

Assignment (1)

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Section 1: To be completed by the student.

Your Name: \_\_\_\_\_ Section Number: \_\_\_\_\_

ID Number: \_\_\_\_\_ Your Tutor's Name: \_\_\_\_\_

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Section 2 : To be completed by the tutor.

CMA grade (from 40): \_\_\_\_\_

Cut-off Date: 19 /4 / 2008

TMA grade (from 60): \_\_\_\_\_

Date Received \_\_\_\_\_

Assignment grade

Total: \_\_\_\_\_

100

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CMA Answers Form:

- Write the letter corresponding to the correct answer for each question.
- One answer per question only.
- Each correct answer is worth 2 points.
- Should you think that the correct answer is not among the four choices, write the word: NONE, for none of the above.

Question number	1	2	3	4	5	6	7	8	9	10
Answer										
Question number	11	12	13	14	15	16	17	18	19	20
Answer										

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*Tutor's Comments:*

CMA 01 This assignment covers Units 1-5.

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You should be able to answer Questions 1-5 after studying Unit 1, and Chapter 1 of the Calculator Book.

Question 1

The value of  $\sqrt[3]{83}$  to one decimal place is:

- (a) 4.3                      (b) 4.4                      (c) 4.5                      (d) 4.9

Question 2

The value of  $\frac{2^4 - 3^2}{7}$  to one decimal place is:

- (a) 14.7                      (b) 11.3                      (c) 7.0                      (d) 1.0

Question 3

If the price of oil increases from 83 dollars to 87 dollars per barrel, the percentage increase, to one decimal place is:

- (a) 4.8                      (b) 6.1                      (c) 5.0                      (d) - 4.8

Question 4

If the price of a mobile phone, after a 30% discount, is 96.60 pounds, what is the original price of the phone?

- (a) 152.32 £                      (b) 145.00 £                      (c) 142.18 £                      (d) 138.00 £

Question 5

If one year is equivalent to 364.25 days, the number of minutes in 10 years, in scientific notation, is:

- (a)  $5.2452 \times 10^9$                       (b)  $5.0 \times 10^6$                       (c)  $5.2 \times 10^6$                       (d)  $5.2452 \times 10^4$

You should be able to answer Questions 6-10 after studying Unit 2, and Chapter 2 of the Calculator Book.

Questions 6 and 7

The table below lists the prices, in Pounds, of a certain stock for 8 consecutive days.

*Table 1: prices (in Pounds) of a stock for 8 consecutive days*

55.24	54.97	56.32	55.06	58.10	58.61	59.38	61.12
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*Note: the above table will be used again in questions 11 to 13 and 17-18.*

Question 6

The median price (in Pounds), rounded to two decimal places, is:

- (a) 55.52                      (b) 56.90                      (c) 57.21                      (d) 57.35

Question 7

The mean price (in Pounds), rounded to 2 decimal places is:

- (a) 55.52                      (b) 57.35                      (c) 56.90                      (d) 57.21

Question 8

Which of the following statements is correct?

- (a) A price ratio of 1.005 is equivalent to a percentage price increase of 5%.  
(b) A price ratio of 1.05 is equivalent to a percentage price increase of 10.5%.  
(c) A percentage price increase of 20% is equivalent to a price ratio of 0.8.  
(d) A percentage price decrease of 5% is equivalent to a price ratio of 0.95.



Question 13

Select the option which corresponds to the inter-quartile range of the prices (in Pounds) in Table 1.

- (a) 4.56                      (b) 5.38                      (c) 3.58                      **(d) 3.85**

Questions 14 and 15

In September 2005 the Retail Prices Index stood at 192.1. The Average Earnings Index for that month was 120.2. In September 2004 the value of the RPI was 186.5, and the value of the AEI was 115.8.

Question 14

Select the option which corresponds to the percentage increase in average earnings between September 2004 and September 2005 (rounded to one decimal place).

- (a) 2.5                      (b) 3.5                      **(c) 3.8**                      (d) 4.5

Question 15

Select the option which is closest to the percentage increase in real earnings for September 2005 compared to the real earnings one year earlier (rounded to one decimal place).

- (a) 0.8**                      (b) 1.0                      (c) 1.1                      (d) 2.5

You should be able to answer Questions 16-18 after studying Unit 4, and Chapter 4 of the Calculator Book.

Question 16

Which of the following commands will produce an error?

- (a) randInt (0, 1, 7)                      (b) randInt (1, 1, 7)  
(c) randInt (7, 1, 888)                      **(d) randInt (1, 7, 0)**

Questions 17 and 18

These questions are again based on the data in Questions 6 and 7.

Table 1: prices (in Pounds) of a stock for 8 consecutive days

55.24	54.97	56.32	55.06	58.10	58.61	59.38	61.12
-------	-------	-------	-------	-------	-------	-------	-------

Question 17

Select the option which corresponds to the standard of deviation (in pounds) of the prices in Table 1 (Correct to 2 decimal places).

- (a) 1.96                                      (b) 2.01                                      **(c) 2.15**                                      (d) 2.29

Question 18

Select the option which corresponds to the relative spread of the prices in Table 1.

- (a) 6.7%**                                      (b) 8.1%                                      (c) 9.3%                                      (d) 11.5%

You should be able to answer Questions 19 and 20 after studying Unit 5, and Chapter 5 of the Calculator Book.

Question 19

Which sequence is produced by the command: `seq( 2X+1, X, 0, 4)`

- (a) 0, 1, 3, 5, 7                                      (b) 0, 1, 2, 3, 4  
**(c) 1, 3, 5, 7, 9**                                      (d) 0, 4, 8, 16, 32

Question 20

Which of the following commands will produce the sequence: 3, 9, 27, 81, 243 ?

- (a) `seq(3^X, X, 3, 243)`                                      **(b) `seq(3^X, X, 1, 5)`**  
(c) `seq(X^3, X, 3, 243)`                                      (d) `seq(X^3, X, 1, 5)`

End of CMA 01  
TMA 01 starts next page

**Question 1** (12 marks) - This question is based on unit 2.

The main aim of this question are to assess your ability to calculate the retail price index RPI and its uses.

Group	Price ratios for October 2004 relative to January 2004	2004 Weights	$r \times w$
Food and Catering	1.001	160	160.160
Tobacco	1.025	97	99.425
Housing and household expenditure	1.068	367	391.956
Personal expenditure	1.010	93	93.930
Travel and leisure	1.005	283	284.415
<b>total</b>			<b>1029.886</b>

Use the information in the table above and the fact that the value of the RPI in January 2004 was 183.1 to answer the following:

- (a) Find the all-item ratio for October 2004 relative to January 2004. [ 3 ]

*All-item ratio for October 2004 relative to January 2004 = 1.029886*

- (b) Find the value of the RPI in October 2004. [ 2 ]

*RPI in October 2004 = RPI in January 2004 x all-item ratio  
 = 183.1 x 1.029886  
 = 188.6*

- (c) (i) Which group had the most effect on the RPI ? Explain your answer briefly. [ 2 ]

*Housing and household expenditure since  $r \times w$  is the largest for that group.*

- (ii) Which group had the least effect on the RPI? Explain your answer briefly. [2]

*Personal expenditure since  $r \times w$  is the smallest for that group.*

- (d) An index linked pension is 186 £ per week in October 2004 and 191 £ per week in October 2005 . Calculate the rate of inflation in October 2005. [3]

$$\begin{aligned} \text{Rate of inflation in October 2005} &= \text{the increase in the pension from October 2004 to} \\ &\quad \text{October 2005} \\ &= [(191 / 186) - 1] * 100 \\ &= 2.7 \% \end{aligned}$$

Question 2: (12 marks) - This question is based on units 2 and 3.

Note to tutors: some errors in the original assignment (in bold letters) have been corrected

The main aim of this question is to assess your understanding of the RPI and its uses.

The values of the RPI (Retail Price Index) and the AEI (Average Earning Index) for **July 2000** and **July 2001** are given in the following table:

	July 2000	July 2001
RPI	172.4	176.2
AEI	140.4	<b>147.22</b>

- (a) Calculate the rate of inflation in July 2001 (to 1 decimal place). [2]

$$\begin{aligned} \text{Rate of inflation in July 2001} &= [(176.2 / 172.4) - 1] * 100 \\ &= 2.3 \% \end{aligned}$$

- (b) Calculate the purchasing power of the pound in July 2001 compared with one year earlier (to the nearest pence). [2]

$$\text{Purchasing power of the pound in July 2001} = (172.4 / 176.2) * 100 = 98 \text{ Pence}$$

- (c) Calculate the percentage increase in earnings from July 2000 to July 2001 (to two decimal places). [2]

$$\begin{aligned} \text{Percentage increase in earnings} &= [(147.22 / 140.4) - 1] * 100 \\ &= 4.86 \% \end{aligned}$$

- (d) Calculate the real earnings (as a percentage) in July 2001 compared to one year earlier (To 2 decimal places). [3]

$$\begin{aligned} \text{Real earnings} &= [(147.22 / 140.4) / (176.2 / 172.4)] * 100 \\ &= 102.6 \% \end{aligned}$$

- (e) Use your answers above to decide if people were better off in July 2001 than they were in July 2000. Explain your answer briefly. [3]

*People are better off since the real earnings show that income rose more than prices*

Question 3 (12 marks) - this question is based on Unit 3.

The main aim of this question is to assess the ability to perform data analysis on two batches of data and use decile box-plots to compare and report on the differences between the two sets.

The weekly earnings (including overtime) and the hourly earnings (including overtime) of male and female restaurant staff who are working full time are given in the table below,

Gross weekly and hourly earnings of male and female restaurant staff in 1999

	<u>Gross weekly earnings</u> (£)		<u>Gross hourly earnings</u> (Pence)	
	Women	Men	Women	Men
Highest decile	235	275	556	641
Upper quartile	192	230	477	513
Median	163	183	402	434
Lower quartile	138	151	363	389
Lowest deciles	122	128	349	360

- (a) Which of these two types of data would you use to compare the earnings of male and female restaurant staff? Give a brief justification for your choice. [3]

*I would use gross hourly earnings since men work more hours per week than women. This would show a smaller gap in earnings between men and women.*

- (b) Calculate the earnings ratios for the restaurant staff at the median, the upper and lower quartiles, and the highest and lowest deciles. Comment on what these figures tell you about the relative earnings of male and female restaurant staff in 1999. [4]

*Using gross hourly earnings:*

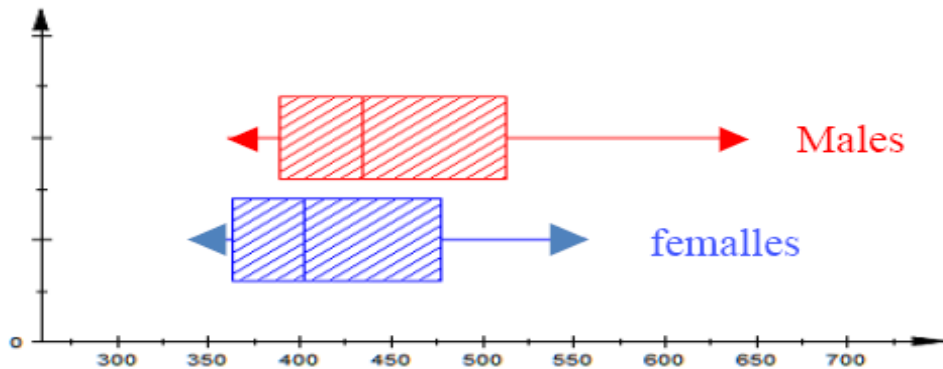
Earning ratio at the Highest decile	87%
Earning ratio at Upper quartile	93%
Earning ratio at the Median	93%
Earning ratio at Lower the quartile	93%
Earning ratio at Lowest the decile	97%

*These figures tell me that male restaurant staff earns more money than female restaurant staff.*

- (c) If data were available on gross earnings (excluding overtime) for male and female restaurant staff, would you expect the earnings ratios calculated using such data to be greater or smaller than those you calculated in (b)? Explain your answer briefly. [2]

*If data were available on gross earnings (excluding overtime) for male and female restaurant staff, then I would expect the earnings ratios calculated using such data to be greater than those calculated in (b) since men work more overtime hours.*

- (d) Draw clear and accurate decile box-plots (as described in Unit 3) to represent the earnings data for male and female restaurant staff. What do the box-plots tell you about the relative earnings of male and female restaurant staff in 1999? [3]



The plots show that men earn more money than women.

Question 4 (12 marks) - This question is based on Unit 4.

The main aim of this question is to assess your understanding of the use of random numbers in analyzing patterns.

The table below gives the number of births on each day of a week in all maternity hospitals in a certain city.

Day	Number of births
Sunday (day 1)	10
Monday (day 2)	6
Tuesday (day 3)	6
Wednesday (day 4)	13
Thursday (day 5)	5
Friday (day 6)	6
Saturday (day 7)	14

Suppose that births are equally likely to take place on each day of the week.

- (a) Explain how you could use your calculator to generate random integers from 1 to 7. [3]

*Use the sequence*

MATH → ◀ → 5 → 1 → , → 7 → ) → Enter

- (b) Use your calculator to generate 60 random integers from 1 to 7 and store them in a list L1. Explain how you did this. [3]

*Use the sequence*

MATH → ◀ → 5 → 1 → , → 7 → , → 6  
→ 0 → ) → STO▶ → 2nd → 1 → Enter

- (c) The numbers stored in L1 provides a simulation of a random distribution of number of births on each day of any week in which there are 60 births. Explain how the 60 numbers in the list should be interpreted in terms of such a simulation. [2]

*The 60 numbers in the list represent 60 births in a given week*

- (d) Sort the numbers in L1 into ascending order, and hence locate the numbers which occur more than once. Give the frequency of the occurrence of these numbers. [2]

*Note to tutors: There should be different answers for different students*

- (e) Does your simulation suggest that it is unlikely that 27 births take place on the same day? Explain why. [2]

*It is not likely that any simulation will result in a number with frequency equal or near 27 and as a result, the answer to this question should be:*

*The simulation suggests that it is unlikely that 27 births take place on the same day.*

**Question 5** [12 points] This question is based on Unit 5.

This questions aims for you to carry out and report on a statistical investigation and interpret the results.

A teacher at the AOU claims that the longer a student study for a test, the better his/her grade will be in the test. You are asked by the teacher to investigate this claim.

- (a) Classify the problem as one of summarizing, comparing or looking for relationships. [2]

*Looking for relationships.*

- (b) Pose a precise question to investigate the teacher's claim. [2]

*Is it likely that a student will score higher in a test if he studies longer for it? Or what is the relationship between the number of hours studied for a test and the score in the test.*

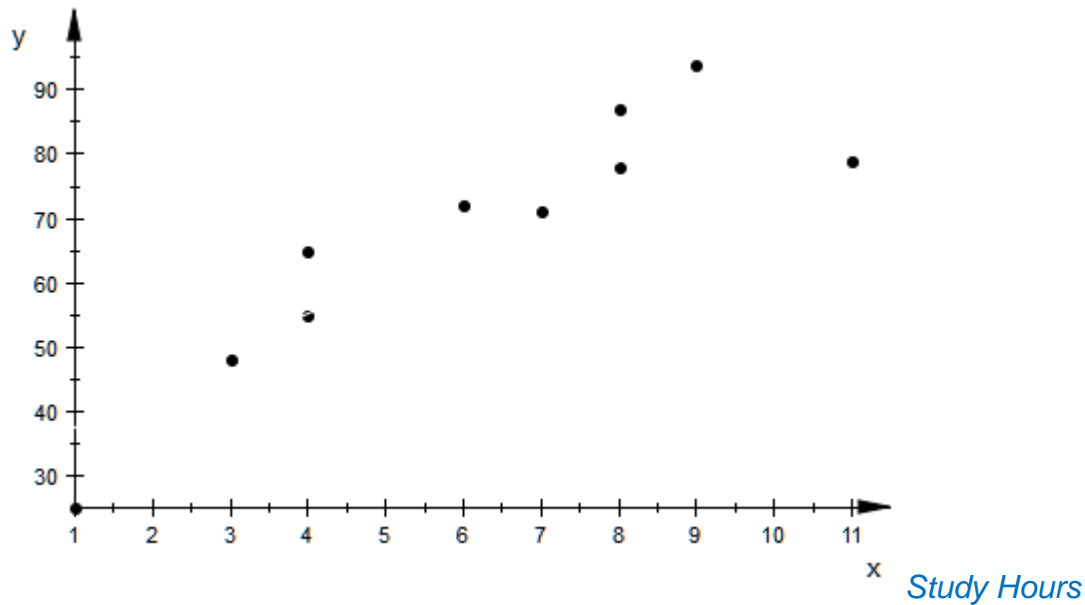
The table below shows the number of hours studied for a test and the grade scored in the test for 10 students.

Study Hours	4	6	1	8	9	11	4	7	8	3
Grade	55	72	25	87	94	79	65	71	78	48

- (a) Use a method of your choice to analyze the data above, as part of your investigation. This should include a graphical representation of the data. [3]

*Using a scatter plot:*

Grade



(d) Does your analysis support the teacher's claim? Explain your answer briefly. [3]

*My analysis supports the teacher's claim. The scatter plot shows that, in general, as the number of hours studied increase, so does the score in the test.*

(e) Can the results of this investigation be generalized to all students at the AOU?  
Explain your answer. [2]

*The results of this investigation can not be generalized to all students at the AOU since it is possible to get different results for a different group of students. Only if we get the same results for many different groups that we can generalize the results to all students at the AOU.*