

Vision 3.3 - A Particular Tendency

Measures of central tendency describe the centre of an **ordered** distribution and the position of the data in the distribution relative to the centre.

The **mean** is a measure indicating the balance point in a distribution.

$$\text{mean} = \frac{\text{sum of all values}}{\text{total number of values}}$$

The **median** is a measure indicating the centre in a distribution.

- In an **ordered** distribution with an odd number of datum, the median is the datum in the exact centre of the distribution.
- In an **ordered** distribution with an even number of datum, the median is the mean of the two datum in the centre of the distribution.

The **mode** is a measure indicating the highest concentration in a distribution.

1, 2, 3, 3, 5, 7, 7, 8 median = 4

Measures of dispersion describe the spread of data in a distribution.

The **range** is a measure indicating the distance between data in a distribution. It is the difference between the highest datum and the lowest datum.

Example:

In the distribution below determine the mean, median, mode and range.

2, 3, 3, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 6, 6, 6, 7, 7, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 9, 9, 9, 9, 9, 9, 10, 10, 10



total # of values is 32

$$\text{mode} = 8$$

$$\text{median} = 7.5$$

$$\begin{aligned} \text{range} &= \text{largest value} - \text{smallest value} \\ &= 10 - 2 \\ &= 8 \end{aligned}$$

$$\text{mean} = \frac{\text{sum of all values}}{\text{total \# of values}}$$

$$\begin{aligned} &= \frac{218}{32} \\ &= 6.8125 \end{aligned}$$

Weighted Mean

If the values in the dataset are assigned a higher importance or weight it impacts the mean. An example of weighted mean is the calculation of end of term grades. The value of a test score is weighted more heavily than the value of an assignment.

Example: Determine John term mark.

Weighting		John's results
homework15%	= 0.15	homework92
quiz10%	= 0.10	quiz74
lab20%	= 0.20	lab83
tests25%	= 0.25	tests76
exam30%	= 0.30	exam88

$$\text{Weighted mean} = \frac{(0.15 \cdot 92) + (0.10 \cdot 74) + (0.20 \cdot 83) + (0.25 \cdot 76) + (0.30 \cdot 88)}{100}$$

$$= \frac{138 + 74 + 166 + 19 + 264}{100}$$

$$= \frac{832}{100}$$

$$= 0.832$$

$$= 83.2$$

Check Your Understanding

Textbook pages 145

1, 3, 4, 5, 7