

MA3110: Week 10 Exercise

Linear Correlation

In this assignment, you should solve four questions, where you will be asked to calculate a linear correlation coefficient and determine whether there is a linear correlation between the two given variables.

Solve the following:

1. Listed below are baseball team statistics consisting of the proportions of wins and the result of this difference: Difference (number of runs scored) – (number of runs allowed). The statistics are from a recent year, and the teams are NY—Yankees, Toronto, Boston, Cleveland, Texas, Houston, San Francisco, and Kansas City.

Difference	163	55	–5	88	51	16	–214
Wins	0.599	0.537	0.531	0.481	0.494	0.506	0.383

- a. Construct a scatter plot, find the value of the linear correlation coefficient r , and find the critical values of r from [Table A–6](#) using $\alpha = 0.05$.
 - b. Is there sufficient evidence to conclude that there is a linear correlation between the proportion of wins and the above difference?
2. One classic application of correlation involves the association between the temperature and the number of times a cricket chirps in a minute. Listed below are the numbers of chirps in 1 min and the corresponding temperatures in °F:

Chirps in 1 min	882	1188	1104	864	1200	1032	960	900
Temperature (°F)	69.7	93.3	84.3	76.3	88.6	82.6	71.6	79.6

- a. Construct a scatter plot, find the value of the linear correlation coefficient r , and find the critical values of r from [Table A–6](#) using $\alpha = 0.05$.
- b. Is there a linear correlation between the number of chirps in 1 min and the temperature?

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3. Listed below are brain sizes (in cm³) and Wechsler IQ scores of subjects:

Brain Size	965	1029	1030	1285	1049	1077	1037	1068	1176	1105
IQ	90	85	86	102	103	97	124	125	102	114

- Construct a scatter plot, find the value of the linear correlation coefficient r , and find the critical values of r from [Table A-6](#) using $\alpha = 0.05$.
 - Is there sufficient evidence to conclude that there is a linear correlation between brain size and IQ score?
 - Does it appear that people with larger brains are more intelligent?
4. Listed below are ages of actresses and actors at the times that they won Oscars. Corresponding ages are matched so that they are from the same year.

Best Actresses									
26	80	42	29	33	35	45	49	39	34
26	25	33	35	35	28	30	29	61	
Best Actors									
51	32	42	54	52	37	38	32	45	60
46	40	36	47	29	43	37	38	45	

- Construct a scatter plot, find the value of the linear correlation coefficient r , and find the critical values of r from [Table A-6](#) using $\alpha = 0.05$.
- Is there sufficient evidence to conclude that there is a linear correlation between ages of best actresses and best actors?

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Submission Requirements:

- For questions 1–4 (a), submit your work in a Microsoft Excel document.
- Save the Excel document as Exercise 10.1_1–4(a)_Your initials.xls.
- For questions 1, 2, and 4 (b) and 3 (b, c), submit the answers in a Microsoft Word document.
- Save the Word document as Exercise 10.1_1–4(b, c)_Your initials.doc.
- The answer to each question should be supported with appropriate rationale or steps.