

### # Population:

✓ 1) what % of Indian families has pets in their house.

# Sample ← calculate (mean, ...)

Estimates ← population. ← Statistician.

### Quantitative data:-

- 1) Discrete data → eg. - i) number of pets (ii) result of rolling a dice.
- 2) Continuous data.
  - mass of an object. (25.7 kg.)
  - Height of a person (5.7 ft.)

### A) Measure of central tendency:-

1)  $\text{Max score} = \frac{10}{2}$   $n = 10$

7, 8, 9, 5, 4, 3, 2, 0, 3, 1

- ✓ 1) Average: (mean)
- ✓ 2) median ← — middle value.
- ✓ 3) mode. ← most occurring number.

### presentation of data:-

- 1) Bar chart ← not connected / discrete data
- 2) Histogram. ← connected. / continuous data.

This table shows the ages of students who exercise in the gym after school.

Find the modal age.

Age (y, years)	f
13 < y ≤ 14	2
14 < y ≤ 15	6
15 < y ≤ 16	8
16 < y ≤ 17	10 ✓
17 < y ≤ 18	3

mode:

This table shows the ages (in years) of 10 pet cats.

Age (x, years)	f
0 < x ≤ 2	2
2 < x ≤ 4	4
4 < x ≤ 6	3
6 < x ≤ 8	1

$\frac{m}{f}$

1  
3  
5  
7

$$\bar{x} = \frac{\sum fm}{\sum f}$$

Find an estimate of the mean age of the cats.

# Measures of dispersion:- Spread of the data.

1) Range = max - min

2) Quartiles → lower quartile  $Q_1$  - 25%  
 upper quartile  $Q_3$  - 75%  
 Median (M) - 50%

$$\underline{\underline{IQR}} = Q_3 - Q_1$$

A group of 80 athletes each run laps of a running track.

The grouped frequency table shows the number of laps run by different athletes.

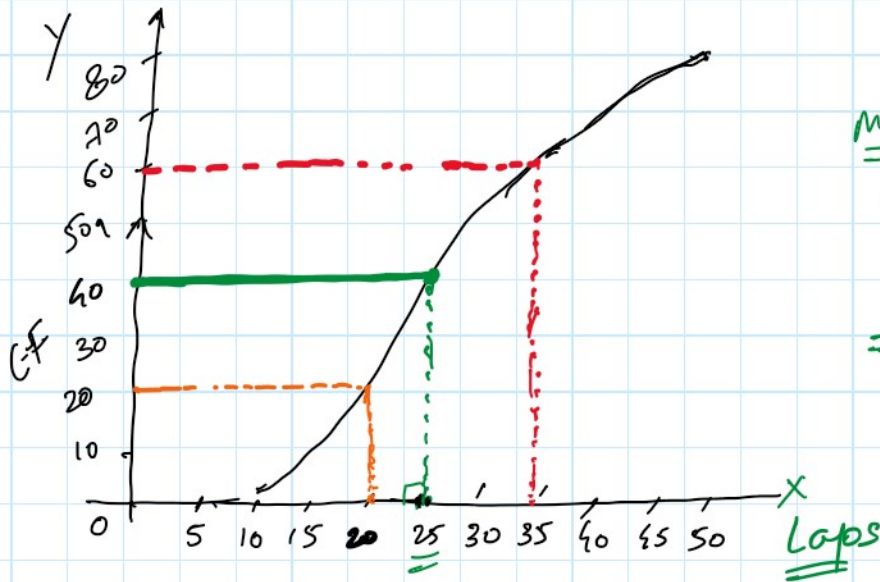
Laps (x)	f
0 < x ≤ 10	1
10 < x ≤ 20	20
<u>20 &lt; x ≤ 30</u>	31
30 < x ≤ 40	21
40 < x ≤ 50	7

CF

1  
21  
52 ←  
73  
80

Construct a cumulative frequency table for this data, and use it to draw a cumulative frequency curve for the number of laps run by different athletes.

Use the curve to estimate the median and interquartile range of number of laps.



Median  
 $= \left(\frac{80}{2}\right)^{\text{th}}$   
 $= \underline{\underline{40^{\text{th}} \text{ data.}}}$

Median = 26.

$Q_1 = 20$  ,  $Q_3 = 34$

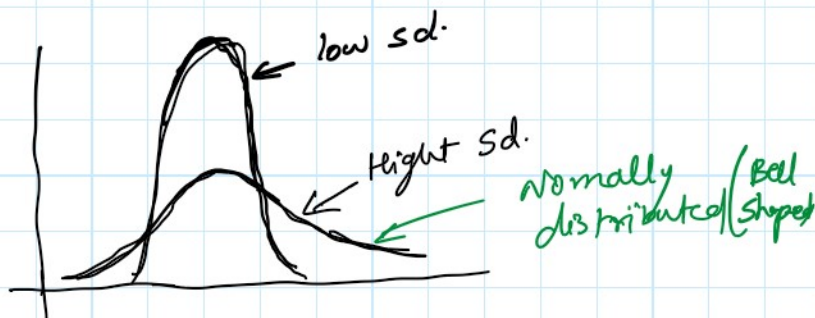
$IQR = 34 - 20 = 14 \text{ laps.}$

$\left(\frac{80}{4}\right) = 20^{\text{th}}$   
 $3 \times \frac{80}{4} = 60$

### # Variance and standard deviation:-

Variance =  $\sigma^2 = \frac{\sum (x - \bar{x})^2}{n}$

Standard deviation =  $\sqrt{\frac{\sum (x - \bar{x})^2}{n}}$



A data set has a mean of 12 and a standard deviation of 2.

- ✓ a Each value in the data set has 20 added to it. Find the new mean and standard deviation.
- ✓ b Each value in the original data set is multiplied by 4. Find the new mean and variance.

12 ,  $sd = 2$



a) Mean =  $12 + 20 = 32$   
 Standard deviation = 2

b) Mean =  $12 \times 4 = 48$ .  
Variance =  $4^2 \times (2^2) = 64$

hw  
 Ode surveyed students for his internal assessment about the number of friends who attended each of their birthday parties last year. His results are shown in this grouped frequency table.

Friends ( $p$ )	$f$
$0 < p \leq 5$	15
$5 < p \leq 10$	11
$10 < p \leq 15$	9
$15 < p \leq 20$	12
$20 < p \leq 25$	6

- Write down estimates for mean, median and standard deviation.
- Explain why you are only able to find estimates in part a.

# The number of children,  $x$ , that each of a class of 30 students has in their family was recorded. Find the mean and standard deviation of the number of children in a family for this set of data, given that  $\sum x = 66$  and  $\sum x^2 = 165$ .

$$\text{Mean} = \frac{\sum x}{n} = \frac{66}{30} = 2.2$$

( $\bar{x}$ )

$$\text{Variance } \sigma^2 = \frac{\sum (x - \bar{x})^2}{n} = \frac{\sum x^2}{n} - \bar{x}^2$$

$$= \frac{165}{30} - (2.2)^2 = 0.66$$

$$\text{Standard deviation} = \sigma = \sqrt{0.66} = \underline{\underline{0.812}} \text{ (3sf.)}$$

# The number of putts,  $x$ , a golfer takes on each of the 18 holes in a round is recorded. Find the standard deviation,  $\sigma$ , of the number of putts he takes on each hole, given that  $\sum (x - \bar{x})^2 = 4.944$ .

$$\text{Variance} = \sigma^2 = \frac{4.944}{18} = 0.2746$$

$$\text{sd} = \sqrt{0.2746} = 0.524$$

The heights of 142 plants are recorded in the table, where, for example, the class 65–70 means at least 65 cm and less than 70 cm tall.

<b>Class</b>	55–60	60–65	65–70	70–75	75–80	80–85	85–90
<b>Frequency</b>	2	11	37	54	28	9	1

Calculate estimates of the mean,  $\bar{x}$ , and variance,  $\sigma^2$ , for the height of the plants.

The heights of the children in a school are measured correct to the nearest centimetre and are summarised in the table:

<b>Height (cm)</b>	120–129	130–139	140–144	145–149	150–154	155–159	160–169	170–179
<b>Frequency</b>	60	80	50	93	77	67	72	54

Draw a histogram.

The ages of members of a cricket society are summarised in the table below.

<b>Age (years)</b>	25–34	35–44	45–49	50–54	55–59	60–74
<b>Frequency</b>	6	9	13	9	7	6

- Draw a relative frequency histogram to display this information.
- Calculate an estimate of the number of members aged between 40 and 52, inclusive.