Chapter 2.2 Frequency Distributions

A **Frequency Distribution** (or table) list data values along with the number of scores that fall into each category.

Height of Women (in.)	f
55 – 59	11
60 – 64	85
65 – 69	90
70 – 74	4
75 – 79	1

classes

***labels and units are necessary*

Lower class limits are the smallest numbers that belong to each class.

LCL's: 55, 60, 65, 70, 75

Upper class limits are the largest numbers that belong to each class.

UCL's: 59, 64, 69, 74, 79

Class boundaries are the numbers used to separate each class $\frac{\text{LC} + \text{UC}}{2}$ of each gap. Include the boundaries for the first LCL and the last UCL.

$\frac{59+60}{2} = 59.5$, $\frac{64+65}{2} = 64.5$, etc.

The class boundaries are: 54,5, 59.5, 64.5, 69.5, 74.5, 79.5

Class width is the difference between two consecutive lower (or upper) class lmits.

Class width = 60 – 55 = 5

Class midpoints are the middle numbers of each class. $\frac{\text{LC} + \text{UC}}{2}$

$\frac{55+59}{2} = 57$, $\frac{60+64}{2} = 62$, etc

The class midpoints are: 57, 62, 67, 72, 77

Constructing a frequency table:

- 5 – 20 classes
- Class width = $\frac{\text{highest value} - \text{lowest value}}{\text{number of classes}}$, round to get a "nice" number.
- Start with the smallest number or smaller.
- Add the class width to the starting number to get the lower class limits.
- List the class limits (upper and lower)
- Use tally marks to place each data point in the correct class
- Each data point belongs to exactly one class
- The sum of the frequencies = the number of data points.

Example: The following are exam scores from 32 students.

80	89	72	92	98	71	68	74	85	89	71	93
67	72	70	89	82	71	74	86	68	95	89	77
72	95	88	82	71	92	52	71				

Construct a frequency table using 5 classes.
The class width is (98 – 52)/5 = 9.2, we will use 10 and start with 50.

	Exam Scores	tally	f
classes	50 – 59	|	1
	60 – 69	|||	3
	70 – 79	𝍸 𝍸 ||	12
	80 – 89	𝍸𝍸	10
	90 – 99	𝍸|	6

A **Relative Frequency Distribution** has the same class limits as the frequency distribution but instead of listing frequencies list relative frequencies.

relative frequency = $\frac{\text{class frequency}}{\text{sum of all frequencies (n)}}$, $rf = \frac{f}{n}$ (can be written as a percent)

Round to 4 decimal places or if in percent form round to 2 decimal places

	Exam Scores	rf
classes	50 – 59	1/32 = 3.13%
	60 – 69	3/32 = 9.38%
	70 – 79	12/32 = 37.50%
	80 – 89	10/32 = 31.25%
	90 – 99	6/32 = 18.75%

One reason for creating a frequency table is to identify the type of distribution. One type of distribution is called the "**Normal Distribution**". We will study the normal distribution in more detail later. A frequency distribution is approximately normal if both of the following are true:

1. The frequencies start low, increase, and then decrease.
2. The distribution is approximately symmetric.

The exam scores appear to be normally distributed.