## (70 marks)

## **Question 9**

The heights of a random sample of 1000 students were collected and recorded.

Tick one box from the table below to indicate how you would categorise the type of data **(a)** collected. Explain your choice.

Categorical Nominal	Explanation:
Categorical Ordinal	
Numerical Discrete	
Numerical Continuous	

The sample of 1000 students was made up of 500 boys and 500 girls. The data from the 500 **(b)** girls was used to create the information shown in Table 1.

			Tab	le 1 (Girls	)			
Height (cm)	145-150	150-155	155-160	160-165	165-170	170-175	175-180	180-185
Number of girls	15	48	80	112	125	81	29	10

Use the information in Table 1 to estimate the mean height of the girls, using mid-**(i)** interval values.

- The median height of the girls in the sample is 164.5 cm. Explain what this means in the (iii) context of the heights of the 500 girls.

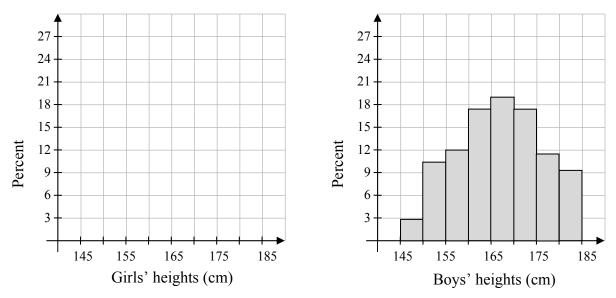
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(c) (i) Use the data in Table 1 to complete Table 2 by finding the percentage of girls in each of the height categories.

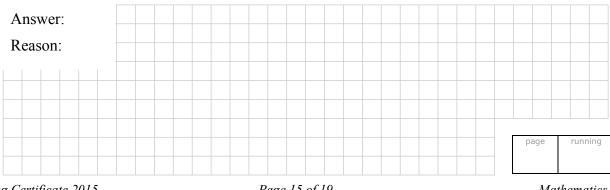
			Table	2 (Girls, 9	%)			
Height (cm)	145-150	150-155	155-160	160-165	165-170	170-175	175-180	180-185
Percentage of girls				22.4	25			



(ii) Use the data in Table 2 to draw a histogram showing the percentage of girls in each height category.



(iii) A histogram showing the percentage of boys in each height category is given above. John examines both histograms and comments that "There are roughly twice as many boys as girls in the 175 to 180 cm category". Do the histograms support his claim? Explain your answer.



Mathematics Paper 2 – Ordinary Level (iv) Mary examines both histograms and comments that "I see that there are more tall girls than tall boys". Do the two histograms support her claim? Explain your answer.

Answer:													
Reason:	_			 _		 	 	 	 	 		 	
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(d) (i) The mean height of the boys in the sample is 166.7 cm and the standard deviation of their height is 8.9 cm. Assuming that boys' heights are normally distributed, use the Empirical Rule to find an interval that will contain the heights of approximately 95% of all boys.



(ii) The standard deviation of the heights of the girls in the sample is 7.7 cm while the standard deviation of the heights of the boys is 8.9 cm. Interpret this difference in the context of the data.



## You may use this page for extra work.

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