

II. Cont.

Lower class limit

IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

Upper class limit

IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

Class width

20

← 'most important'

20
20
20
20

IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

class boundaries: $\frac{\text{lower} + \text{upper}}{2}$

← "half way"

	IQ Score	Frequency
49.5 →	50-69	2
69.5 →	70-89	33
89.5 →	90-109	35
109.5 →	110-129	7
129.5 →	130-149	1
149.5 →		

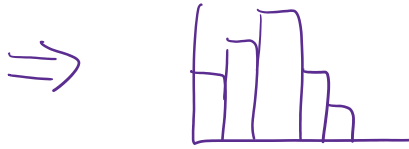
lower class limit — smaller number to each class
 upper class limit — bigger

class width — the difference between each class

eg $20 = 70 - 50$

class boundaries — the number half way between classes

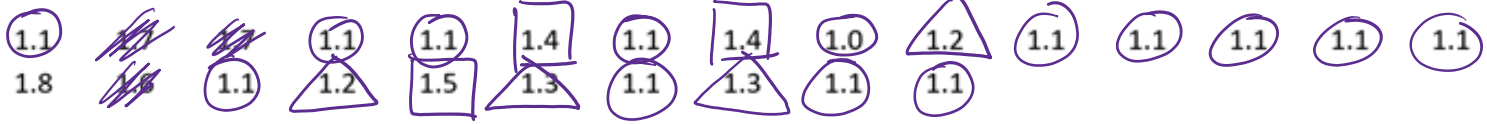
eg $20 = 130 - 110$



Histogram

← give a visual representation

Eg. 25 nicotine amounts in mg for nonfiltered king-size cigarettes.



Construct a frequency distribution.

S:

Amount of nicotine	Frequency
1.0 - 1.1	14
1.2 - 1.3	4
1.4 - 1.5	3
1.6 - 1.7	3
1.8 - 1.9	1

eg Construct a frequency distribution:

A researcher played a mobile device game for 2 hours. The objective of the game is to capture as many virtual characters as possible. The following table shows the list of characters captured after 2 hours of playing.

Plastic	Liquid	Wheat	Insect	Metal	Plastic	Insect
Insect	Plastic	Insect	Liquid	Wheat	Insect	Liquid
Wheat	Insect	Wheat	Plastic	Insect	Liquid	Insect
Metal	Wheat	Insect	Wheat	Insect	Plastic	Wheat
Plastic	Insect	Plastic	Plastic	Liquid	Insect	Plastic

S:

Materials	Frequency
Plastic	9
Liquid	5
Wheat	7
Insect	12
..	..

Insect | 12
Metal | 2

eg Our example from above:

Table 2-1 Full IQ Scores of Low Lead Group and High Lead Group

Low Lead Level (Group 1)

70	85	86	76	84	96	94	56	115	97	77	128	99	80	118	86
141	88	96	96	107	86	80	107	101	91	125	96	99	99	115	106
105	96	50	99	85	88	120	93	87	98	78	100	105	87	94	89
80	111	104	85	94	75	73	76	107	88	89	96	72	97	76	107
104	85	76	95	86	89	76	96	101	108	102	77	74	92		

High Lead Level (Group 3)

82	93	85	75	85	80	101	89	80	94	88	104	88	88	83	104
96	76	80	79	75											



IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

eg ~~15~~ **Old Faithful** Listed below are sorted duration times (seconds) of eruptions of the Old Faithful geyser in Yellowstone National Park. Use these times to construct a frequency distribution. Use a class width of 25 seconds and begin with a lower class limit of 125 seconds.

125 203 205 221 225 229 233 233 235 236 236 237 238 238 239 240 240
 240 240 241 241 242 242 242 243 243 244 245 245 245 245 246 246 248
 248 248 249 249 250 251 252 253 253 255 255 256 257 258 262 264

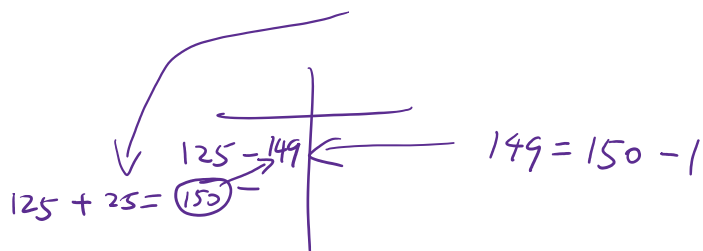
S:

seconds | Frequency

S:

Seconds	Frequency
1st → 125 - 149	1
2nd → 150 - 174	0
175 - 199	0
200 - 224	3
225 - 249	34
250 - 274	12

Class width = 25



III. Relative & Cumulative Frequency

Relative frequency (percent) - It is the percentage to the total.

$$\text{relative frequency} = \frac{\text{Each frequency}}{\text{Total frequency}} \cdot 100\% \quad (\text{Decimal okay})$$

← "Pie %"

Cumulative frequency - the sum to previous frequency for each class.

$$\text{Cumulative frequency} = \text{"start with first"}$$

total

eg. Find the relative frequency:

Amount of nicotine	Frequency
1.0 - 1.1	14
1.2 - 1.3	4
1.4 - 1.5	3
1.6 - 1.7	3

Amount of nicotine	Frequency
1.0 - 1.1	14
1.2 - 1.3	4
1.4 - 1.5	3
1.6 - 1.7	3
1.8 - 1.9	1

S:

Amount of nicotine	Frequency	Relative Frequency
1.0 - 1.1	14	56%
1.2 - 1.3	4	16%
1.4 - 1.5	3	12%
1.6 - 1.7	3	12%
1.8 - 1.9	1	4%

$\leftarrow \frac{14}{25} \cdot 100\%$
 $\leftarrow \frac{4}{25} \cdot 100\%$
 $\leftarrow \frac{3}{25} \cdot 100\%$
 $\leftarrow \frac{1}{25} \cdot 100\%$

Total: $14 + 4 + 3 + 3 + 1 = 25$

eg. Find the cumulative frequency:

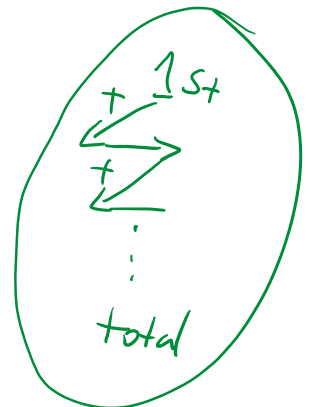
Amount of nicotine	Frequency
1.0 - 1.1	14
1.2 - 1.3	4
1.4 - 1.5	3
1.6 - 1.7	3
1.8 - 1.9	1

"Boat fair"

S:

Amount of nicotine	Frequency	Cumulative Frequency
1.0 - 1.1	14	14
1.2 - 1.3	4	18
1.4 - 1.5	3	21
1.6 - 1.7	3	24
1.8 - 1.9	1	25

\leftarrow total



Eg. Find each of the relative and cumulative frequency for the following:

IQ Score	Frequency
50-69	2
70-89	33
90-109	35
110-129	7
130-149	1

S:

IQ Score	Frequency	Relative Frequency	Cumulative Frequency
50-69	2	2.6%	2
70-89	33	42.3%	35
90-109	35	44.9%	70
110-129	7	9.0%	77
130-149	1	1.3%	78

$$\frac{2}{78} \cdot 100\% \approx 2.6\%$$

$$\frac{33}{78} \cdot 100\% \approx 42.3\%$$

$$\frac{35}{78} \cdot 100\% \approx 44.9\%$$

$$\frac{7}{78} \cdot 100\% \approx 9.0\%$$

$$\frac{1}{78} \cdot 100\% \approx 1.3\%$$

$$\text{Total: } 2 + 33 + 35 + 7 + 1 = 78$$