For a given set of numbers, it may be desirable to have a single number to serve as a "representative value" around which all the numbers in a set tend to cluster, kind of like a "middle" number. This number is called a measure of central tendency.
Three of these measures in this section are: mean, median, mode

I. Mean and Weighted Mean

1. The mean or what is properly called the Arithmetic mean, of a set of data is found by adding up all the items and then dividing by the total number of items. Mean is also known as the Average.

Mean of a Sample: $\bar{x}$ "x bar"

Mean of a Population: μ Greek letter mu

Mean of a set of items: $\bar{x} = \dfrac{\Sigma x}{n}$ Σ Greek letter sigma - summation

EXAMPLE: A small recycling business had the following daily sales over a six ~~week~~ day period. What is the mean daily sales for that period? (average daily sales)

$305, $285, $240, $376, $198, $264

$$\bar{x} = \frac{\Sigma x}{n} = \frac{305+285+240+376+198+264}{6} = \frac{1668}{6} = \$278$$

2. The Weighted mean of a set of data is found by first, multiplying the numbers by a weighted factor or frequency, then adding up all the weighted items and dividing by the total.

EXAMPLE: What is the grade-point average for this student?

Step 1: multiply the grade and the number of credits (credit hours)
Step 2: Add the products to get a total for the weighted grades
Step 3: Divide by the total credits (credit hours)

$$\bar{w} = \frac{\Sigma\,(x \cdot f)}{\Sigma f}$$

Course	Grade	Grade Points x	Credit f	Points · Credit
Math	A	4	3	12
History	C	2	3	6
Chemistry	B	3	4	12
Art	B	3	2	6
PE	A	4	1	4
		Totals:	13	40

Grade-point average: $\overline{w} = \dfrac{\Sigma\,(x \cdot f)}{\Sigma f} = \dfrac{40}{13} = 3.077$

EXAMPLE: Find the mean salary for a company that pays the following annual salaries listed in the frequency distribution chart below.

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Salary x	Number of Employees f	Salary · Number $x \cdot f$
$22,000	8	176,000
$26,000	11	286,000
$28,500	14	399,000
$31,000	9	279,000
$44,000	2	88,000
$52,000	1	52,000
Totals:	45	1,280,000

Mean Salary = $\dfrac{1280000}{45} = \$28,444$

II. Median

Another measure of central tendency which is not so sensitive to extreme values is the median. This measure divides a group of numbers into two parts, half the numbers below it and half the numbers above it. It's simply the middle number.

To find the median of a group of items:

Step 1: Rank the items in order (numerical order)
Step 2: If the total number of items is odd, then the median is the middle item in the list
Step 3: If the total number of items is even, then the median is the mean/average of the two middle items

EXAMPLE: Find the median for each list of numbers.

1. 24, 23, 18, 13, 12, 7, 6 median = 13

2. 17, 15, 9, 13, 21, 32, 41, 7, 12

   7, 9, 12, 13, 15, 17, 21, 32, 41 median = 15

3. 147, 159, 132, 181, 174, 253

   132, 147, 159, 174, 181, 253 median = $\frac{159+174}{2}$ = 166.5

III. Mode

The mode is the measure of central tendency that occurs most often. Sometimes a set of data can have two modes, which means they have the same number of frequency. Having two modes is called bimodal. The data does not need to be in any specific order.

EXAMPLE: Find the mode for each set of data.

(a) 482, 485, 483, 485, 487, 487, 489 bimodal = 485, 487

(b) 51, 32, 49, 49, 74, 81, 92, 49 mode = 49

(c)

Value	19	20	22	25	26	28
Frequency	1	3	8	7	4	2

count

most

mode = 22