Averages: fact sheet

Planner week 3 · Learn these facts

Mean

13 5 4 9 3 8

42 ÷ 6 = 7

Add them all up, **divide** by how many

Mean = total ÷ number

Median

in order first

3 4 5 8 9 13

(5 + 8) ÷ 2 = 6.5

Put them **in order**, find the middle

Two in the middle? Halfway

Mode

3 3 3 4 4 7

mode = 3 (most common)

The value that appears **most often**

Can be a word, e.g. "bus"

Range

2 4 4 7 8

8 − 2 = 6

Biggest − smallest

Always one number

Mean backwards

3 cinemas, mean 380 seats

total = 3 × 380 = 1140

mean × how many = total

Use the mean to find the **total**

Then subtract what you know

Comparing

Boys: median 7, range 5

Girls: median 6, range 3

Compare an average AND the range

Say which is higher **and** what it means

Range: bigger = more spread out

Stem and leaf

4	5 9
5	3 7 8
6	1 2 4 5

4 | 5 = 45

Read across: stem then leaf. Use the key

Already in order: count to the middle

Remember

Mean	add, then divide
Median	middle (in order)
Mode	most common
Range	biggest − smallest

Which sheet do I need?

Mean, median, mode and range ▸
a list of numbers

Working backwards from the mean ▸
you know the mean, and need a missing number

Key words

- **Average** mean, median or mode
- **Range** how spread out the data is
- **Total** everything added up
- **Frequency** how many times

Exam tips

- Median: **order** the numbers first.
- Middle position = (n + 1) ÷ 2.
- Mean backwards: total = mean × how many.
- Range is **one number** (6), not "2 to 8".
- Comparing: one sentence about an average, one about the range, using the **context**.
- Show your working: the mean needs the total **and** the division.

Mean, median, mode and range: fact sheet

Averages · Planner week 3 · Work out which type it is, follow the example

1 MODE: the most common

Find the mode of 4, 7, 3, 9, 7, 6

4 **7** 3 9 **7** 6

7 appears twice

1. The mode is the **most common** value
2. Look for the number that appears the most
3. Mode = **7**

Use this when: they ask for the mode, or "the most common"

2 MEDIAN: the middle value

Find the median of 4, 7, 3, 9, 7, 6

3 4 **6** **7** 7 9

in order first

1. Put them **in order**: 3, 4, 6, 7, 7, 9
2. The median is the **middle value**
3. Two numbers in the middle? **Add them together and divide by two**: (6 + 7) ÷ 2
4. Median = **6.5**

Use this when: they ask for the median, or "the middle"

3 MEAN: add and divide

Find the mean of 4, 7, 3, 9, 7, 6

4 + 7 + 3 + 9 + 7 + 6 = 36

36 ÷ 6 = **6**

1. **Add them all together**: 36
2. Count **how many** there are: 6
3. **Divide**: 36 ÷ 6
4. Mean = **6**

Use this when: they ask for the mean, or "the average"

4 RANGE: biggest subtract smallest

Find the range of 4, 7, 3, 9, 7, 6

3 4 6 7 7 **9**

smallest and biggest

1. Find the **biggest**: 9
2. Find the **smallest**: 3
3. **Biggest subtract smallest**: 9 − 3
4. Range = **6** (one number, not "3 to 9")

Use this when: they ask for the range, or "how spread out"

The big question

Is the data a **list**, a **frequency table**, or do I know the **mean** and need to **work backwards**?

List: Mean, median, mode and range. Table: Averages from tables. Mean given: Working backwards from the mean.

Careful: in a table, the frequency tells you how many times each value appears.

Watch out

- Finding the median without putting the numbers in order first.
- Giving the range as "3 to 9" (it is one number: 6).
- Forgetting to divide when finding the mean.

Working backwards from the mean: fact sheet

Averages · Planner week 3 · Work out which type it is, follow the example

1 BACKWARDS from the mean

The mean height of 50 people is 167.6 cm. The mean height of the 20 men is 182 cm. Work out the mean height of the 30 women.

total = mean × how many

1. **Total for all 50**: 50 × 167.6 = 8380
2. **Total for the 20 men**: 20 × 182 = 3640
3. **Total for the 30 women**: 8380 − 3640 = 4740
4. **Mean**: 4740 ÷ 30 = **158 cm**

Use this when: you are given a mean and asked for a total, a missing value or a new mean

2 A missing value

The mean of 5 numbers is 8. Four of the numbers are 6, 9, 7 and 10. Work out the fifth number.

total = mean × how many

5 × 8 = 40

1. **Total of all 5**: 5 × 8 = 40
2. **Add the four you know**: 6 + 9 + 7 + 10 = 32
3. **Missing number**: 40 − 32 = **8**

Use this when: one number is missing and you know the mean

The big question

Is the data a **list**, a **frequency table**, or do I know the **mean** and need to **work backwards**?

List: Mean, median, mode and range. Table: Averages from tables. Mean given: Working backwards from the mean.

Careful: in a table, the frequency tells you how many times each value appears.

Watch out

- Adding the two means and halving (the groups are different sizes).
- Forgetting to work out the total first.
- Dividing by the wrong number of values.