



# **Skills for Computing**

**07 September 2021**

## **Time-Controlled Assessment Paper**

**Answer ALL questions.**

**Clearly cross out surplus answers.**

**Time: 4 hours**

**The maximum mark for this paper is 50.**

**A formula sheet is provided at the end of the question paper.**

### **IMPORTANT INFORMATION**

**Reference material is not permitted in this assessment.**

**Candidates are allowed to use a scientific calculator during this examination.**

**Graph paper will be provided by the centre.**

**Question 1**

The average rainfall each January over 6 years is recorded:

Year	Rainfall (mm)
2015	35
2016	22
2017	31
2018	26
2019	15
2020	29

- a) Draw a line graph for the average rainfall. 6
- b) Explain why a pie chart is **not** appropriate to represent this data. 2
- c) Explain whether the data collected is discrete or continuous. 2

**Total 10 Marks**

**Question 2**

The average rainfall each month for a 1-year period is shown.

Month	Rainfall (mm)
January	35
February	40
March	23
April	15
May	10
June	3
July	8
August	19
September	41
October	25
November	38
December	42

- a) Calculate the median amount of rainfall. Show your working. 2
- b)
  - i) Calculate the mean amount of rainfall to 2dp. Show your working. 2
  - ii) The standard deviation is 13.46. Identify the range that falls within one standard deviation of the mean. 1

- |  |              |
|--|--------------|
|  | <b>Marks</b> |
| iii) Give the range that would provide a 90% confidence interval.  | <b>1</b>     |
| <b>c)</b> The person who collected the data measured the rainfall outside a school hall.                 |              |
| i) Identify how bias might have been introduced in this collection <b>and</b> how this could be avoided. | <b>2</b>     |
| ii) Identify whether the data collected is primary or secondary. Justify your choice.                    | <b>2</b>     |

**Total 10 Marks**

### Question 3

The average rainfall over a 6-month period is compared to the average temperature for the same months.

The data collected is shown:

Month	Temperature (Celsius)	Rainfall (mm)
January	5	40
February	8	35
March	11	23
April	13	15
May	21	7
June	25	10

- |  |          |
|--|----------|
| a) Calculate Spearman's rank correlation coefficient for the given data to 2dp.                | <b>8</b> |
| b) Explain what your result to question 3a) means in relation to the temperature and rainfall. | <b>2</b> |

**Total 10 marks**

### Question 4

You need to work as part of a team to decide how to raise money for a new computer room at your school.

- |  |          |
|--|----------|
| a) Describe how you will make use of right-brained thinking in this discussion.                  | <b>2</b> |
| b) Describe how you will make use of left-brained thinking in this discussion.                   | <b>2</b> |
| c) Describe how your team will use the TASC cycle to raise the money.                            | <b>4</b> |
| d) Describe how your team could use the 6-hats in parallel to generate ideas to raise the money. | <b>2</b> |

**Total 10 Marks**

**Question 5**

**a)** Describe ONE (1) piece of work where you made use of references, and why these were included. **3**

**b)** The following entries form part of a reference list. **3**

Wu, C., (2020) Hello World, London

M., (2018) Selection for beginners, New York, Green Publishers

Hillary, J., (2015) Advanced OOP, Berlin, Orange Press

Smith, I., (2019) Fundamentals, Berlin, Orange Press

Identify THREE (3) errors in the reference list.

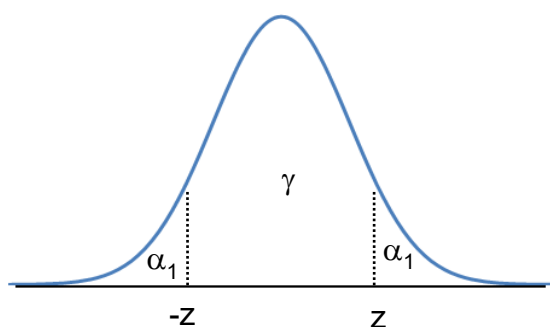
**c)** Identify ONE (1) example of continual professional development that you have taken part in and why you took part in it. **2**

**d)** Identify ONE (1) example of lifelong learning that you take part in and why you take part in it. **2**

**Total 10 Marks**

**End of paper**

## 1. Percentage points of the normal distribution



$\alpha_1$	15.87%	15%	5.00%	2.50%	2.28%	1.00%	0.50%
$\Phi$	68.27%	70.00%	90.00%	95.00%	95.45%	98.00%	99.00%
z	1.0000	1.0364	1.6449	1.9600	2.0000	2.3263	2.5758

## 2. Formulae

Spearman's Rank Correlation (with no ties)

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

The Pearson Correlation Function

$$R = r = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n \sum x_i^2 - (\sum x_i)^2)(n \sum y_i^2 - (\sum y_i)^2)}}$$

Simple Linear Regression

$$\hat{y} = mx_i + c$$

is the least SSE straight line where:

$$m = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$m = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{n \sum x_i^2 - (\sum x_i)^2}$$

$$c = \bar{y} - m\bar{x}$$

The Coefficient of Determination

$$R^2 = r^2 = \frac{\sum (\hat{y} - \bar{y})^2}{\sum (y - \bar{y})^2}$$