

3. The product moment correlation coefficient is denoted by r and Spearman's rank correlation coefficient is denoted by r_s .

(a) Sketch separate scatter diagrams, with five points on each diagram, to show

(i) $r = 1$,

(ii) $r_s = -1$ but $r > -1$.

(3)

Two judges rank seven collie dogs in a competition. The collie dogs are labelled A to G and the rankings are as follows

Rank	1	2	3	4	5	6	7
Judge 1	A	C	D	B	E	F	G
Judge 2	A	B	D	C	E	G	F

(b) (i) Calculate Spearman's rank correlation coefficient for these data.

(6)

(ii) Stating your hypotheses clearly, test, at the 5% level of significance, whether or not the judges are generally in agreement.

(5)



6. Ten cuttings were taken from each of 100 randomly selected garden plants. The numbers of cuttings that did not grow were recorded.

The results are as follows

No. of cuttings which did not grow	0	1	2	3	4	5	6	7	8, 9 or 10
Frequency	11	21	30	20	12	3	2	1	0

- (a) Show that the probability of a randomly selected cutting, from this sample, not growing is 0.223 (2)

A gardener believes that a binomial distribution might provide a good model for the number of cuttings, out of 10, that do not grow.

He uses a binomial distribution, with the probability 0.2 of a cutting not growing. The calculated expected frequencies are as follows

No. of cuttings which did not grow	0	1	2	3	4	5 or more
Expected frequency	r	26.84	s	20.13	8.81	t

- (b) Find the values of r , s and t . (4)
- (c) State clearly the hypotheses required to test whether or not this binomial distribution is a suitable model for these data. (2)

The test statistic for the test is 4.17 and the number of degrees of freedom used is 4.

- (d) Explain fully why there are 4 degrees of freedom. (2)
- (e) Stating clearly the critical value used, carry out the test using a 5% level of significance. (3)



