

GRADE 9 | MATHEMATICS

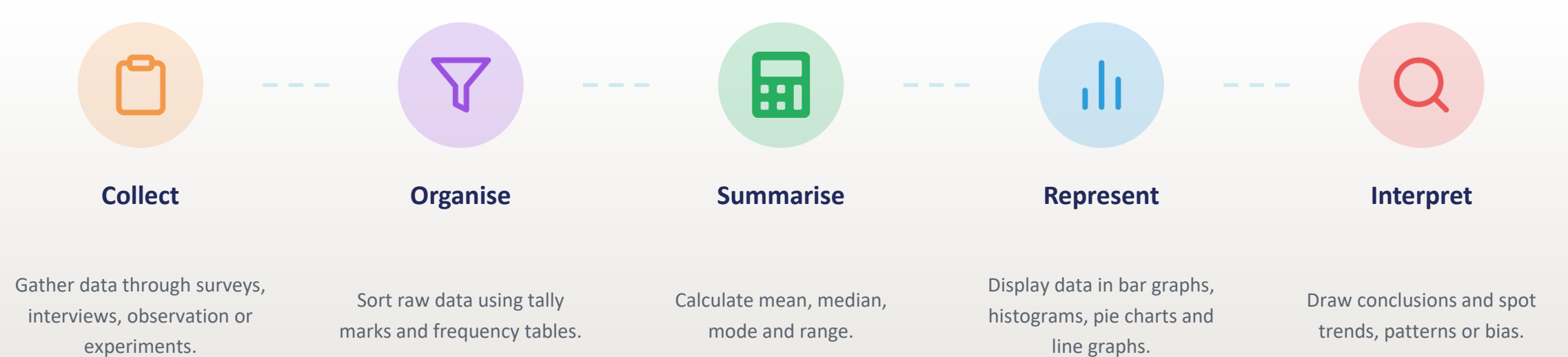
Data Handling

Collecting, organising, summarising, representing
and interpreting data



What is Data Handling?

Data handling is the process statisticians follow to turn raw information into meaningful conclusions.



Why it matters: Businesses, scientists and governments all use data handling to make evidence-based decisions — from predicting weather to planning school timetables.

Types of Data

Before you can analyse data, you need to know what kind of data you're working with.



Qualitative Data

Describes qualities or categories — it cannot be measured with numbers.

Examples:

- Eye colour (blue, brown, green)
- Favourite subject
- Type of transport used to school



Quantitative Data

Numerical data that can be measured or counted.



Discrete

Counted in exact, whole values
— no in-between.

- Number of siblings
- Learners in a class



Continuous

Measured, and can take any
value in a range.

- Height in cm
- Time taken to run 100 m

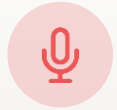
Collecting Data

Methods of Collection



Survey / Questionnaire

Ask a set of written questions.



Interview

Ask questions face-to-face or by phone.



Observation

Watch and record what happens.



Experiment

Test under controlled conditions.

Sampling Methods

It's often too costly to survey a whole population, so we choose a sample.



Random

Every member has an equal chance of being chosen.



Systematic

Choose every nth person from a list.



Stratified

Divide into groups, then sample from each.



Convenience

Choose whoever is easiest to reach.

Organising Data

Tally marks and frequency tables turn a messy list of raw data into something readable.

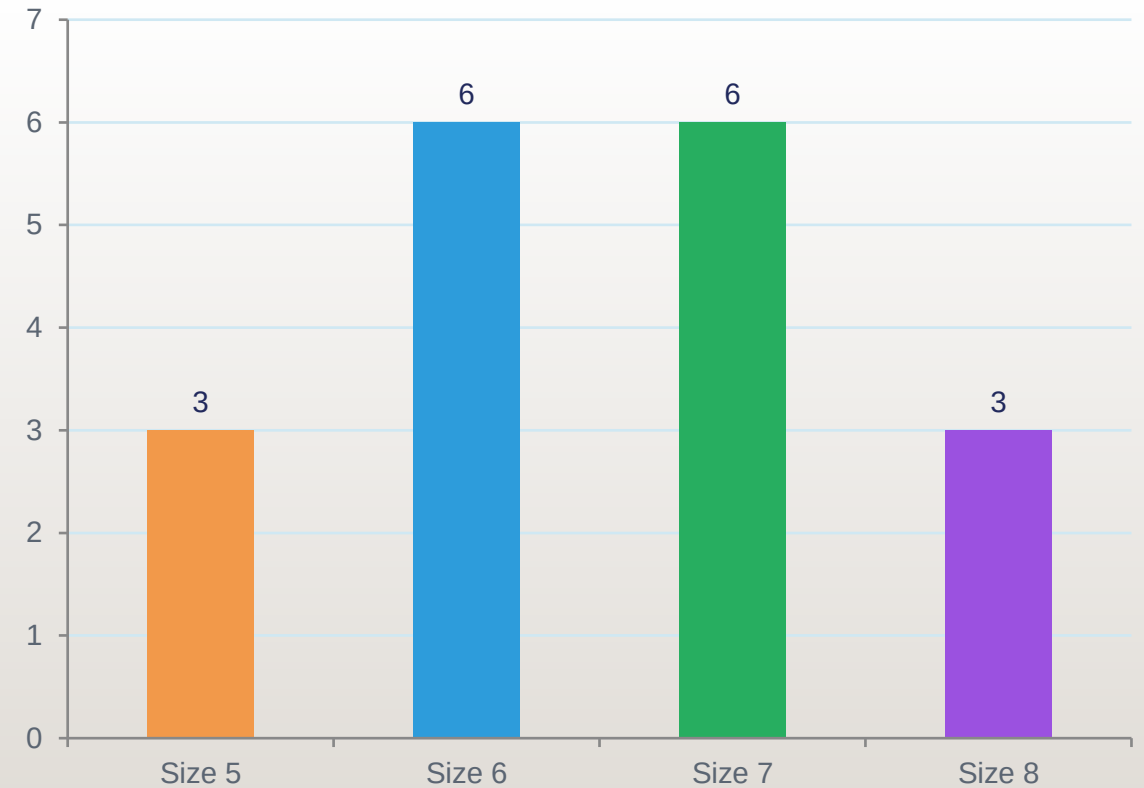
Raw data: shoe sizes of 20 learners

5, 6, 7, 6, 5, 8, 7, 6, 6, 5, 7, 8, 6, 7, 6,
5, 7, 6, 8, 7

Frequency table

Shoe Size	Tally	Frequency
5		3
6		6
7		6
8		3
Total		20

Same data, visualised



Measures of Central Tendency

A single value that tries to describe the “centre” of a data set.

Mean

Add all values, divide by how many there are.

Mean = Sum of values ÷ Number of values

Median

The middle value when data is ordered from smallest to largest.

Odd count → middle value.

Even count → average of 2 middle values.

Mode

The value that occurs most often.

A data set can have one mode, more than one, or no mode.

Worked example: data set = 4, 7, 7, 9, 3, 7, 5

Mean = $(3+4+5+7+7+7+9) \div 7 = 42 \div 7 =$

6

Ordered: 3, 4, 5, 7, 7, 7, 9 → Median (middle of 7 values) =

7

Mode = most frequent value = **7**

Measures of Dispersion

The average alone doesn't tell the whole story — dispersion shows how spread out the data is.



Range

The difference between the highest and lowest values in a data set.

Range = Maximum value – Minimum value

Worked example

Test scores: 45, 62, 78, 51, 90, 68

Max = 90, Min = 45

Range = 90 – 45 = **45**

Why does spread matter?

Class A test scores: 68, 70, 69, 71, 70 → Mean = 69.6, Range = 3 (very consistent)

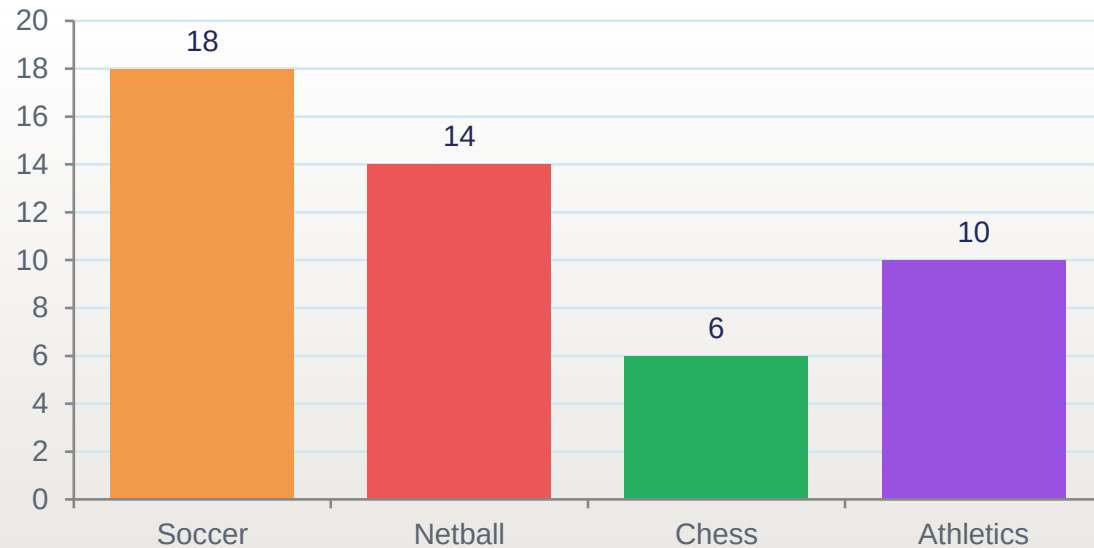
Class B test scores: 20, 95, 50, 100, 43 → Mean = 61.6, Range = 80 (highly varied)

Two classes can have similar averages but very different spreads — range helps reveal that.

Bar Graphs & Histograms

Bar Graph

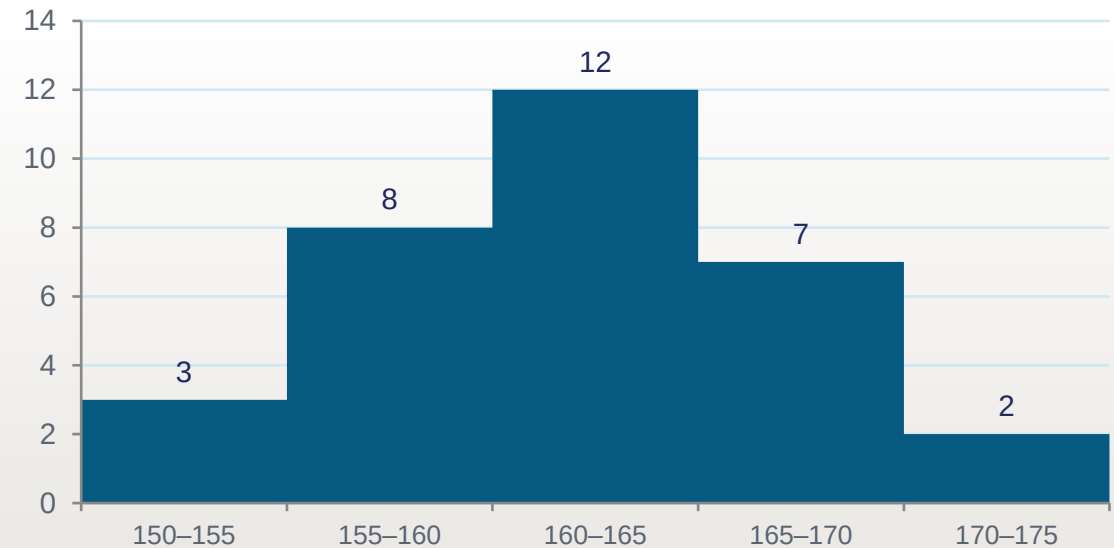
Compares separate categories. Bars don't touch.



Favourite sport of Grade 9 learners (category data)

Histogram

Shows continuous data grouped into intervals. Bars touch.



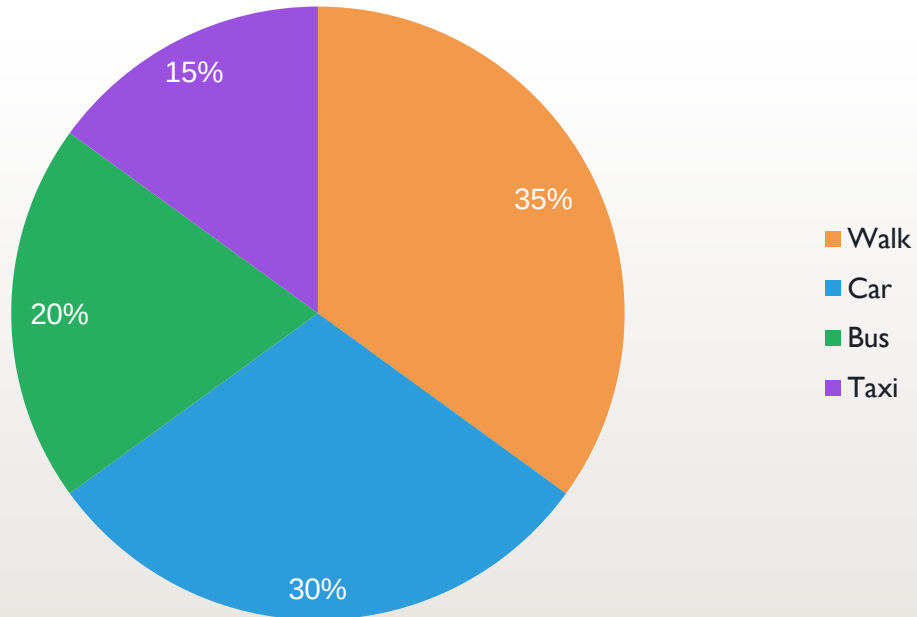
Height (cm) of Grade 9 learners (continuous data)

Key difference: Bar graphs represent discrete, separate categories (gaps between bars, often one colour per category). Histograms represent continuous, grouped data on a numeric scale (no gaps, one colour showing the flow).

Pie Charts & Line Graphs



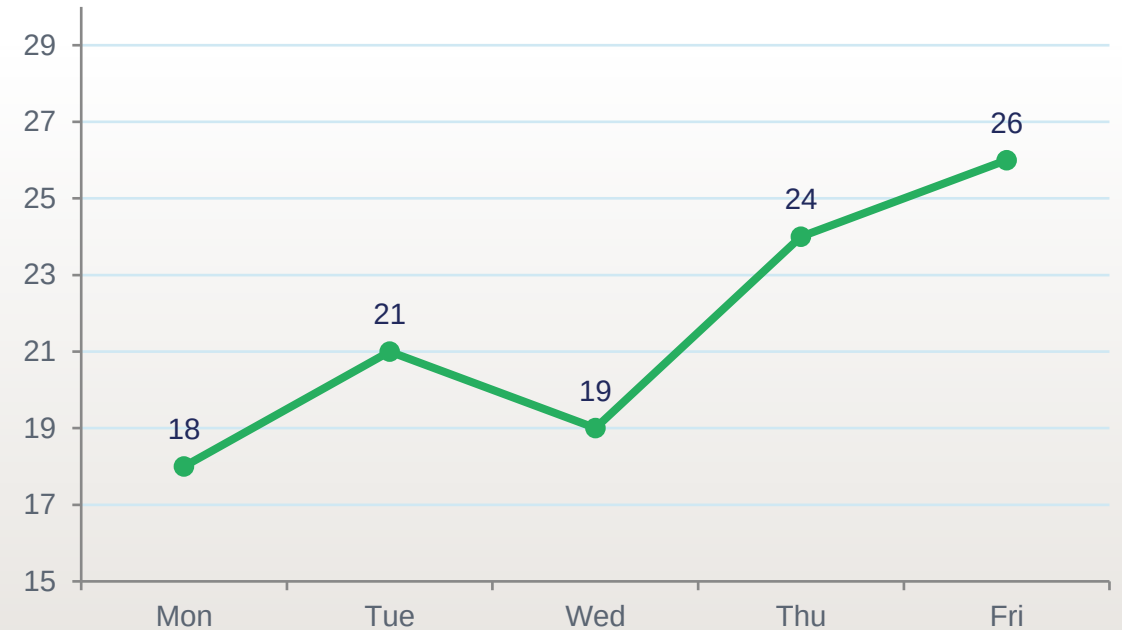
Pie Chart — shows parts of a whole



How Grade 9 learners get to school



Line Graph — shows change over time



Daily temperature over one school week

Choosing a graph: Use a pie chart for proportions of a whole (must add to 100%). Use a line graph to track a trend over time or a continuous scale.

Worked Example

The number of goals scored by a soccer team in 11 matches:

2, 1, 3, 0, 2, 4, 1, 2, 5, 1, 2

Ordered data

0, 1, 1, 1, 2, 2, 2, 2, 3, 4, 5

Mean

$(0+1+1+1+2+2+2+2+3+4+5) \div 11 = 23 \div 11 \approx 2.1$ goals

Median

11 values → middle (6th) value = 2 goals

Mode

2 (appears four times)

Range

$5 - 0 = 5$ goals

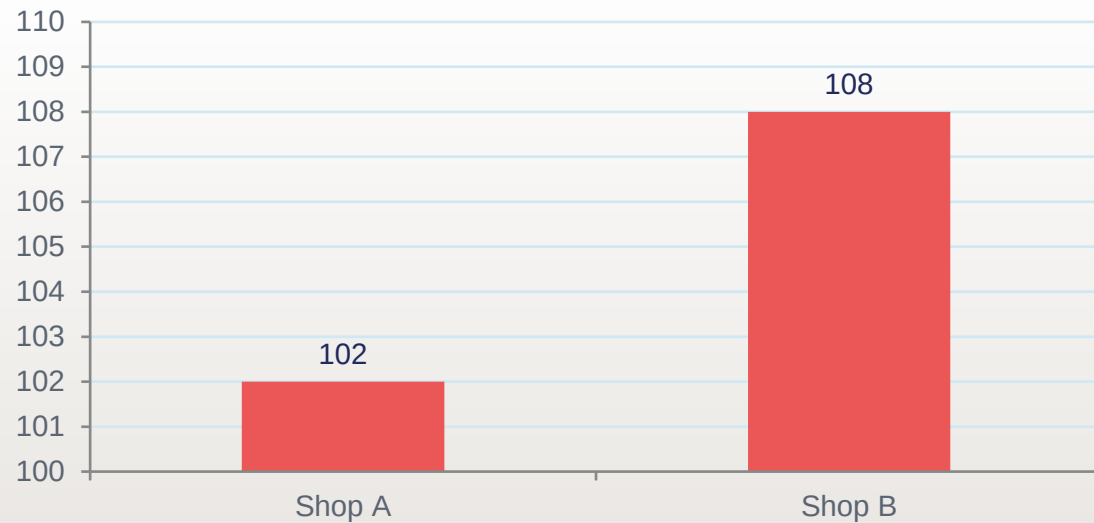
The team usually scores around 2 goals per match and are consistent to score goals (range = 5).

Misleading Graphs

The same data can be made to look very different depending on how a graph is drawn.



Misleading: truncated y-axis



The axis starts at 100, so a small 6-unit gap looks huge.



Honest: axis starts at zero



Same data — now the true (small) difference is clear.

Watch out for: truncated (cut) axes, inconsistent scales, and 3D effects that distort size.

Key Takeaways



Data cycle

Collect → organise → summarise → represent → interpret.



Two data types

Qualitative (categories) and quantitative (discrete or continuous numbers).



Central tendency

Mean, median and mode each describe the “centre” differently.



Spread

Range shows how varied the data is — not just its average.



Right graph, right job

Bar/histogram for counts, pie for proportions, line for trends over time.



Read critically

Always check the axes — graphs can mislead.

Practice Questions

Try these on your own, then check your working against the earlier slides.



A survey asks learners how they travel to school. Is this qualitative or quantitative data? Explain.



Data set: 12, 15, 12, 18, 20, 12, 15. Find the mean, median, mode and range.



You want to sample 50 learners from a school of 900, choosing every 18th name on the register. Which sampling method is this?



A newspaper graph shows a bar chart with its y-axis starting at 80 instead of 0. Why could this be misleading?