1. The table below shows the distance travelled by car and the amount of commission earned by each of 8 salespersons in 2015

Salesperson	Distance travelled (in 1000s of km)	Commission earned (in $1000s)
A	20.4	17.7
B	22.2	24.1
C	29.9	20.3
D	37.8	28.3
E	25.5	34.9
F	30.2	29.3
G	35.3	23.6
H	16.5	26.8

(a) Find Spearman's rank correlation coefficient for these data.

(4)

(b) Stating your hypotheses clearly, test, at the 5% level of significance, whether or not there is evidence of a positive correlation between the distance travelled by car and the amount of commission earned.

(4)

(Total for Question 1 is 8 marks)

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2. The random variable X follows a continuous uniform distribution over the interval $[\alpha - 3, 2\alpha + 3]$ where α is a constant.

The mean of a random sample of size n is denoted by $\overline{X}$

(a) Show that $\overline{X}$ is a biased estimator of α, and state the bias.

(3)

Given that $Y = k\overline{X}$ is an unbiased estimator for α

(b) find the value of k.

(1)

A random sample of 10 values of X is taken and the results are as follows

3 5 8 12 4 13 10 8 5 12

(c) Hence estimate the maximum value of X

(3)

(Total for Question 2 is 7 marks)