Correlation – 2021/20 GCE AS Statistics Further Mathematics A

1. Nov/2021/Paper_Y532/01/No.2

A shopper estimates the cost, £X per item, of each of 12 items in a supermarket. The shopper's estimates are compared with the actual cost, £Y per item, of each item. The results are summarised as follows.

$n = 12$ $\quad \Sigma x = 399$ $\quad \Sigma y = 623.88$

$\Sigma x^2 = 28\,127$ $\quad \Sigma y^2 = 116\,509.0212$ $\quad \Sigma xy = 45\,006.01$

Test at the 1% significance level whether the shopper's estimates are positively correlated with the actual cost of the items. **[7]**

2. Nov/2020/Paper_Y532/01/No.1

Five observations of bivariate data (x, y) are given in the table.

x	7	8	12	6	4
y	20	16	7	17	23

(a) Find the value of Pearson's product-moment correlation coefficient. **[2]**

(b) State what your answer to part **(a)** tells you about a scatter diagram representing the data. **[2]**

(c) A new variable a is defined by $a = 3x + 4$. Dee says "The value of Pearson's product-moment correlation coefficient between a and y will not be the same as the answer to part **(a)**."

State with a reason whether you agree with Dee. **[1]**

3. Nov/2020/Paper_Y532/01/No.4

After a holiday organised for a group, the company organising the holiday obtained scores out of 10 for six different aspects of the holiday. The company obtained responses from 100 couples and 100 single travellers. The total scores for each of the aspects are given in the following table.

Aspect	Couples	Single travellers
Organisation	884	867
Travel	710	633
Food	692	675
Leader	898	898
Included visits	561	736
Optional visits	683	712

Fred wishes to test whether there is significant positive correlation between the scores given by the two categories.

(a) Explain why it is probably not appropriate to use Pearson's product-moment correlation coefficient. **[1]**

(b) Carry out an appropriate test at the 1% level. **[7]**

(c) Explain what is meant by the statement that the test carried out in part **(b)** is a non-parametric test. **[1]**