

2.1 Frequency Distributions and their Graphs

FREQUENCY DISTRIBUTIONS

1. A _____ is a table that shows _____ or _____ of data entries with a count of the number of entries in each class. The _____, (), of a class is the _____.
2. List the guidelines for constructing a frequency distribution from a data set.

1. The number of classes should be between 5 and 20.

high-lowest

Range
Classes

2. Determine the data, divide the range by the number of classes, and round up to the next convenient number.

3. Find the class limits. You can use the minimum data entry as the lower limit of the first class. To find the remaining lower limits, add the class width to the lower limit of the preceding class. Then find the upper limit of the first class.

|||||
|

4. Make a tally mark for each data entry in the row of the appropriate class.

5. Count the tally marks to find the total frequency, f , for each class.

Σ "sigma"

means: to sum
to add

3. In a frequency distribution, it is best if each class has the same width

4. Example:

The following represents census data reporting the ages of the entire population of the 77 residents of Akhiok, Alaska. Construct a frequency distribution that has eight classes.

~~28, 8, 17, 48, 62, 47, 27, 21, 27, 12, 29, 50, 54, 32, 45, 15, 24, 17, 36, 53, 47, 21, 5, 10, 22, 50, 52, 17, 42, 22, 3, 17, 34, 36, 25, 2, 30, 10, 32, 1, 49, 13, 10, 8, 21, 21, 6, 9, 2, 41, 22, 25, 9, 55, 23, 41, 28, 4, 51, 1, 6, 34, 5, 7, 11, 4, 10, 20, 12, 6, 10, 8, 2, 4, 8~~

Classes width
 ↓
 Formula
 ↓

$$\frac{\text{Range}}{\text{Classes}} = \frac{63 - 0}{8}$$

$8 = \frac{63}{8} = 7.875$ | 8 #
 • always
 * round up

	Class	Tally	Frequency, f
1	0 - 7	 	21
2	8 - 15	 	13
3	16 - 23	 	8
4	24 - 31	 	12
5	32 - 39	 	9
6	40 - 47		5
7	48 - 55	 	9
8	56 - 63		1
		∑ tallies = 77	∑ f = 77



5. Definitions:

a. **Midpoint:** the sum of the lower and upper limits of the class divided by two.

$$\text{Midpoint} = \frac{(\text{Lower class limit}) + (\text{Upper class limit})}{2}$$

b. **Relative frequency:** the portion or percentage of the data that ~~less~~ is in that class.

most
histograms

$$\text{Relative frequency} = \frac{\text{Class size}}{\text{Sample size}} = \frac{f}{n} \quad \text{is } \frac{\text{Frequency}}{\text{Sample size}}$$

c. **Cumulative frequency:** the sum of the frequency for that class and all previous classes. The cumulative frequency of the last class is equal to the sample size, n .

Use the census data from Akhiok, Alaska to find the midpoint, relative frequency, and cumulative frequency for each class. Organize your results in a frequency distribution. Identify any patterns and chara

Class lower limit	upper limit	f	Midpoint	Relative frequency	Cumulative frequency
0 - 7		21	$\frac{0+7}{2} = 3.5$	$\frac{21}{77} = 27\%$	21
8 - 15		13	$\frac{8+15}{2} = 11.5$	$\frac{13}{77} = 16.9\%$	21 + 13 = 34
16 - 23		8	$\frac{16+23}{2} = 19.5$	$\frac{8}{77} = 10.4\%$	34 + 8 = 42
24 - 31		12	$\frac{24+31}{2} = 27.5$	$\frac{12}{77} = 15.6\%$	42 + 12 = 54
32 - 39		8	$\frac{32+39}{2} = 35.5$	$\frac{8}{77} = 10.4\%$	54 + 8 = 62
40 - 47		5	$\frac{40+47}{2} = 43.5$	$\frac{5}{77} = 6.5\%$	62 + 5 = 67
48 - 55		9	$\frac{48+55}{2} = 51.5$	$\frac{9}{77} = 11.7\%$	67 + 9 = 76
56 - 63		1	$\frac{56+63}{2} = 59.5$	$\frac{1}{77} = 1.3\%$	76 + 1 = 77
		$\sum f = 77$		$\sum \frac{f}{n} = \frac{77}{77}$	

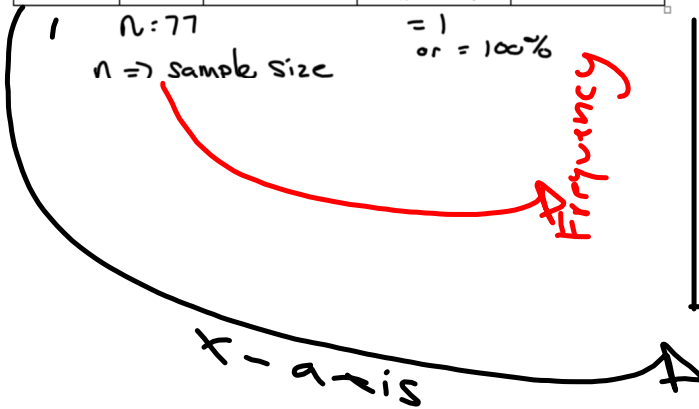
$$n = 77$$

$$n \Rightarrow \text{sample size}$$

$$= 1$$

$$\text{or} = 100\%$$

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(age)
Classes

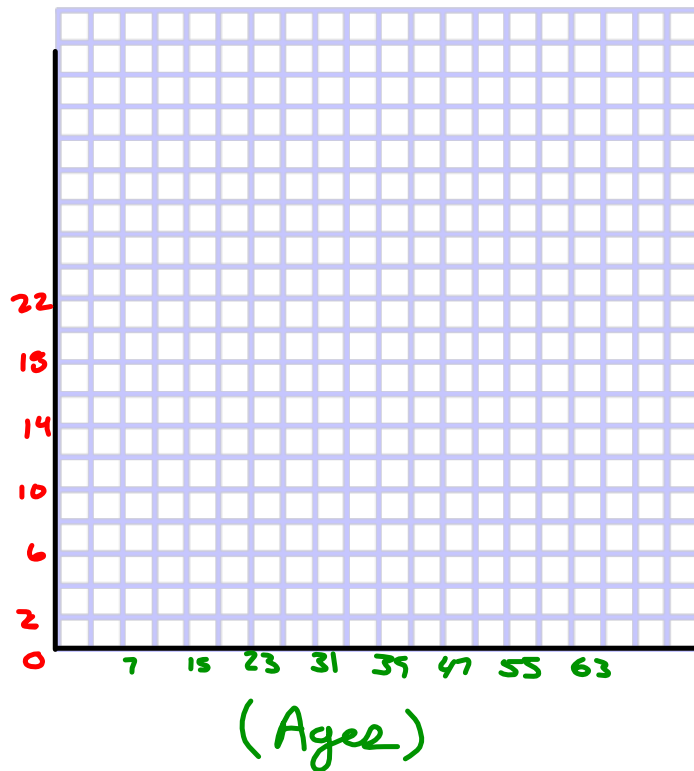
2.1 Notes (2013).notebook

Class Lower limit	Upper limit	f Frequency	Midpoint	Relative frequency	Cumulative frequency
0 - 7	21	$\frac{21}{77} = 27.1\%$	3.5	$\frac{21}{77} = 27.1\%$	21
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		$\sum f = 77$		$\sum \frac{f}{n} = \frac{77}{77} = 1$ or = 100%	

$n = 77$
 $n \Rightarrow$ sample size

$\sum \frac{f}{n} = \frac{77}{77} = 1$
or = 100%

Frequency



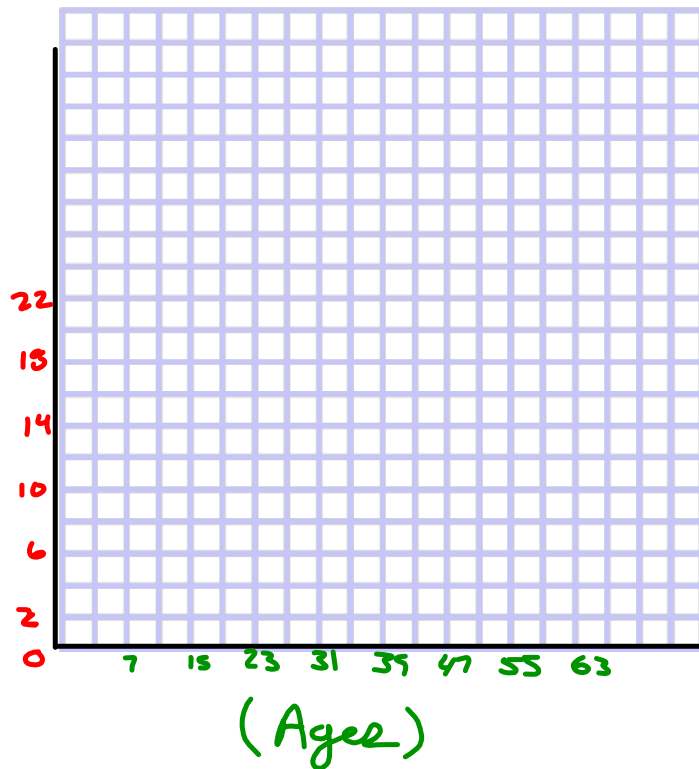
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$n = 77$
 $n \Rightarrow$ sample size

$= 1$
 $or = 100\%$

Frequency



2.1 Notes (2013).notebook

Use the census data from Akhiok, Alaska to construct a frequency histogram that represents the ages of the residents. Describe any patterns.

- a. Find the *class boundaries*.
- b. Choose appropriate *horizontal* and *vertical scales*.
- c. Use the frequency distributions to *find the height of each bar*.
- d. *Describe* any patterns for the data.



II. Frequency Polygon:

Draw a frequency polygon that represents the ages of the residents of Akhiok. Describe any patterns.

- Choose appropriate *horizontal and vertical scales*.
- Plot points* that represent the midpoint and frequency for each class.
- Connect the points* and extend the sides as necessary.
- Describe any patterns* for the data.

