Exercises "Basic"

1. Describe one difference between a frequency histogram and a relative frequency histogram

Frequency Histogram

A frequency histogram shows the number of occurrences (frequency) of data points within specific intervals or "bins" on the x-axis.

A relative frequency histogram on the other hand, shows the proportion (or percentage) of data points that fall within each interval relative to the total number of data points.

3 Construct a stem and leaf diagram, a frequency histogram, and a relative frequency histogram for the following dataset. For the histogram use classes 51-60, 61-70, and so on.

| | | | | |
|---|---|---|---|---|
| 69 | 92 | 68 | 77 | 80 |
| 70 | 85 | 88 | 85 | 96 |

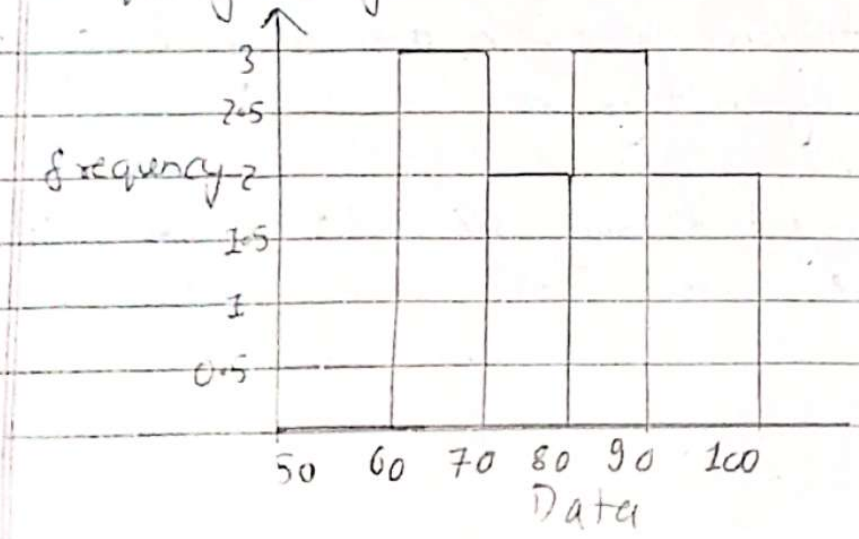
Let's First organize and display the data

68, 69, 70, 77, 80, 85, 85, 88, 92, 96

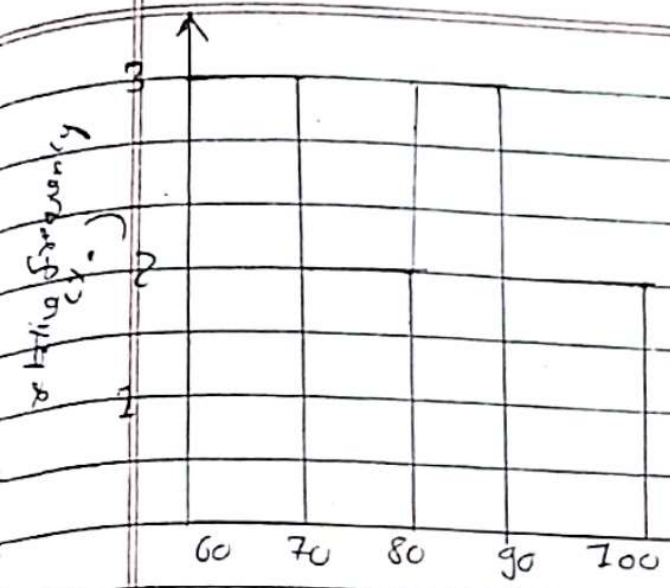
(1) Stem & leaf diagram

| Stem | | Leaf | | | |
|---|---|---|---|---|---|
| 6 | \| | 8 | 9 | | |
| 7 | \| | 0 | 7 | | |
| 8 | \| | 0 | 5 | 5 | 8 |
| 9 | \| | 2 | 6 | | |

(2) Frequency Histogram




| | |
|---|---|
| 51-60 | 0 |
| 61-70 | 3 |
| 71-80 | 2 |
| 81-90 | 3 |
| 91-100 | 2 |




| Data | frequency | Relative frequency |
|---|---|---|
| 61-70 | 3 | 0.3 |
| 71-80 | 2 | 0.2 |
| 81-90 | 3 | 0.3 |
| 91-100 | 2 | 0.2 |

⑤ Applications

3 The IQ scores of ten students randomly selected from an elementary school are given

108 100 99 125 87 105 107 105 119 118

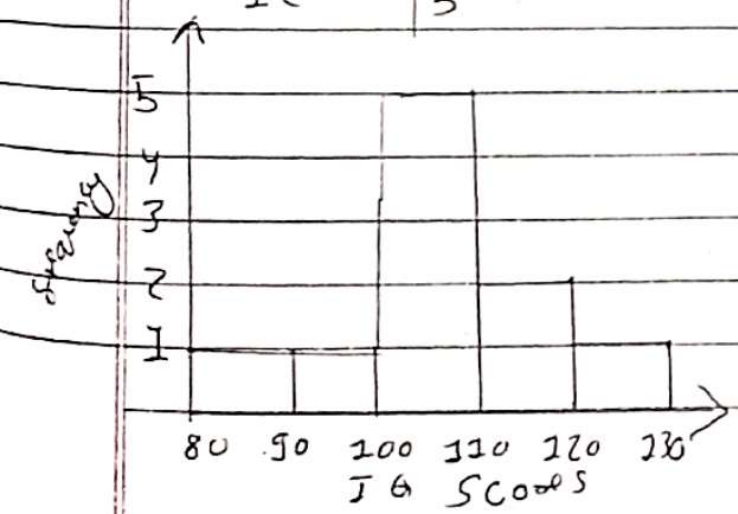
Here,

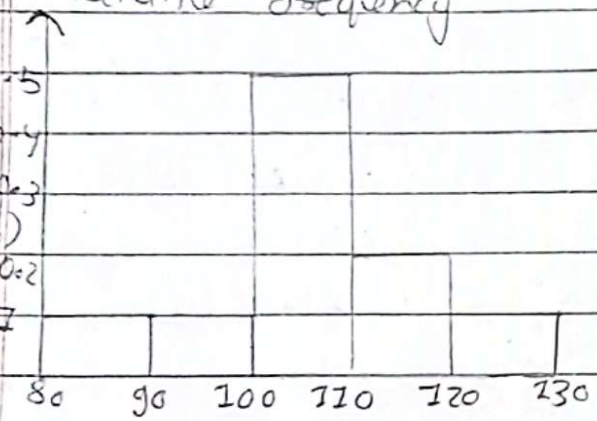
Let's organize data in ascending order at first

87, 99, 100, 105, 105, 107, 108, 118, 119, 125

| stem | leaf |
|---|---|
| 8 | 7 |
| 9 | 9 |
| 10 | 0 5 5 7 8 |
| 11 | 0 9 |
| 12 | 5 |

| IQ score | frequency |
|---|---|
| 80-89 | 1 |
| 90-99 | 1 |
| 100-109 | 5 |
| 109-119 | 2 |
| 120-129 | 1 |






| IQ Scores | frequency | Relative |
|---|---|---|
| 80-89 | 1 | 1/10 = 0.1 |
| 90-99 | 1 | 1/10 = 0.1 |
| 100-109 | 5 | 5/10 = 0.5 |
| 110-119 | 2 | 2/10 = 0.2 |
| 120-129 | 1 | 1/10 = 0.1 |

n = 10

4 Random sample, each size n=10, were taken of the lengths in centimetres of three kinds of romercial dish, with the following results.

Sample 1: 87, 99, 100, 105, 105, 107, 108, 110, 119, 125

Sample 2: 133, 137, 138, 138, 139, 140, 142, 145

Sample 3 152, 160

| Stem | Leaf |
|---|---|
| 8 | 7 |
| 9 | 9 |
| 10 | 0 5 5 7 8 |
| 11 | 9 |
| 12 | 5 |
| 13 | 3 7 8 8 9 |
| 14 | 2 5 |
| 15 | 2 |
| 16 | 0 |

5 In a particular kitchen appliance store the weekly sales of an electronic automatic rice cooker for the last 20 weeks are as follows

14 14 15 15 16 16 17 18 18 20

9 12 13 15 15 15 15 16 19 19

In retail store, too large an inventory ties up capital, while too small an inventory costs lost sales and customer satisfaction. Using the relative frequency histogram for these data find approximately how many rice cookers must be in stock at the beginning of each week if

(i) the store is not to run out of stock by the end of a week for more than 15% of the weeks

| value | frequency | Cumulative count | Cumulative Relative frequency |
|---|---|---|---|
| 9 | 1 | 1 | @ 5% |
| 12 | 1 | 2 | 10% |
| 13 | 1 | 3 | 15% |
| 14 | 2 | 5 | 25% |
| 15 | 6 | 11 | 55% |
| 16 | 3 | 14 | 70% |
| 17 | 1 | 15 | 75% |
| 18 | 2 | 17 | 85% |
| 19 | 2 | 19 | 95% |
| 20 | 1 | 20 | 100% |

For the 85th Percentile (not more than 15% stockout)

=) The Cumulative Relative frequency reaches 85% at the value 18. This means that 85% of the weeks have sales of 18 or fewer

2) The store is not to run out of stock by the end of a week for more than 5% of the weeks

=> for the 95th Percentile (not more than 5% stockout)
The cumulative frequency reaches 95% at the value 19.
This means 95% of the weeks have sales of 19 or fewer.