POPULATION & ECONOMIC GEOGRAPHY (GGR2B10 / GGR02B2)
LECTURER: DR. JONATHAN LEVIN (JLEVIN@UJ.AC.ZA)

PRACTICAL EXERCISE 2: STATISTICAL ANALYSIS AND DATA VISUALIZATION

DUE DATE: 7th August 2025, Time: 13:00

Submission instructions: Please submit the completed Excel workbook to your demonstrator

INTRODUCTION

This practical exercise is designed to assess your ability to create and interpret different types of statistical graphs in Excel. You will work with multiple datasets to create scatter plots, line graphs, bar graphs, and box plots, while interpreting statistical relationships.

FORMATTING REQUIREMENTS

- Create a separate worksheet for each question
- Rename worksheets appropriately (Q1_SCATTER, Q2_LINE, etc.)
- Ensure all charts have appropriate axis labels, and legends
- Include your name and student number in cell A1 of the first worksheet

TASKS

QUESTION 1: SCATTER PLOT ANALYSIS [10 marks]
Using Dataset 1:

1. Create a scatter plot showing the relationship between Average Temperature (x-axis) and Annual Rainfall (y-axis) for the South African cities. **[3]**
2. Add a trendline to the scatter plot and display both the linear equation and R^2 value on the chart. **[2]**
3. Calculate the Pearson correlation coefficient (*r*) using the SQRT function, including the direction (positive/negative). **[2]**
4. Interpret the R^2 value and the Pearson correlation coefficient (*r*). What does this tell you about the relationship between temperature and rainfall in South African cities? **[3]**

QUESTION 2: LINE GRAPH ANALYSIS [10 marks]
Using Dataset 2:

1. Create a line graph showing monthly rainfall patterns for all four provinces. Use different colours for each province and include the legend. Ensure the X-axis labels are changed to show the months. **[3]**
2. Add a secondary axis to display the monthly average temperature from Dataset 4 for ONLY the Coastal Region on the same graph. Format the secondary axis appropriately. **[4]**
3. Add a legend and format the chart with appropriate titles and axis labels. **[3]**

QUESTION 3: BAR GRAPH ANALYSIS [12 MARKS]
Using Dataset 3:

1. Create a 2-D (column) clustered column bar graph comparing Domestic and International Tourist numbers for each province (3). Ensure the X-axis (1) has the months added also add a legend (1). **[5]**
2. Add error bars to your graph using the Standard Error values provided. **[3]**
3. Identify the **two** provinces with the largest and the **two** provinces with the smallest differences between domestic and international tourism. **[4]**

QUESTION 4: BOX PLOT ANALYSIS [15 MARKS]
Using Dataset 4:

1. Create a box plot showing the temperature distribution for all four regions. Add a legend. **[5]**
2. **Identify at least one region that is significantly different from the others (3)**. What does this tell you about temperature patterns across these regions? Write two sentences (2). Also **add letters above the boxes to denote (indicate) where the differences exist (5)** **[10]**

Question 5: Data Interpretation [5 marks]

1. Based on all your analyses, write a short paragraph (150 words) in a new sheet. Merge A11 to L11 to create one large cell to write in, click wrap text as well. Explain the **relationships** between climate patterns and tourism in South Africa. Use specific evidence from your graphs to support your conclusions (e.g. r and R2, etc). **[5]**

SUBMISSION
Save your workbook using your Surname and student number (e.g., SMITH_123456789.xlsx). Submit your completed Excel file to your demonstrator by the due date.
TOTAL MARKS: 52

DATA SETS FOR PRAC 3:

DATASET 1: TEMPERATURE AND RAINFALL IN SOUTH AFRICAN CITIES

City	Average Temperature (°C)	Annual Rainfall (mm)
Johannesburg	16.1	713
Cape Town	16.8	515
Durban	20.6	1009
Pretoria	18.2	674
Bloemfontein	15.6	559
Port Elizabeth	17.0	618
East London	18.0	593
Kimberley	18.4	414
Polokwane	18.9	495
Upington	20.4	195
Nelspruit	19.8	796
Pietermaritzburg	17.9	844

DATASET 2: MONTHLY RAINFALL PATTERNS (mm)

Month	Western Cape	Eastern Cape	Gauteng	KwaZulu-Natal
January	15	65	125	134
February	10	70	90	112
March	20	75	80	120
April	40	60	55	70
May	85	50	25	60
June	110	45	10	40
July	95	40	5	35
August	85	45	8	45
September	55	55	20	65
October	35	60	60	95
November	25	55	85	105
December	20	65	105	125

DATASET 3: TOURIST NUMBERS BY PROVINCE WITH STANDARD ERROR

Province	Domestic Tourists (thousands)	Standard Error	International Tourists (thousands)	Standard Error
Western Cape	2450	180	1850	200
Gauteng	3100	220	2200	500
KwaZulu-Natal	3500	500	950	90
Eastern Cape	1800	160	380	45
Mpumalanga	1250	130	750	85
Limpopo	1700	150	420	50
North West	1150	120	650	75
Free State	950	90	220	30
Northern Cape	520	60	180	25

DATASET 4: ANNUAL TEMPERATURE DISTRIBUTION (°C) BY REGION

Month	Coastal Region	Central Region	Northern Region	Southern Region
January	24	28	31	22
February	25	28	30	23
March	23	26	28	21
April	20	22	25	18
May	17	18	22	15
June	15	14	19	12
July	14	13	18	11
August	15	15	20	12
September	16	19	23	14
October	18	22	26	16
November	20	24	28	18
December	22	26	30	20