Graphs Tables and Charts (Unit 3 Foundation)

Frequency Tables

These are a useful and clear way of displaying data,
e.g. the table below shows the scores out of ten for 20 students.

Mark	Tally	Frequency
4	II	2
5	II	2
6	IIII	4
7	~~IIII~~	5
8	IIII	4
9	II	2
10	I	1

Frequency means how often something occurs.

This means 5 students scored 7 marks in their test.

Grouped Frequency Tables

These contain sorted data in groups called **classes,**
e.g. the table below shows the ages of people taking swimming lessons.

Class Interval	Frequency
15 – 25	60
25 – 35	35
35 – 45	22
45 – 55	18
55 – 65	15

Total frequency will tell you the total number of people taking swimming lessons.

This means 18 people who took swimming lessons were between the ages of 45 and 55.

Classes or class widths

Comparative Bar Charts

The table shows the number of cars sold by Kitty and George in the first four months of 2014.

Video 147
Video 148

	January	February	March	April
Kitty	2	5	13	10
George	4	7	9	10

The chart has a key to make it easier to understand.

A **comparative bar chart** allows you to easily compare the number of cars Kitty and George sold each month.

Two-Way Tables

Video 319

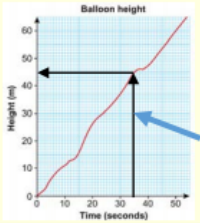
These are used to show how data falls into 2 different categories, for example gender and favourite sport to watch.

What is your favorite sport to watch on television?			
	Football	Basketball	Baseball
Males	40	22	15
Females	12	16	45
Total	52	38	60

A two-way table divides data into groups in rows going across and columns going down the table.

Time-Series Graph

These are used to show how something changes over time. It is a line graph with time plotted along the horizontal axis
For example the height of a balloon at different times

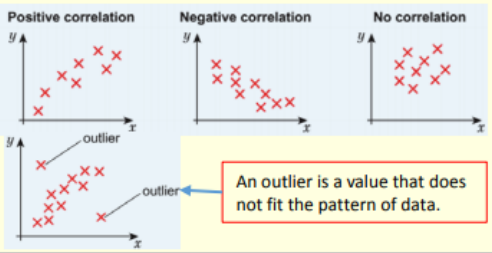


You can estimate the height of the balloon at different times using the graph

E.g. the height of the balloon at 35 seconds is approximately 45m as shown by the arrows on the graph

Scatter Graphs

A scatter graph allows you to see the **relationship** between two sets of data, e.g. your height and your stride length. Correlation is used to describe a relationship between two **variables.**

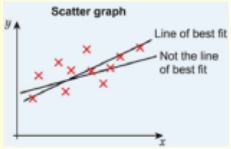


An outlier is a value that does not fit the pattern of data.

A line of best fit

Videos 165 - 168

This is a straight line drawn through the middle of the points on a scatter graph. It should pass as near as many points as possible and represents the **trend** of the points.

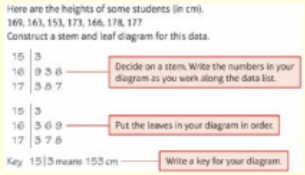


A line of best fit can be used to predict data values within the range of data given.
This is called **interpolation.**
It can also be used to predict data values outside the range of data given.
This is called **extrapolation.**

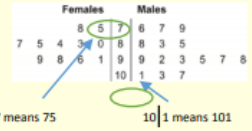
Stem and Leaf Diagrams

Video 169
Video 170

This shows numerical data split into a '**stem**' and '**leaves**'. The leaf is usually the last digit and the stem is the other digits.



A back-to-back stem and leaf diagram compares two sets of data, e.g. the ages of males and females.



Pie Charts

Video 163 - Drawing
Video 164 - Interpreting

This is a circle divided into **sectors.** Each sector represents a set of data. Pie charts are excellent for displaying the most/ least popular type of something.

Plotting pie charts example

The table show the match results of a football team.

Result	Won	Drawn	Lost
Frequency	28	12	20

28 + 12 + 20 = 60 — The total number of games is the total frequency.

1 game = 360° ÷ 60 games = 6° per game — Work out the angle for **one** game.

360° in a circle

28 games won = 28 × 6° = 168°
12 games drawn = 12 × 6° = 72°
20 games lost = 20 × 6° = 120°
Work out the angle for each result.

Draw the pie chart. Give it a title and a key. Or label each section

Year 9 – Maths / Unit 3 Graphs Tables & Charts (F) – HT3 & 4

Unit 4 Foundation Fractions & Percentages

Corbett Maths video links: V142 V146 V234

Fractions

The basics:

This pizza is ¾ shaded green

3 is the "numerator"
4 is the "denominator"

Notice that 6/8 is exactly the same amount. (both numbers doubled)

Multiplying fractions:

Just multiply numerators, multiply denominators, and ***simplify*** if possible

$\frac{2}{4} \times \frac{2}{4} = \frac{4}{16} = \frac{1}{4}$ (÷4 top, ÷4 bottom)

Simplifying involves dividing numerator and denominator by their HCF

HCF is the Highest Common Factor

Fractions of amounts:

Use simpler fractions to find the fraction you actually want:
Eg. ¾ of 32: ¼ of 32 = 32 ÷ 4 = 8
so ¾ of 32 = 8 x 3 = 24

Divide by the denominator, Then multiply by the numerator

In this example, a whole pizza = 32

Simplifying fractions:

Divide numerator and denominator by HCF. You should do this to any final answer fraction where possible.

Percentages of amounts

Calculator allowed?

Turn % into decimal (÷100) and "of" means "multiply".

e.g. 30% of £54 = 30 ÷100 x 54 = £16.20

e.g. 28% of £40 = 28 ÷100 x 40 = £11.20

Reverse percentages:

Use the logic of function machines, which can be run backwards.
You need to figure out the forwards multiplier first.

e.g. $30 dress reduced by 20%:

$30 X 0.8 $24

e.g. Sale price after 30% discount = £28

? X 0.7 £28
Original price £40 ÷ 0.8 £28

Calculator *not* allowed?

10% is your starting point.
10% means "a tenth of the amount"
(because 10% = 10/100 = 1/10)

You can work out all the other percentages you need by scaling up or down from 10%

e.g. 30% of £54?

10% = £5.40 (a tenth of 54 = 54/10)
20% = £10.80 (20% is double 10%)
30% = £16.20 (30% = 10% + 20%)

e.g. 28% of £40?

10% = £4
1% = 40p (divide 10% by 10)
2% = 80p (double 1%)
5% = £2 (half 10%)
20% = £8 (double 10%)

28% = these 4 added together, = £11.20

Fractions, decimals, percentages conversion

Example:

Fraction 24/100 = 6/25 ⟷ decimal 0.24 ⟷ percentage 24%

numerator ÷ denominator

X 100

Write as fraction out of 10, 100, or 1000, and simplify

÷ 100

Some examples:

1/10 =	10/100 =	0.1 =	10%
1/5 =	20/100 =	0.2 =	20%
3/10 =	30/100 =	0.3 =	30%
9/20 =	45/100 =	0.45 =	45%

People often assume a % cannot be over 100, but it can (just like a fraction can be improper* and a decimal can be over 1)

* top-heavy

Battenburg: adding

1. Draw the battenburg grid.
2. Put the fractions on the side, (left to right, top to bottom).
3. Eat the top left corner (cross it out).
4. Do the multiplications.
5. "**ADD** the peanut" (the yellow ones below).
6. Peanut answer is numerator, the remaining number is denominator.
7. Simplify the fraction, if possible.

$\frac{1}{4} + \frac{1}{3} = \frac{7}{12}$

	1	4
1	X	4
3	3	12

Divide top and bottom of fraction with the HCF that they share

Battenburg: subtracting

1. Draw the battenburg grid.
2. Put the fractions on the side, (left to right, top to bottom).
3. Eat the top left corner (cross it out).
4. Do the multiplications.
5. "**SUBTRACT** the peanut" (the yellow ones below).
6. Peanut answer is numerator, the remaining number is denominator.
7. Simplify the fraction, if possible.

$\frac{1}{4} - \frac{1}{3} = \frac{1}{12}$

	1	4
1	X	4
3	3	12

Divide top and bottom of fraction with the HCF that they share

Fractions:

To multiply fractions, just multiply numerators and denominators:

e.g. $\frac{2}{7} \times \frac{4}{5} = \frac{8}{35}$

To divide fractions, KFC (keep, flip, change)

e.g. $\frac{2}{7} \div \frac{4}{5} = \frac{2}{7} \times \frac{5}{4} = \frac{10}{28}$

simplify

Equations, Inequalities, Sequences (Unit 5 Foundation)

An **equation** contains an unknown number (letter) and an equals (=) sign.

You **solve** an equation by working out the value of the unknown.

Video 110 - https://tinyurl.com/y866296z

In an equation, both sides of the = sign have the same value (like balanced scales). As with balanced scales, the two sides remain equal if the same is done to both sides (**balancing method**).

In an equation with **brackets**, expand the brackets first.

To expand brackets, multiply everything within the brackets by any multiplier on the outside.

A **formula** is an equation with two or more **variables** (unknown numbers).

Values can be **substituted** into a formula to get results.

Video 113 - https://tinyurl.com/y76yatx2

Key Points:

https://tinyurl.com/y9cavj7r

An **integer** is a positive or negative whole number, or a zero.

< means **less than** (the thing on the left is less than the thing on the right)

> means **greater than** (left side greater than right side)

≤ means **less than or equal to** (like less than, but the two sides might be equal)

≥ means **greater than or equal to** (like greater than but the two sides might be equal)

Video 176 - https://tinyurl.com/y7py6cf9

You **MUST** do the **SAME** to **BOTH** sides of an equation or inequality
Video 178 - https://tinyurl.com/hkxkrvk

Inequalities can be shown on number lines with empty circles (for less than or greater than) or filled circles (if value could be equal) and arrows in correct direction.
Video 177 - https://tinyurl.com/y72g4v69

Knowledge Check:

https://tinyurl.com/y96fhs9v

Sequences are patterns of numbers that follow a rule.

The numbers in a sequence are called **terms**.

Video 286 - https://tinyurl.com/ydaj355k

The **term-to-term** rule describes how to get from one term to the next.

Video 287 - https://tinyurl.com/y7mp8hdf

The ***nth*** term of a sequence is how to work out the term given its position (*n*) in the sequence.

Video 288 - https://tinyurl.com/hs9qnsx

The ***nth*** term is sometimes called the **general term** of a sequence.

In a **linear sequence** (same difference between each pair of terms) the *n*th term is found by multiplying the position by the difference between the first and second terms, then adding or subtracting a constant to make the output when $n = 1$ actually equal the first term.

As with all mathematical calculations, please remember to use **BIDMAS**:

Brackets then **Indices** then **Division & Multiplication** then **Addition & Subtraction**

Video 211 - https://tinyurl.com/y98jn4wk