1] Arithmetic Mean example :

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1. The frequency distribution below represents the weights in pounds of a sample. Compute the sample mean of given distribution.

Class	Frequency	Class	Frequency
10.0-10.9	1	15.0-15.9	11
11.0-11.9	4	16.0-16.9	8
12.0-12.9	6	17.0-17.9	7
13.0-13.9	8	18.0-18.9	6
14.0-14.9	12	19.0-19.9	2

Solution :

Class	Frequency (f)	Midpoint (x)	$f \times x$	C
10.0–10.9	1	10.5	10.5	
11.0–11.9	4	11.5	46.0	
12.0–12.9	6	12.5	75.0	
13.0–13.9	8	13.5	108.0	
14.0–14.9	12	14.5	174.0	
15.0–15.9	11	15.5	170.5	
16.0–16.9	8	16.5	132.0	
17.0–17.9	7	17.5	122.5	
18.0–18.9	6	18.5	111.0	
19.0–19.9	2	19.5	39.0	
	total = 65		Σ = 988.5	

x = mid point of class

(a) $\bar{x} = \frac{\Sigma(f \times x)}{n} = \frac{988.5}{65} = 15.2077$ pounds

2] Weighted Mean example

2. X Distribution Company, a subsidiary of a major appliance manufacturer, is forecasting regional sales for next year. The Atlantic branch, with current yearly sales of $193.8 million, is expected to achieve a sales growth of 7.25%; the Midwest branch, with current sales of $79.3 million is expected to grow by 8.20%; and the Pacific branch, with sales of $57.5 million, is expected to increase sales by 7.15%. What is the average rate of sales growth forecasted for next year?

2.

$$\bar{X} = \frac{\sum(w \times x)}{\sum w} = \frac{193.8\,(7.25)+79.3\,(8.20)+57.5\,(7.15)}{193.8+79.3+57.5} = \frac{2466.435}{330.6} = 7.46\%$$

Sales growth rate Avg.

3] Geometric Mean Example

3. Calculate the average percentage increase in bad-debt expenses over this given time period. If this rate continues, estimate the percentage increase in bad debts for 2018, relative to 2016.

2010	2011	2012	2013	2014	2015	2016
0.11	0.09	0.075	0.08	0.095	0.108	0.120

1+0.11 = 1.11 0.09+1 = 1.09

3. $\sqrt[7]{1.11\,(1.09)(1.075)(1.08)(1.095)(1.108)(1.12)}$

$= \sqrt[7]{1.908769992} = 1.09675 - 1 \Rightarrow 0.0967 \times 100 = 9.6\%$.

The average increase is 9.675% per year. The estimate bad debt expenses in 2018 is (1.09675)2 - 1 = 0.2029, ×100 i.e., 20.29% higher than in 2016.

1) mean

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5. Here are the ages in years of the cars worked on by the Village Autohaus last week:

5	6	3	6	11	7	9	10	2	4	10	6	2	1	5

1 1 2 1 3 2 2

80

99 ungrouped data

a) Compute the mode for this data set.
b) Compute the mean of the data set.
c) Compare parts (a) and (b) and comment on which is the better measure of the central tendency of the data.

mean, median, mode

5.

(a) Mode = 6 → 3

(b) $\bar{X} = \frac{\sum x}{n} = 87/15 = 5.8$

mean value

(a) Mode = 6

(b) $\bar{X} = \frac{\Sigma x}{n} = 87/15 = 5.8$

(c) Because the modal frequency is only 3 and because the data are reasonably symmetric, the **mean** is the better measure of central tendency.

mean value

6. Here are student scores on a history quiz. Find the 80th percentile.

95	81	59	68	100	92	75	67	85	79
71	88	100	94	87	65	93	72	83	91

Soln :- 6. First we arrange data in increasing order:

59, 65, 67, 68, 71, 72, 75, 79, 81, 83,

85, 87, 88, 91, 92, 93, 94, 95, 100, 100

$i = \frac{80}{100} \times 20 = 16th$ ⇐ Index. 16.5

16 17 → 93 + 94 = 187/2

80% → 93

10, 5 16

The 16th of these (or 93) is the 80th percentile.

Defn :- A percentile is a value below which a certain percentage of observation lies.

95% percentile means that the person got better marks than 95% of the entire students.

eg 1] {1, 2, 3, 4, 5}

% of number that are even = Total no of even nos / Total nos.

= 2/5 = 0.4 × 100 = 40%

2] 2, 2, 3, 4, 5, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

5 | 6 → $\frac{5+5}{2} = \frac{10}{2} = 5$

2] 2, 2, 3, 4, 5, 5, 5, 6, 7, 8 8 8 8 8 9 9 10 11 11 12

what is the percentile rank of 10

$$\% \text{ Rank of } 10 = \frac{\text{no. of values below } 10}{\text{total no}} \times 100$$

$$= \frac{16}{20} \times 100 = 80^{\text{th}} \text{ percentile}$$

(2) What value exists at percentile rank of 25%.

$$\text{Value} = \frac{\text{Percentile}}{100} \times n+1 \Rightarrow \frac{\text{Percentile}}{100} \times n$$

$$= \frac{25}{100} \times 21 = 5.25 \text{ Index}$$

5.5 ⇒ 6 Position

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[Value = 5] .n

$\frac{5+6}{2}$