

Finding the PMCC

Question Paper 1

Level	A LEVEL
Exam Board	Edexcel
Subject	Mathematics
Module	Mechanics and Statistics
Topic	Regression correlation & hypothesis testing
Sub-Topic	Finding the PMCC
Booklet	Question Paper 1

Time Allowed: 27 minutes

Score: /22

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1. A number of people were asked to guess the calorific content of 10 foods. The mean s of the guesses for each food and the true calorific content t are given in the table below.

Food	t	s
Packet of biscuits	170	420
1 potato	90	160
1 apple	80	110
Crisp breads	10	70
Chocolate bar	260	360
1 slice white bread	75	135
1 slice brown bread	60	115
Portion of beef curry	270	350
Portion of rice pudding	165	390
Half a pint of milk	160	200

[You may assume that $\Sigma t = 1340$, $\Sigma s = 2310$, $\Sigma ts = 396\,775$, $\Sigma t^2 = 246\,050$, $\Sigma s^2 = 694\,650$.]

Calculate, to 3 significant figures, the product moment correlation coefficient (7)
for the above data.

(Total 7 marks)

2. As part of a statistics project, Gill collected data relating to the length of time, to the nearest minute, spent by shoppers in a supermarket and the amount of money they spent. Her data for a random sample of 10 shoppers are summarised in the table below, where t represents time and $\pounds m$ the amount spent over $\pounds 20$.

t (minutes)	$\pounds m$
15	-3
23	17
5	-19
16	4
30	12
6	-9
32	27
23	6
35	20
27	6

- (a) Write down the actual amount spent by the shopper who was in the supermarket for 15 minutes. (1)
- (b) Calculate the value of the product moment correlation coefficient between t and m . (3)

(Total 4 marks)

3. A personnel manager wants to find out if a test carried out during an employee's interview and a skills assessment at the end of basic training is a guide to performance after working for the company for one year.

The table below shows the results of the interview test of 10 employees and their performance after one year.

Employee	A	B	C	D	E	F	G	H	I	J
Interview test, x %.	65	71	79	77	85	78	85	90	81	62
Performance after one year, y %.	65	74	82	64	87	78	61	65	79	69

[You may use $\sum x^2 = 60\,475$, $\sum y^2 = 53\,122$, $\sum xy = 56\,076$]

- (a) Showing your working clearly, calculate the product moment correlation coefficient between the interview test and the performance after one year. (5)

The product moment correlation coefficient between the skills assessment and the performance after one year is -0.156 to 3 significant figures.

- (b) Use your answer to part (a) to comment on whether or not the interview test and skills assessment are a guide to the performance after one year. Give clear reasons for your answers. (2)

(Total 7 marks)

4. The blood pressures, p mmHg, and the ages, t years, of 7 hospital patients are shown in the table below.

Patient	A	B	C	D	E	F	G
t	42	74	48	35	56	26	60
p	98	130	120	88	182	80	135

- (a) Calculate the product moment correlation coefficient for these data. **(3)**
- (b) Interpret the correlation coefficient. **(1)**

(Total 4 marks)