Skills for Computing

December 2015

Sample Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 2 hours

The maximum mark for this paper is 50.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

<u>A formula sheet is provided at the end of the question paper.</u>

Candidates are allowed to bring in a scientific calculator for this module.

Marks

Question 1

A researcher is conducting a survey to investigate how much people spend in a local shop.

a) The researcher selects a random sample of nine shoppers and asks them how much they have spent. The responses are:

£7.96   £2.82   £15.31   £13.18   £12.58   £6.32   £10.48   £9.85   £14.49

  i)   Is the data collected primary or secondary data?   **1**

  ii) Find the median of the sample.   **2**

  iii) State one advantage of using the median rather than the mean.   **1**

b) To gain a more accurate result, the researcher decides to record the amount spent in the local shop by a larger number of shoppers.100 shoppers, including the initial sample of nine, are selected at random. The mean amount of money spent is found to be £17.56 with a standard error of £5.79

  i)   State the range of the amount of money spent that would give a 95%   **1**
       confidence interval.

  ii) The initial sample of nine shoppers is included in the second larger sample.   **3**
       Was the initial sample representative? Explain your reasoning.

c) The survey is conducted again at a later date with 100 respondents. The mean   **2**
     amount of money spent by shoppers was found to be £19.86 with a standard
     error of £6.13. Is there more variation in the results of the first or second survey?
     Explain your answer.

Total: 10 Marks

Questions continue on next page

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Question 2

The height (in cm) and age (in months) of six small children is recorded in the table below:

Age in months (x)	17	20	22	23	26	28
Height in cm (y)	76	79	81	80	83	83

a) Calculate Pearson's correlation coefficient for the set of data. **6**

b) Comment on your result (i.e. what does the result indicate?). **2**

c) Find the mean height of the children. **2**

Total 10 Marks

Questions continue on next page

Question 3

The marks of six candidates in a mathematics exam and a science exam are shown in the table below:

Candidate	1	2	3	4	5	6
Mathematics (x)	22	35	46	63	62	45
Science(y)	45	57	66	54	73	64

a) Which of the following two terms best describes this data? **2**
- Quantitative
- Discrete
- Continuous
- Qualitative

b) Draw a scatter plot of the results. You should plot 'Mathematics Exam' on the horizontal axis and 'Science Exam' on the vertical axis. You should give your scatter plot an appropriate title and label both axis. Use the graph paper provided. **5**

c) A student who achieved a result of 86 in the science exam wants to use the data to estimate their result in the mathematics exam.

    i)   What is this type of estimate called? **1**

    ii)   Comment on the accuracy of using the trend line on a scatter plot to estimate this. **2**

Total: 10 Marks

Questions continue on next page

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Question 4

A theme park is deciding whether to open a new attraction as part of a strategy to increase visitor numbers. The management team has decided to apply the 'Six Hats' method to the problem.

a) The Six Hats method is going to be applied 'in parallel'. Explain what this means. **1**

b) State the name of an alternative way of applying the Six Hats method to the problem. **1**

c) What colour hat would the chair or facilitator wear at the meeting? Explain the role of this colour hat. **4**

d) Describe the role of the yellow hat. Suggest how they might respond to the idea of opening a new attraction. Is the wearer of the yellow hat involved in predominantly right-brained or left-brained activity? **4**

Total: 10 Marks

Question 5

a) Write down the in-text reference for the following book. **3**
Page number: 78
Title: Writing skills
Author: D. Roberts
Year of publication: 2014
Publisher: AB Publishing
Location of publisher: Melbourne

b) Give two reasons why referencing correctly is important. **2**

c) Explain what Continuing Professional Development (CPD) is. Give an example of an activity that could contribute to the CPD of an IT professional. **3**

d) Explain the differences between speed reading and detail reading **2**

Total: 10 Marks

End of Examination Paper

1. Percentage points of the normal distribution
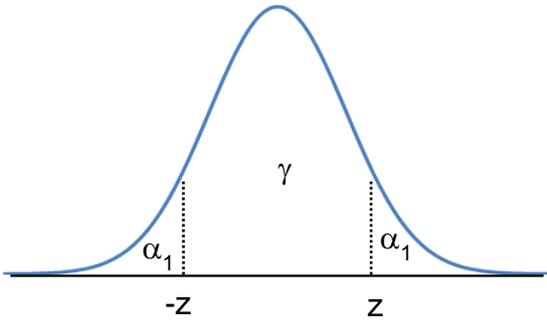
α_1	15.87%	15%	5.00%	2.50%	2.28%	1.00%	0.50%
γ	68.27%	70.00%	90.00%	95.00%	95.45%	98.00%	99.00%
z	1.0000	1.0364	1.6449	1.9600	2.0000	2.3263	2.5758

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

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

Simple Linear Regression

$\hat{y} = mx_i + c$ is the least SSE straight line where:

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

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

The Coefficient of Determination

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