

Name _____

Date _____

Unit 16 · Interpreting and discussing results — revision sheet

Everything you need from every section. Read it before the end-of-unit test.

16.1 Mode, median and range

- The **mode** is the value that occurs **most often**.
- The **median** is the **middle** value — but only once the data is **in order**.
- With an **even** number of values, the median is halfway between the middle two.
- The **range** is **largest – smallest**. It measures **spread**, not average.
- With n values in order, the median is in position $(n + 1) \div 2$.
- The mode must be one of the values; the median need not be.
- A set can have **no mode**, and saying so is a proper answer.
- The mode is the only average that works for words — a modal colour makes sense, a mean colour does not.
- The range sees only the two ends, so two very different sets can share one.

Key words: mode · median · range · average · spread · data set

```
3, 7, 7, 2, 9, 5, 7
mode 7
median 7
range  $9 - 2 = 7$ 
4, 8, 6, 8, 10, 2, 8
8 appears three times
mode = 8
```

16.2 The mean

- **Mean = total ÷ how many.**
- It shares the total out equally: what everyone would have if they all had the same.
- Rearranged: **total = mean × how many**. That step unlocks most mean problems.
- The mean need **not** be one of the values — 1.6 pets is a perfectly good mean.
- It must lie **between the smallest and the largest** value.
- From a **frequency table**: multiply each value by its frequency, add those, then divide by the total frequency.
- To find a missing value: work out the total the mean demands, then subtract what you already have.
- The mean uses **every** value, so one extreme reading moves it a long way.
- That sensitivity is its weakness, and the subject of the next section.

Key words: mean · total · frequency · average · per

4, 6, 8, 10, 12
 total 40
 $40 \div 5 = 8$
 mean = 8
 before: 4, 6, 8, 10, 12
 after: 8, 8, 8, 8, 8
 same total, 40

16.3 Choosing the right average

- All three of mode, median and mean are **averages**. They choose the representative value differently.
- **Mode**: use it for **categories** and for “which is most popular”. It is the only one that works for words.
- **Median**: use it when there is an **outlier** or the data is lopsided — house prices, salaries.
- **Mean**: use it when the values are close together with no extremes. It uses every value.
- An **outlier** moves the mean a long way and the median hardly at all.
- Do not silently delete an outlier. Investigate it, and say what you decided.
- Always quote a **range** alongside an average — the average alone says nothing about spread.
- A smaller range means more **consistent**.
- In an examination the **reason** earns the mark, not the name of the average.

Key words: outlier · appropriate · distort · typical · consistent · categorical data

most popular? → mode
 typical, with an odd value? → median
 all values matter? → mean
 favourite colour
 shoe sizes sold
 most common pizza topping
 180, 200, 210, 220, 240, 950

16.4 Reading charts and graphs

- A **bar chart** compares separate categories. Read the height against the scale.
- A **line graph** shows how something changes over time. The joined points show the **trend**.
- A **pie chart** shows **shares of a whole**. The sectors must total **360°**.
- In a pie chart of N people, **one person is worth $360 \div N$ degrees**.
- To go the other way: **people = angle $\div$ ($360 \div N$)**.
- A percentage becomes an angle by taking that percentage of 360°.
- A bar chart's scale should **start at zero**. If it does not, the differences look bigger than they are.
- A pie chart alone does not tell you **how many** people were asked — the total must be stated.
- Always read the numbers from the scale, never judge by the picture alone.

Key words: bar chart · line graph · pie chart · sector · scale · trend

Mon 12, Tue 18, Wed 9
 Thu 15, Fri 21
 highest Friday, lowest Wednesday
 range $21 - 9 = 12$
 weeks 1–6: 4, 7, 9, 8, 12, 15
 generally rising
 but week 3 to 4 fell

16.5 Comparing data sets and drawing conclusions

- To compare two data sets, quote **an average and a range**. Either one alone is half a comparison.
- The **average** says what is typical; the **range** says how much it varies.
- A **smaller range** means more **consistent**.
- Write the comparison as a **sentence about the situation**, with the numbers in it.
- A **trend** is the general direction. One dip does not end a rising trend.
- A trend describes what has happened; it does **not** promise what comes next.
- A **small sample** gives an unreliable conclusion — Unit 6's idea, used here.
- A **biased** sample is worse than a small one: no amount of correct arithmetic can fix it.
- Mention the **sources of variation**: the weather, the time of day, who was asked, how it was measured.

Key words: compare · consistent · trend · sample · bias · variation

A: mean 13.7, range 4
 B: mean 14.0, range 17
 similar typical score
 very different consistency
 "On average the two classes score about the same."
 "But A's range is much smaller, so A is more consistent."
 machine 1: 22–26 ml, range 4