Main Examination period 2019

MTH4114
Computing and Data Analysis with Excel
Duration: 2 hours

Examiners: Dr S. Sarfo And Dr T. Popiel

NOTE:
For this exam, there are **5 marks** available for presentation and proper organisation of work.

Question 1. [28 marks]
Use the worksheet labelled **Question 1**

When you are thinking of moving to an area, checking local crime rates is one way of getting a feel for the place and the type of security you should consider. And they will impact your insurance premium, too. Here, you are presented with data in a text file (named Data.txt on QMplus) on types of crime for boroughs in a popular city.

Download the data file from QMplus, and import the content into your Excel worksheet labelled Question 1.

(a) Create an appropriate labelled chart or graph to compare the crime figures in each borough from table 1.   [**8**]

(b) Briefly comment on the crime figures as presented in your chart or graph.   [**5**]

(c) Table 2 shows a breakdown of the figures according crime type. Table 2 also presents the crime figures for the previous year in a separate column.

  (i) Calculate the percentage change in each crime over the period (from 2017 to 2018) in the range **D40:D49**.   [**5**]

 (ii) Create an appropriate labelled chart or graph to compare the change in each crime.   [**5**]

 (iii) Write a brief comment on your observations from the graph.   [**5**]

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Question 2. [25 marks]
Use the worksheet labelled **Question 2**

(a) (a) Convert the range **J3:L17** to a table named Department.   **[5]**

(b) Use an exact VLOOKUP to return Johnny Caine's Department in cell B4 of
     the Employee Summary table.   **[5]**

(c) Use another exact VLOOKUP to return Johnny Caine's Salary in cell D4.   **[5]**

(d) Autofill your formulas in B4 and D4 down to B18 and D18 respectively.   **[5]**

(e) Adjust the formulas in cells B18 and D18 to display blank (instead of **#N/A**). **[5]**

Question 3. [26 marks]
Use the worksheet labelled **Question 3**

One theory in brain science states that the level of dopamine in a person's nervous system determines whether someone will exhibit psychotic behaviour.
In the Table 1, you are given data on the dopamine levels for 10 psychotic and 14 nonpsychotic adults.

(a) Use **descriptive statistics** to compare the distribution of dopamine in psychotic and nonpsychotic people. You are **not** required to comment on the values.   [**5**]

(b) Use a **boxplot (box and whiskers)** to compare the distribution of dopamine in psychotic and nonpsychotic people. You are **not** required to comment on the values.   [**5**]

(c) You are provided data on births during 2001 at a named hospital in Table 2, (cell range **A24:B687**). **You are not allowed to sort the data.**

   (i) Construct a PivotTable that summarizes the births by day of the week.   [**6**]

   (ii) Use another PivotChart or PivotTable to help you explain the pattern in births by day of the week.   [**10**]

Question 4. [16 marks]
Use the worksheet labelled **Question 4**

(a) Use MS Excel to solve the following simultaneous equations.

(i)
$$\left.\begin{array}{rcrcrcr} x & + & y & - & z & = & 4 \\ x & - & 2y & + & 3z & = & -6 \\ 2x & + & 3y & + & z & = & 7 \end{array}\right\}$$

[8]

(b) Use MS Excel to implement the trapezium rule with four ordinates (three strips) to find an appropriate value to 3 decimal places for each of:

(i)
$$\int_{1.5}^{6} x^2 \sqrt{x^2 - 1} \, dx.$$

[8]

End of Paper.