## Question 9

The heights of a random sample of 1000 students were collected and recorded.
(a) Tick one box from the table below to indicate how you would categorise the type of data collected. Explain your choice.

| Categorical Nominal |  |
| :--- | :--- |
| Categorical Ordinal |  |
| Numerical Discrete |  |
| Numerical Continuous |  |

Explanation:

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

## Table 1 (Girls)

| Height <br> (cm) | $145-150$ | $150-155$ | $155-160$ | $160-165$ | $165-170$ | $170-175$ | $175-180$ | $180-185$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Number of <br> girls | 15 | 48 | 80 | 112 | 125 | 81 | 29 | 10 |

(i) Use the information in Table 1 to estimate the mean height of the girls, using midinterval values.

(ii) What is the largest possible value for the range of the heights of the girls in this sample?

(iii) The median height of the girls in the sample is 164.5 cm . Explain what this means in the context of the heights of the 500 girls.
$\square$
(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, \%)

| Height <br> (cm) | $145-150$ | $150-155$ | $155-160$ | $160-165$ | $165-170$ | $170-175$ | $175-180$ | $180-185$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Percentage <br> of girls |  |  |  | $22 \cdot 4$ | 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.

## Answer:

## Reason:


(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.


