}{dq} = 0$ ie q =6750

$\frac{d^2P(q)}{dq^2} < 0$

Thus only critical point is at q=6750

Profit is maximized when they sell 6750 kente strips

(4 marks)

iii) Maximum profit, $P = -0.02(6750)^2+270(6750)-9000$

$P= -911250+1822500-9000$

P=GH₵ 90,2250

(2 marks)

(c)

(i) $q = 400 - p^2$

Price Elasticity of Demand, $PED=\frac{dq}{dp}\times\frac{p}{q}$, when $p = 5$

$\frac{dq}{dp} = -2p\big|_5 = -2(5) = -10$

Therefore $PED=-10\times 5/(400-5^2) = -0.133$

When $p = 15$ we have

PED= when $-2(15) \times 5 / (400 - (15)^2) = -2.57$

(6 marks)

(ii) It is inelastic at price 5 and elastic at 15.

(2 marks)

EXAMINER'S COMMENTS

Interestingly, Question Two was the second most popular question among candidates after Question One, and those who answered it did well with the average mark hovering around the figure 10/20. Candidates who attempted this question could easily differentiate the cost and revenue functions. However, only a handful of the candidates could explain the term stationary point and interpret elasticity values computed in sub-question (c). A few candidates gave excellent answers for this question and scored high marks. i.e. 19.5/20, 20/20, 20/20.

QUESTION THREE

(a) Using the present value formula, we have

$$\text{PV} = R\left[\frac{1-(1+i)^n}{i}\right]$$

$$\text{PV} = 15{,}000\left[\frac{1-(1+0.06)^{-10}}{0.06}\right] = 15{,}000(7.36) = GHS110{,}400.00$$ **(10 marks)**

(b) PV= when $14{,}000\left[\frac{1-(1+0.15)^{-240}}{0.0125}\right] = 1328.99 / 0.0125 = GHS106{,}319.2$

(10 marks)

(Total: 20 marks)

EXAMINER'S COMMENTS

Question Three was the least patronized question among candidates. A couple of candidates scored 20/20. Most candidates could not identify and compute the monthly interest rate and the investment time. . In fact, Candidates were ill-prepared for the Mathematics of Finance questions.

QUESTION FOUR

a) The Mode is preferred as a measure of central tendency if the underlying data understand is not numeric and so cannot be arranged in ascending or descending order of magnitude. **(5 marks)**

b)

i) $E(X) = 0\times0.10 + 1\times0.30 + 2\times0.40 + 3\times0.12 + 4\times0.06 + 5\times0.02 = 1.8$ **(4 marks)**

ii) $E(X^2) = 0^2\times0.10 + 1^2\times0.30 + 2^2\times0.40 + 3^2\times0.12 + 4^2\times0.06 + 5^2\times0.02 = 4.44$

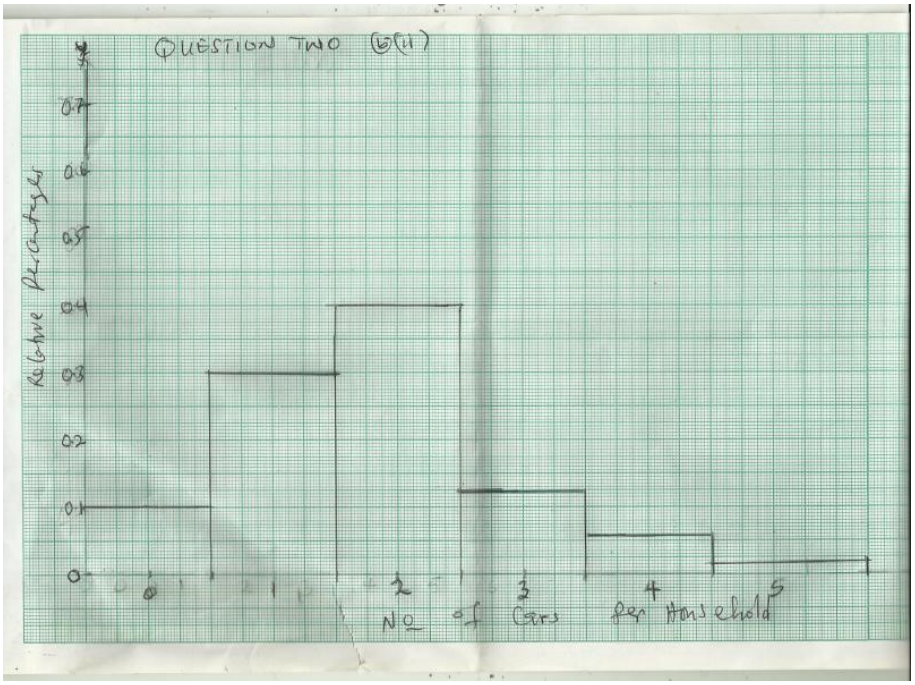
and $Std(X) = \sqrt{1.2} = 1.095$ **(4 marks)**

iii) **(4 marks)**

iv) The distribution of number of cars is positively skewed. **(3 marks)**

(Total: 20 marks

Relative Percentage Histogram



EXAMINER'S COMMENTS

It can be adjudged the second least popular question after Question THREE. Candidates who answered this question performed averagely well. In fact, they could easily draw the relative frequency and a Histogram. . Candidates could also do the calculation of the expected random variable. However, many candidates who tackled the question could not deliver (give) when the mode is preferred to the mean and the median, and could hardly give a meaningful comment on the data using the graph or the summary measures computed.

QUESTION FIVE

a) **Properties of the Normal Distribution:**

i)

- It is a continual distribution
- The mean, median and mode lie in the centre of the distribution and have the same value.
- It is symmetrical and bell shaped.
- The area under the curve equals to 1.
- The curve is asymptotic to the horizontal axis.
- The distribution can be defined completely by two parameters; the mean and the standard deviation

(Any 4 points for 4 marks)

ii) Many things closely follow a Normal Distribution:

- Heights of people
- Size of things produced by machines
- Errors in measurements
- Blood pressure
- Marks on a test

(Any 2 points for 2 marks)

b)

a)

i)

$X \backsim N(760, 70^2)$

$P(X<620)$

$$=P\left[\frac{X-760}{70} < \frac{620-760}{70}\right]$$

$P(Z<-2) = P(Z>2) = 0.5 - P(0<Z<2)$

0.5 – 0.4772 (From the normal distribution table)

= 0.0228 **(3 marks)**

ii)

$P(X>1000)$

$P\left[\frac{X - 760}{70} > \frac{1000 - 760}{70}\right]$

$P(X > 3.43) = 0.5 - P(0<Z<3.43)$

0.5 – 0.4997 = 0.0003

(3 marks)

iii)

$P(800<X<900)$

$P\left[\frac{800 - 760}{70} < Z < \frac{900 - 760}{70}\right]$

$P(0.57<Z<2) = P(0<Z<2) - P(0<Z<0.57)$

0.4772 – 0.2157 = 0.262

(4 marks)

b)

i) $P(Z > -Z_1) = 0.8$

$P(0<Z<Z_1) = 0.3$

$Z_1 = 0.85$ (From the normal distribution table)

$Z = \frac{X - \mu}{\eth}$

X = -0.85x70+760 = 700.5

Thus 80% of the residents will spend above GH₵ 700.50 in a week. **(2 marks)**

ii)

$P(Z<-Z_1) = P(Z>Z_1) = 0.3$

$P(0 < Z< Z_1) = 0.2$

Z_1= 0.53 (from the normal distribution table)

Thus X= -0.53x70+760 =722.9

Thus 30% of the residents will spend below GH₵ 722.90 in a week. **(2 marks)**

(Total: 20 marks)

EXAMINER'S COMMENTS

This question was a moderately popular question among students. Some candidates were well-prepared for the normal distribution question and so could easily standardize and read probabilities from the table.. However, some of the candidates who answered this question could not give the four properties of the normal distribution and give examples of phenomena which closely follow the normal distribution model. Unfortunately, some candidates recorded zero (0) Marks.

QUESTION SIX

a) A series of values of a quantity obtained at successive times, often with equal intervals between them.

The two main models of time series analysis are

- the multiplicative model and
- the additive model.

(2 marks)

b)

i)

Quarter	Membership, y	4Moving Total	8 Moving Total	4 CMA	Trend, T	S=y/T
1	713				719.52	0.991
2	694				726.83	0.955
		2897				
3	735		5848	731	734.15	1.005
		2951				
4	755		5941	742.63	741.46	1.017
		2990				
5	767		6011	751.38	748.77	1.024

		3021				
6	733		6067	758.38	756.08	0.969
		3046				
7	766		6112	764	763.39	1.003
		3066				
8	780		6154	769.25	770.71	1.012
		3088				
9	787		6208	776	778.02	1.013
		3120				
10	755		6274	784.25	785.33	0.961
		3154				
11	798		6337	792.13	792.64	1.007
		3183				
12	814		6401	800.13	799.95	1.018
		3218				
13	816		6464	808	807.27	1.011
		3246				
14	790		6521	815.13	814.58	0.970
		3275				
15	826				821.89	1.005
16	843				829.20	1.017

(4 marks)

ii)

x	y	xy	x^2
3	731	2193	9
4	742.63	2970.52	16
5	751.38	3756.90	25
6	758.38	4550.28	36
7	764	5348	49
8	769.25	6154	64
9	776	6984	81
10	784.25	7842.5	100
11	792.13	8713.43	121
12	800.13	9601.56	144
13	808	10504	169
14	815.13	11411.82	196
102	**9292.28**	**80,030.01**	**1,010**

The least squares trend line is of the form T=a+bx

$$b=\frac{n\sum xy-\sum x\sum y}{n\sum x^2-(\sum x)^2}=\frac{12x80030.01-102x9292.28}{12x1010-102^2}=\frac{960,360.12-947,812.56}{12120-10404}$$

$$\frac{12,547.56}{1716}=7.312$$

$a=\frac{\sum y}{n}-b\frac{\sum x}{n} = \frac{9292.28}{12} - 7.312x\frac{102}{12} = 774.36 - 62.15 = 712.21$

T=712.21+7.312x

(5 marks)

iii)

Average Seasonal Variation

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
Year 1	0.991	0.955	1.005	1.017	
Year 2	1.024	0.969	1.003	1.012	
Year 3	1.013	0.961	1.007	1.018	
Year 4	1.011	0.970	1.005	1.017	
Total	4.039	3.855	4.02	4.064	
Average	1.010	0.964	1.005	1.016	3.995
Adjusted Avg	1.010	0.969	1.005	1.016	4.000

Adjustment factor of 0.00125 (4-3.995=0.005 and 0.005/4=0.00125) must be added to each average to make the total average 4. Since this is insignificant, the difference of 0.005 is arbitrarily added to the average of Quarter 2. **(5 marks)**

iv)

Quarter	Trend, T	Seasonal Index, SI	Forecast=**TxSI**
17	836.51	1.010	844.88
18	843.83	0.969	817.67
19	851.14	1.005	855.40
20	858.45	1.016	872.19

T=712.21+7.312x

The forecasted membership: Quarter 1 is 845 members, Quarter 2 is 818 members; Quarter 3 is 855 members and Quarter 4 is 872 members. **(4 marks)**

(Total: 20 marks)

EXAMINER'S COMMENTS

Question Six was the fourth most popular question among candidates, and/yet most candidates who attempted this question did averagely well. Many candidates scored above 10 marks in this question. However, many candidates could not give the two main models of time series analysis and using the four centered moving average as the trend values for decomposition of the time series was a challenge for candidates.

QUESTION SEVEN

a)

i)

Market Condition	Probability	Strategy		
		Regular Shares	Risky Shares	Property
Good	0.2	0.08	0.15	0.2
Moderate	0.5	0.05	0.07	0.1
Poor	0.3	0.02	-0.05	-0.1

Regular Shares	Probability	Rate of Return	Expected Return	
Good	0.2	0.08	0.016	
Moderate	0.5	0.05	0.025	
Poor	0.3	0.02	0.006	
			0.047	4.7%
Risky Shares				
Good	0.2	0.15	0.03	
Moderate	0.5	0.07	0.035	
Poor	0.3	-0.05	-0.015	
			0.05	**5%**
Property				
Good	0.2	0.2	0.04	
Moderate	0.5	0.1	0.05	
Poor	0.3	-0.1	-0.03	
			4.06	**6%**

(4 marks)

ii) Since the expected return of 6% is the highest and it is for property, the school should invest in Property. **(3 marks)**

b)

i)

Number	Boundaries	Frequency	Midpoint,X	fX	fX^2	Cumulative Frequency
7 – 13	6.5 – 13.5	3	10	30	300	3
14 – 20	13.5 – 20.5	12	17	204	3468	15
21 – 27	20.5 – 27.5	23	24	552	13248	38

28 – 34	27.5 – 34.5	44	31	1364	42284	82
35 – 41	34.5 – 41.5	54	38	2052	77976	136
42 – 48	41.5 – 48.5	56	45	2520	113400	192
49 – 55	48.5 – 55.5	43	52	2236	116272	235
56 – 62	55.5 - 62.5	24	59	1416	83544	259
63 – 69	62.5 – 69.5	23	66	1518	100188	282
70 – 76	69.5 – 76.5	12	73	876	63948	294
		294		**12,768**	**614,628**	

Mean = $\frac{\sum fx}{\sum f} = \frac{12768}{294} = 43.43$

Mode = $L + \left[\frac{D_1}{D_1 + D_2}\right] C$

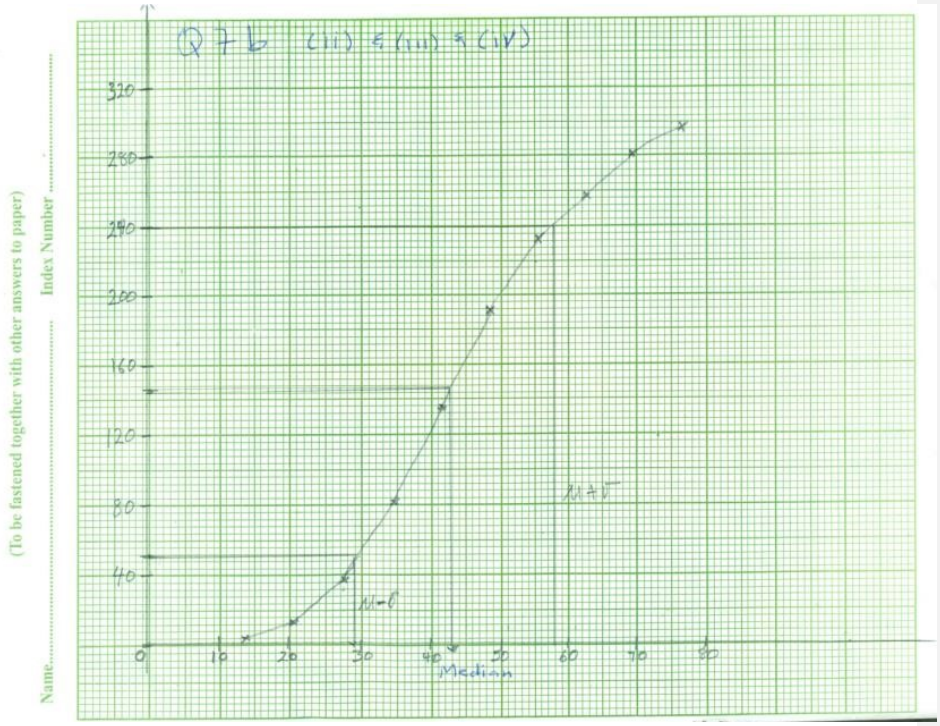
L= 41.5; D1 = 56-54 = 2; D2 = 56 – 43 = 13; C=7

Mode = $41.5 \left[+ \frac{2}{2+13}\right] x7$

Mode = 41.5 + 0.93 = 42.43

(3 marks)

ii)



(4 marks)

iii) The median is at the 294/2 = 147th position. Thus from the graph the estimate of the median is 43. **(3 marks)**

iv)The standard deviation for the distribution:

$$SD = \sqrt{\frac{\sum fX^2}{\sum f} - \left[\frac{\sum fX}{\sum f}\right]^2}$$

$$SD = \sqrt{\frac{614628}{294} - \left[\frac{12768}{294}\right]^2}$$

$$SD = \sqrt{[2090.57 - 1886.16]}$$

SD=14.3

$\mu \pm \delta = 43.43 \pm 14.3$

ie 29 and 58 errors

From the graph:

$\frac{240 - 52}{294} = 0.639$

Thus percentage of errors within one standard deviation of the mean is 64%

(3 marks)
(Total: 20 marks)

EXAMINER'S COMMENTS

Answers provided by candidates for Question Seven were appropriate as answers. It was the third most patronized question in this diet's examination. Many candidates who attempted this question scored more than 10 Marks. The only identifiable limitation of candidates was their inability to identify the probabilities for various returns in the sub- question (a). This affected the total mark scored on the question by candidates.