What do I need to be able to do?

- Know names of 2D and 3D shapes
- Recognise faces, edges and vertices
- Recognise, sketch and accurately dram nets of 3D objects
- Construct plans and elevations of 3D objects
- Find the surface area of cubes and cuboids
- Find the volume of cubes and cuboids

Keywords

Face- A single flat surface of a 3D shape.

Edge- A line segment between faces.

Vertex- a corner (plural is vertices).

Net-The net of a 3D shape is what it looks like if it is opened out flat.

Plan- A scale drawing showing a 3D shape when it is looked at from above.

Elevation-A scale drawing showing a 3D shape when it is looked at from the front or the side.

Faces

face (a surface)

Edges

edge (a line)

Vertices

vertex (a point)

Nets of 3D shapes

Plans and Elevations of 3D shapes

Plan

Front Elevation

Side Elevation

Plan

Front   Side

Find the surface area of cubes and cuboids

3 cm
2 cm
4 cm
= 52 cm²

4 cm
2 cm   8 cm²
8 cm²

4 cm
3 cm   12 cm²
12 cm²

3 cm
2 cm   6 cm²
6 cm²

Find the volume of cubes and cuboids

2 cm
3 cm
4 cm

Volume = length × width × height
$2 \times 3 \times 4 = 24 \text{ cm}^3$

MATHS – AVERAGES

What do I need to be able to do?

- Calculate the mode, median, mean and range from a list of numbers
- Find missing numbers given an average, or a combination of averages
- Compare sets of data using an average and the range
- Decide which is the most appropriate average to use
- Calculate the mode and range from a frequency table
- Calculate the median from a frequency table
- Calculate the mean from a frequency table
- Calculate the mean from a grouped frequency table

Keywords:

Data: Set of information (may not be numbers)
Numerical data: Information which is numbers
Ordered data:
Types of Average:
Mode/Modal value: The most common piece of data
Median: The middle value of an ordered set of data.
Mean: The total of the numbers divided by how many numbers
Range: Measures how spread out the numbers are, calculated by highest–lowest number.
Frequency: How many pieces of data are in a category
Grouped data: Data which is already in groups
Class interval: The size of the gap that contain the data
Mid-point: The middle of a class interval

Mean, Median, Mode

The Mean

A measure of average to find the central tendency... a typical value that represents the data

$$24, 8, 4, 11, 8,$$

Find the sum of the data (add the values) **55**
Divide the overall total by how many pieces of data you have $55 \div 5$

Mean = 11

The Median

The value in the center (in the middle) of the data

$$24, 8, 4, 11, 8,$$

Put the data in order $\quad 4, 8, 8, 11, 24$
Find the value in the middle $\quad 4, 8, 8, 11, 24$

Median = 8

NOTE: If there is no single middle value find the mean of the two numbers left

The Mode (The modal value)

This is the number OR the item that occurs the most (it does not have to be numerical)

$$24, 8, 4, 11, 8,$$

This can still be easier if the data is ordered first

$$4, 8, 8, 11, 24$$

Mode = 8

Choosing the appropriate average

The average should be a representative of the data set – so it should be compared to the set as a whole - to check if it is an appropriate average

Here are the weekly wages of a small firm

£240	£240	£240	£240	£240
£260	£260	£300	£350	£700

Which average best represents the weekly wage?

The Mean = £307
The Median = £250
The Mode = £240

Put the data back into context
Mean/Median – too high (most of this company earn £240)
Mode is the best average that represents this wage

It is likely that the salaries above £240 are more senior staff members – their salary doesn't represent the average weekly wage of the majority of employers

Comparing Distributions

Comparisons should include a statement of average and central tendency, as well as a statement about spread and consistency.

Here are the number of runs scored last month by Lucy and James in cricket matches
Lucy: 45, 32, 37, 41, 48, 35
James: 60, 90, 41, 23, 14, 23

Lucy
Mean: 39.6 (1dp), **Median:** 38 **Mode:** no mode, **Range:** 16
James
Mean: 41.8 (1dp), **Median:** 32, **Mode:** 23, **Range:** 76

James has two extreme values that have a big impact on the range

"James is less consistent that Lucy because his scores have a greater range. Lucy performed better on average because her scores have a similar mean and a higher median"

Averages from a table (R)

Number of Siblings	0	1	2
Frequency	6	8	6
Subtotal	0	8	12

Overall Frequency: 20
Total number of siblings: 20

The data in a list: 0,0,0,0,0,0,1,1,1,1,1,1,1,1,2,2,2,2,2,2

Mean: $\dfrac{\text{total number of siblings}}{\text{Total frequency}} = 1$

Grouped data

x Weight(g)	Frequency	Mid Point	MP x Freq
$40 < x \le 50$	1	45	45
$50 < x \le 60$	3	65	195
$60 < x \le 70$	5	65	325

Overall Frequency: 9
Overall Total : 565

Mean: 62.8g

The data in a list: 45, 55, 55, 55, 65, 65, 65, 65, 65

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