

國立政治大學 114 學年度第一學期

統計學(一) 期中 R 程式加分考

系級:_____ 學號:_____ 姓名:_____

考試科目: 統計學(一)

考試日期: 2025/10/21

本試題共 6 大題 (共 120%)

考試時間: 15:00~16:00 (共 60 分鐘)

注意事項:

1. 從教學網站下載電子考卷 (**114-1-Stat-R-Midterm.zip**)，並於自己的筆電解壓縮。
壓縮檔包含題目卷、答案卷和資料集。
2. 本次考題以 R 程式(Rgui 或 RStudio)方式作答，其他程式不允許。
3. 考試過程中可查詢書本、教學講義或上網，禁止利用 messenger, IG, Line 等等通訊軟體。
4. **禁止使用 AI 模式搜尋。禁止使用 chatGPT 或類似的 AI 平台/工具。** 禁止疑似作弊行為。
1. 本答案卷上請務必於 **R Console** 內**複製「執行後的程式碼及結果(含圖形)」**，於本答案卷貼上(**Courier New, 10 點字, 白底黑字**)，**不是只有程式碼，不是只有報表**。最後，將每小題之**答案以黃色底高亮起來(不能只印出報表，要助教去找答案)**。
5. 請依序註明題號: (1)a, (1)b, (2)a 等等。
6. 作答完請將此 word 檔存檔，檔名為「學號-姓名-Stat-R-Midterm.docx」(更改成自己「學號、姓名」)並上傳至教學網站【作業考試上傳區】或 <http://hmwu.nccu.edu.tw/login.html>
7. 帳號: stat114，密碼: 上課教室號碼，資料夾: 「20251021-Midterm」
8. 如果上傳網站出現「空白頁」，請將滑鼠移至「網址列」後，按「Enter」即可。若再不行，請換其它瀏覽器(IE/Edge/Firefox/Chrome)
9. 上傳檔案無法刪除，若要上傳更新檔，請於主檔名後加「-2」，例如: 「學號-姓名-Stat-R-Midterm-2.docx」。

祝考試順利

(1) (5 分)	用 R 印出下列字句(姓名改為自己的姓名): " 本人(學號)(姓名)恪遵各項考試規則，若如違反，願受校方最嚴厲處罰，謹誓。"
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(2)
(20 分)

Data file: Hypertension.xlsx

Hypertension and Heart Disease. People often wait until middle age to worry about having a healthy heart. However, many studies have shown that earlier monitoring of risk factors such as blood pressure can be very beneficial (*The Wall Street Journal*). Having higher than normal blood pressure, a condition known as hypertension, is a major risk factor for heart disease. Suppose a large sample of individuals of various ages and gender was selected and that each individual's blood pressure was measured to determine if they have hypertension. For the sample data, the following table shows the percentage of individuals with hypertension.

Age	Male	Female
20–34	11.00%	9.00%
35–44	24.00%	19.00%
45–54	39.00%	37.00%
55–64	57.00%	56.00%
65–74	62.00%	64.00%
75+	73.30%	79.00%

a. Develop a side-by-side bar chart with age on the horizontal axis, the percentage of individuals with hypertension on the vertical axis, and side-by-side bars based on gender.

(3)
(25 分)

Data file: Colleges

Colleges' Year Founded and Percent Graduated. Refer to the data set in Table 2.18.

TABLE 2.18 Data for a Sample of Private Colleges and Universities

School	Year Founded	Tuition & Fees	% Graduate
American University	1893	\$36,697	79.00
Baylor University	1845	\$29,754	70.00
Belmont University	1951	\$23,680	68.00
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.	.	.	.
.	.	.	.
Wofford College	1854	\$31,710	82.00
Xavier University	1831	\$29,970	79.00
Yale University	1701	\$38,300	98.00

- Construct a crosstabulation with Year Founded as the row variable and % Graduate as the column variable. Use classes starting with 1600 and ending with 2000 in increments of 50 for Year Founded. For % Graduate, use classes starting with 35% and ending with 100% in increments of 5%.
- Compute the row percentages for your crosstabulation in part (a).
- Comment on any relationship between the variables.
- Construct a histogram.
- Construct a scatter diagram to show the relationship between Year Founded and Tuition & Fees.

(4) (25 分)	Household Incomes. The following data represent a sample of 14 household incomes (\$1000s). Answer the following questions based on this sample.														
	<table><tr><td>49.4</td><td>52.4</td><td>53.4</td><td>51.3</td><td>52.1</td><td>48.7</td><td>52.1</td></tr><tr><td>52.2</td><td>64.5</td><td>51.6</td><td>46.5</td><td>52.9</td><td>52.5</td><td>51.2</td></tr></table>	49.4	52.4	53.4	51.3	52.1	48.7	52.1	52.2	64.5	51.6	46.5	52.9	52.5	51.2
49.4	52.4	53.4	51.3	52.1	48.7	52.1									
52.2	64.5	51.6	46.5	52.9	52.5	51.2									
	<p>a. What is the median household income for these sample data?</p> <p>b. According to a previous survey, the median annual household income five years ago was \$55,000. Based on the sample data above, estimate the percentage change in the median household income from five years ago to today.</p> <p>c. Compute the first and third quartiles.</p> <p>d. Provide a five-number summary.</p> <p>e. Using the z-score approach, do the data contain any outliers? Does the approach that uses the values of the first and third quartiles and the interquartile range to detect outliers provide the same results?</p>														

<p>(5) (25 分)</p>	<p>Data file: Coldstream12</p> <p>Golf Scores. During the summer of 2018, Coldstream Country Club in Cincinnati, Ohio, collected data on 443 rounds of golf played from its white tees. The data for each golfer's score on the twelfth hole are contained in the DATAfile <i>Coldstream12</i>.</p> <ol style="list-style-type: none"> Construct an empirical discrete probability distribution for the player scores on the twelfth hole. A <i>par</i> is the score that a good golfer is expected to get for the hole. For hole number 12, par is four. What is the probability of a player scoring less than or equal to par on hole number 12? What is the expected score for hole number 12? What is the variance for hole number 12? What is the standard deviation for hole number 12?
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<p>(6) (20 分)</p>	<p>Web Browser Market Share. Market-share-analysis company Net Applications monitors and reports on Internet browser usage. According to Net Applications, in the summer of 2014, Google's Chrome browser exceeded a 20% market share for the first time, with a 20.37% share of the browser market (<i>Forbes</i> website). For a randomly selected group of 20 Internet browser users, answer the following questions.</p> <ol style="list-style-type: none"> Compute the probability that exactly 8 of the 20 Internet browser users use Chrome as their Internet browser. Compute the probability that at least 3 of the 20 Internet browser users use Chrome as their Internet browser. For the sample of 20 Internet browser users, compute the expected number of Chrome users. For the sample of 20 Internet browser users, compute the variance and standard deviation for the number of Chrome users. <p>((a)(b)禁止用 R 直接加減乘除做計算，請利用 R 套件或指令運算)</p>
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