Higher Level Question

(Suggested maximum time: 5 minutes)

(a) Give an example of a data set where this statement is false:

"minimum < mean < maximum".

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(b) Describe for what kind of data sets this statement is false:

"minimum < mean < maximum".



All of the students in a class took *IQ Test 1* on the same day. A week later they all took *IQ Test 2*. Their scores on the two IQ tests are shown in the tables below.

		IQ Test I	!	
86	104	89	105	96
96	103	94	104	119
115	79	97	111	108

		IQ Test 2		
83	120	105	111	114
99	111	108	106	97
97	102	94	108	117

(i) Draw a back-to-back stem-and-leaf plot below to display the students' scores.

IQ Test 1		IQ Te	st 2	
	7			
	8			
	9			
	10			
	11			
	12			
Ke	ey:			

(ii) Find the range of scores for each IQ test.

IQ Test 1:	IQ Test 2:

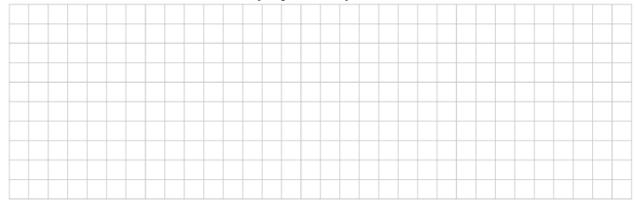
(iii) Find the median score for each IQ test.

IQ Test 1:	IQ Test 2:

(iv) Find the mean score for each IQ test.

IQ Test 1:	IQ Test 2:

(v) Compare the scores on the two IQ tests. Refer to at least one measure of central tendency and at least one measure of variability (spread) in your answer.



(vi) Marshall says that every student in the class must have done better on *IQ Test 2* than on *IQ Test 1*. Is Marshall correct? Explain your answer.

Students in a class are investigating spending in their local area. They each carry out a different survey, and display the results.

(a) John is investigating whether people pay for their weekly shopping with Credit Card, Debit Card, Cash, or Cheque. When people tell him which one of these they usually use, he writes it in a table. His results are shown below.



Credit Card	Debit Card	Debit Card	Cash	Debit Card
Credit Card	Cash	Cash	Credit Card	Debit Card
Debit Card	Debit Card	Cheque	Cash	Cash
Cash	Cash	Debit Card	Cash	Credit Card

(i) What type of data has John collected? Put a tick (\checkmark) in the correct box below.

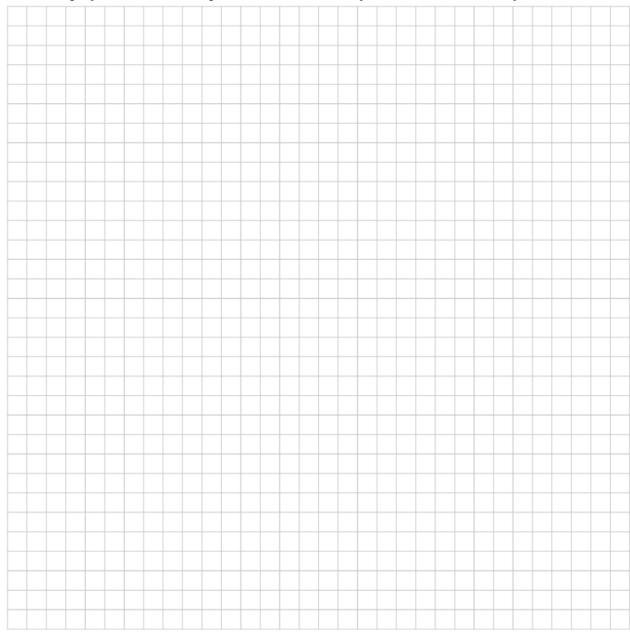
Numerical	Numerical	Categorical	Categorical
Continuous	Discrete	Nominal	Ordinal

(ii) Fill in the frequency table below.

Method of Payment	Credit Card	Debit Card	Cash	Cheque
Frequency				
				<u> </u> ¬

(iii) What is the mode of John's data? Mode =

(iv) John says that he cannot find the mean of his data. Explain why this is the case.



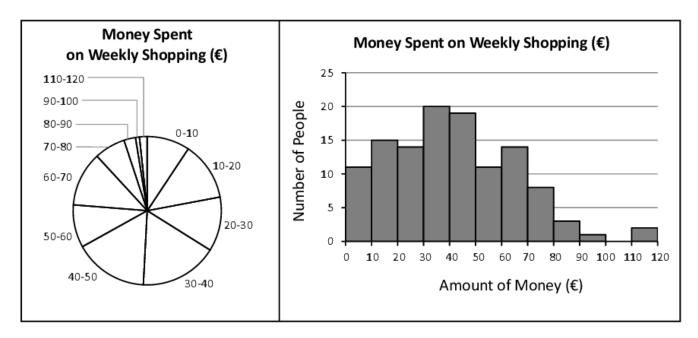
(v) Display John's data in a pie chart. Show all of your calculations clearly.

(b) Margaret wants to examine if people prefer to do their weekly shopping in *Tesco*, *Dunnes Stores*, *SuperValu*, or *Lidl*. She stands outside her local *Lidl* shop for one day, and asks everyone as they leave the shop where they prefer to do their weekly shopping.

Give one reason why Margaret's data may be biased.



(c) Mary is interested in the amount of money people spend on their weekly shopping. She surveys people as they leave the local supermarket on a Saturday morning, and displays her results in the two graphs below.



(i) Mary wants to show that about half of her sample spent less than €40 on their weekly shopping. Which graph do you think she should use? Give a reason for your answer.

Answer:								
Reason:								

(ii) Mary wants to show that there were more people in the 30–40 group than in any other. Which graph do you think she should use? Give a reason for your answer.

Answer:				
Reason:				

The ages of the 30 people who took part in an aerobics class are as follows:

18	24	32	37	9	13	22	41	51	49
15	42	37	58	48	53	27	54	42	24
33	48	56	17	61	37	63	45	20	39
The ages of	the 30 pe	eople wh	io took p	oart in a	swimmi	ng class	are as fo	ollows:	

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16	22	29	7	36	45	12	38	52	13
33	41	24	35	51	8	47	22	14	24
42	62	15	24	23	31	53	36	48	18

(a) Represent this data on a back-to-back stem-and-leaf diagram.

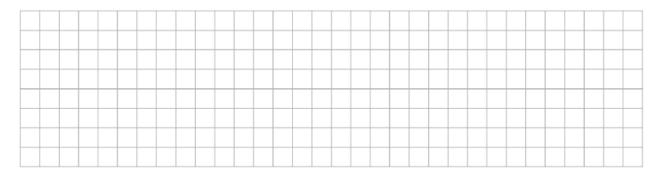
Aerobics class		Swimming class
	0	
	1	
	2	
	3	
	4	
	5	
	6	
		Key:

(b) Use your diagram to identify the median in each case.

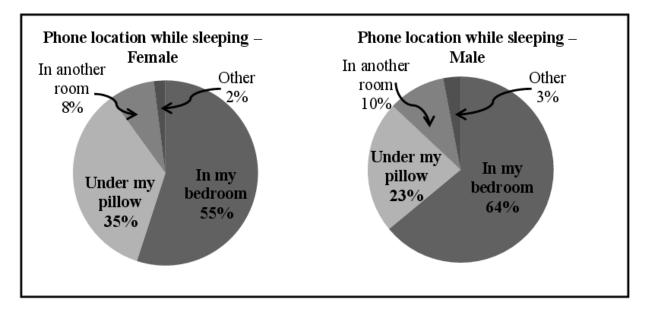
(c) What other measure of central tendancy could have been used when examining this data?

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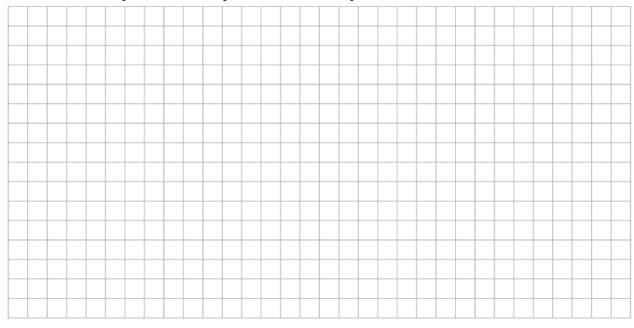
(d) Based on the data make one observation about the ages of the two groups.



In total 7150 second level school students from 216 schools completed the 2011/2012 phase 11 *CensusAtSchool* questionnaire. The questionnaire contained a question relating to where students keep their mobile phones while sleeping.



(a) Given that this question was answered by 4171 girls and 2979 boys, calculate how many female students kept their mobile phones under their pillows.



(b) Calculate the overall percentage of students who kept their mobile phones under their pillows.



(c) A new pie chart is to be drawn showing the mobile phone location for all students. Calculate the measure of the angle that would represent the students who kept their mobile phones under their pillows.



The salaries, in \in , of the different employees working in a call centre are listed below.

22 000	16500	38000	26 500	15000	21 000	15500	46000
42 000	9500	32000	27 000	33 000	36 000	24000	37000
65 000	37000	24 500	23 500	28 000	52 000	33000	25000
23 000	16500	35000	25 000	33 000	20 000	19500	16000

(a) Use this data to complete the grouped frequency table below.

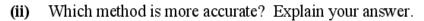
Salary (€1000)	0-10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 – 70
No. of Employees							

[Note: 10 – 20 means €10 000 or more but less than €20 000, etc.]

(b) Using mid-interval values find the mean salary of the employees.

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(c) (i) Outline another method which could have been used to calculate the mean salary.



Answer												
Reason												

The ages of the Academy Award winners for best male actor and best female actor (at the time they won the award) from 1992 to 2011 are as follows:

Male actor 54 52 37 38 32 45 60 46 40 36 47 29 43 37 38 45 50 48 60 50

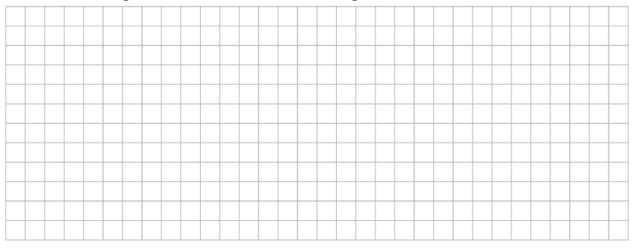
Female actor 42 29 33 36 45 49 39 26 25 33 35 35 28 30 29 61 32 33 45 29

(a) Represent the data on a back-to-back stem-and-leaf diagram.

Male actors		Female actors
	2	
	3	
	4	
	5	
	6	
		Key:

(b) State one similarity and one difference that can be observed between the ages of the male and female winners.

- (c) Mary says "The female winners were younger than the male winners." Investigate this statement in relation to:
 - (i) The mean age of the male winners and mean age of the female winners.



THE	me	dia	n ag	e o	f th	e m	nale	e w	inn	ers	s an	ld t	he	me	dia	n a	ge	of	the	fei	nal	le v	vin	ner	s.			
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		-		-																						-	_	-
																				_								_
		-		-																								_
																										The median age of the male winners and the median age of the female winners.		

(d) Find the interquartile ranges of the ages of the male winners and of the female winners.

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Male		Female