



# Numeracy

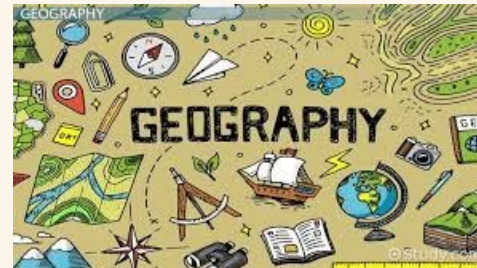


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# Numeracy for Learning

- Being good at numeracy is not just for maths.
- You will need maths skills in all subjects from history, geography, sports studies, music, product design, food, science and computer science etc
- In this session we will look at
  - where maths comes up across a range of subjects
  - Some 'big hitter' topics
  - What formulae/rules you do and don't need to know of by heart (and how to remember some of them)
  - Using your calculator effectively
  - Some ideas to help with exam technique

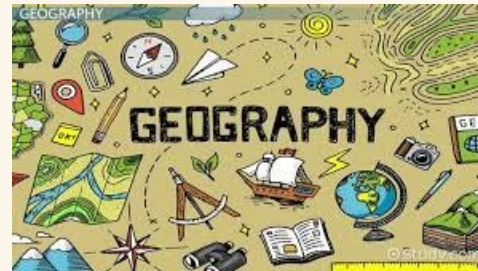


# Numeracy for Learning

- In history you have to put dates into chronological order and have to analyse data including statistics
- In food you have to purchase ingredients and weigh them
- In computer science you use coding
- In science you use formulae and equations
- In Geography and DT you work with averages and percentages



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# Key Mathematical skills

## Numerical skills:

- Decimals
- Percentages
- Fractions
- Ratios
- Estimation

## Shape and space:

- Measurements
- Area, surface area and volume
- Using scales on maps/diagrams
- Co-ordinates

## Data processing:

- Using statistics
- Interpreting graphs and charts
- Calculating rates/gradients
- Drawing graphs and charts
- Calculating averages (mean, mode, median)

## Algebra skills:

- Use formulae
- Rearrange equations
- Balance equations
- Linking formulae

# Basic transferrable maths tips

<u>estimate</u> $(8.56 - 6.02)^2$	$14.2 \times 97.54$
$\frac{139}{6.9}$	$0.47 \times 121.7$



# answers

$$(8.56 - 6.02)^2$$

$$\approx (9 - 6)^2$$

$$= 3^2$$

9

$$14.2 \times 97.54$$

$$\approx 15 \times 100$$

1500

$$\frac{139}{6.9}$$

$$6.9$$

$$\approx \frac{140}{7}$$

20

$$0.47 \times 121.7$$

$$\approx 0.5 \times 120$$

60



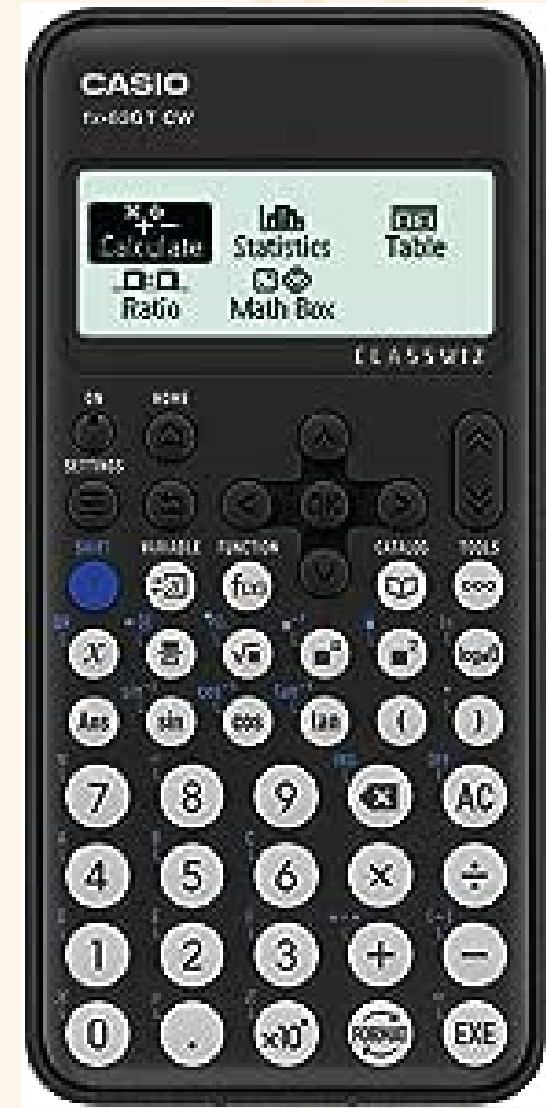
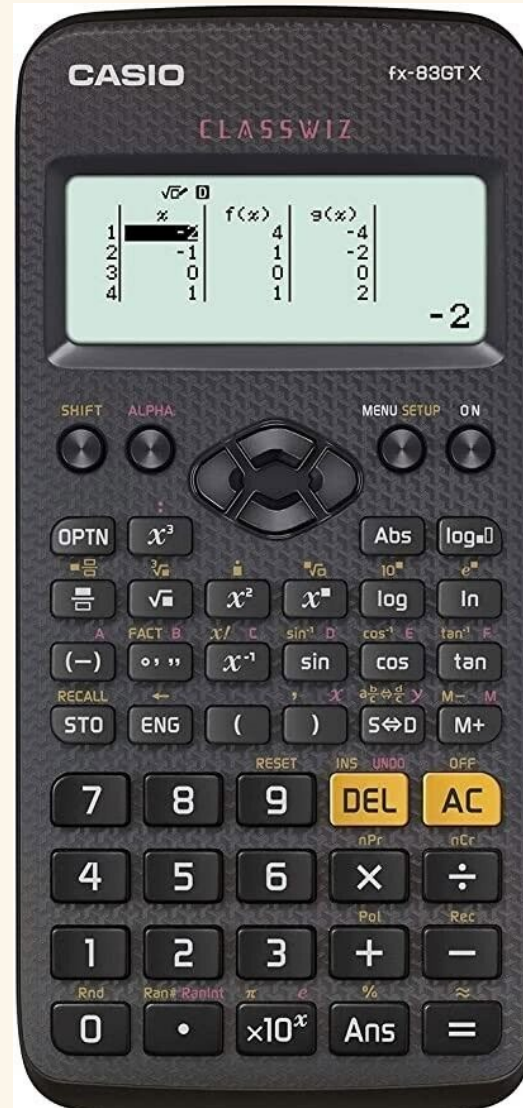
# You need a scientific calculator and you need to know how to use it!!!

Do you know where to find:

- The fraction button
- The S=D button
- The % button
- The roots and powers buttons
- The mixed fraction button

Etc

Do you know how to RESET your calculator?



Now you can look at some questions from a variety of subjects. You can use your calculator!



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# Examples of exam questions across subjects - Science

(b) The ball has an average speed of 11 m/s

The ball takes 0.25 s to travel the same distance as the length of the table.

Calculate the length of the table.

Use the equation:

$$\text{distance travelled} = \text{speed} \times \text{time}$$

(2)

(b)

*an answer of 2.75 scores 2 marks*

$$s = 11 \times 0.25$$

1

$$s = 2.75 \text{ (m)}$$

*allow 2.8 (m)*

1

(c)

$$\frac{75}{100} \times 30.0$$

*allow any correct method of determining 75% of 30*

1

$$22.5 \text{ (cm)}$$

1

(25.1 > 22.5) therefore the ball can be used

(c) A table tennis ball should only be used if it bounces to at least 75% of the height it was dropped from.

A manufacturer tested a table tennis ball.

The table shows the results.

Height ball was dropped from in cm	Height of bounce in cm
30.0	25.1

Determine whether the ball can be used.

Use the data from the table above.

(3)



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# Exam questions – Science

(e) Calculate the percentage by mass of oxygen in ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ).

Relative atomic masses ( $A_r$ ): H = 1 N = 14 O = 16

Relative formula mass ( $M_r$ ):  $\text{NH}_4\text{NO}_3 = 80$   
(e)  $3 \times 16$  or 48

$$\frac{48}{80} (\times 100)$$

60 (%)

*an answer of 60 (%) scores **3** marks*

*an answer of 20 (%) scores **2** marks for:*

$$\frac{16}{80} (\times 100) \quad (1)$$
$$= 20 (\%) \quad (1)$$



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1

1

1

# Exam questions – DT

2

You have marked out and cut a design to a measurement of 100 x 100mm with a tolerance of  $\pm 2\text{mm}$ . Which one of the following measurements is in tolerance?

A 97.9 x 100.58mm

B 98.2 x 102.56mm

C 99.9 x 101.07mm

D 102.58 x 96.2mm

[1 mark]

22

.

1

You have been asked to redesign your chosen product to make it suitable for a child aged between 3 and 5 years old.

The data in the table below shows the preferred colour scheme according to 250 children aged between 3 and 5 years old.

Calculate the missing percentages.

[2 marks]

	Number of children	Percentage of total
Pastel colours	55	22%
Primary colours	105	42 %
Fluorescent colours	50	20%
Subtle colours	30	12 %
Metallic colours	10	4%
<b>Total</b>	<b>250</b>	

Exam technique:  
Check you know how to get the correct answer by trying one of the ones already given

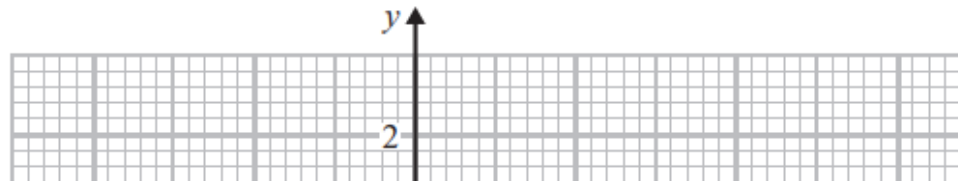
# Exam questions – Maths

13 (a) Complete the table of values for  $y = \frac{1}{2}x - 1$

x	-2	-1	0	1	2	3
y	-2				0	

(2)

(b) On the grid, draw the graph of  $y = \frac{1}{2}x - 1$  for values of  $x$  from -2 to 3



Exam technique:  
Check you know  
how to get the  
correct answer by  
trying one of the  
ones already given

(-2) -1.5 -1  
-0.5 (0) 0.5

B2  
[B1

for a fully correct table  
for 2 or 3 correct entries]

Correct line

M1

for correctly plotting at least 5 of their points (provided B1 scored in part (a)) or for a straight line with gradient 0.5 or for a straight line through (0,-1) with a positive gradient

A1

for a correct line between  $x = -2$  and  $x = 3$

# Exam questions – Geography

Exam technique: Check you know how to get the correct answer by trying one of the ones already given

Location X Sediment size (cm)	Location Y Sediment size (cm)
12	9
10	4
9	2
15	3
8	2
13	6
Mean: 11.2	Mean: <b>4.3</b>

0 3 . 2

Complete the table in Figure 12 by calculating the mean sediment size, in cm, for location Y.

[1 mark]



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Students measured the flow of water in two different rivers over 7 days. **Figure 7** shows the results, in rank order, for the two rivers.

**Figure 7**

	River A (Flow in cubic metres/second)	River B (Flow in cubic metres/second)
	6.2	11.8
Upper quartile →	6.0	10.4
	5.6	8.7
	5.2	5.1
	5.0	2.1
Lower quartile →	4.5	1.4
	3.7	1.2
<b>Median</b>	<b>5.2</b>	<b>5.1</b>
<b>Interquartile range</b>	<b>1.5</b>	<b>9</b>

Exam technique:  
Check you know how to get the correct answer by trying one of the ones already given

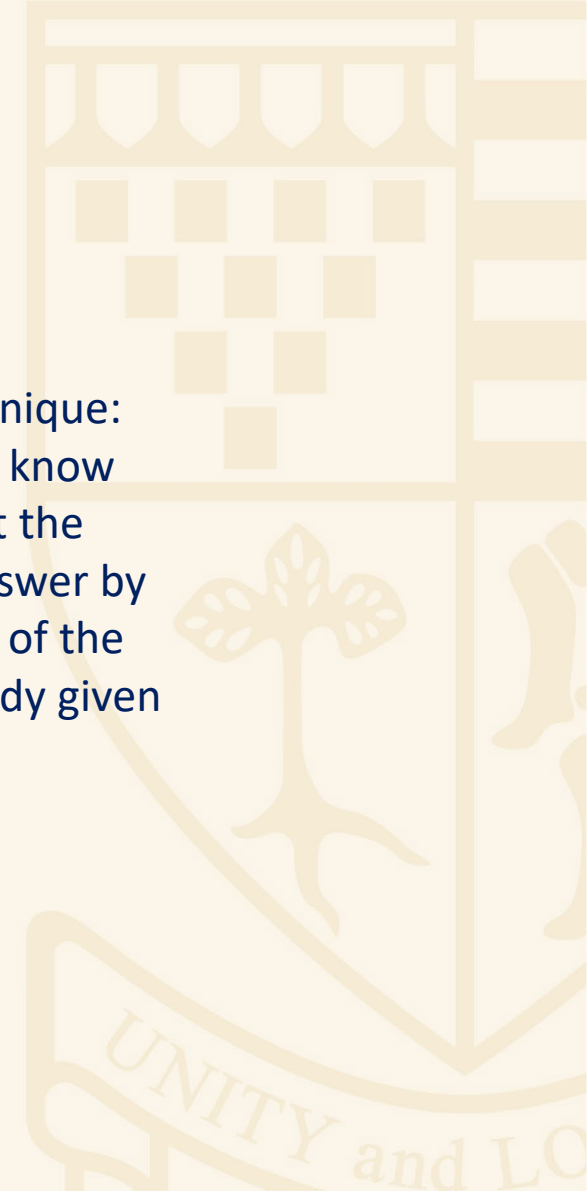
**0 4 . 7** Complete the table (**Figure 7**) by calculating the interquartile range for River B.

**[1 mark]**

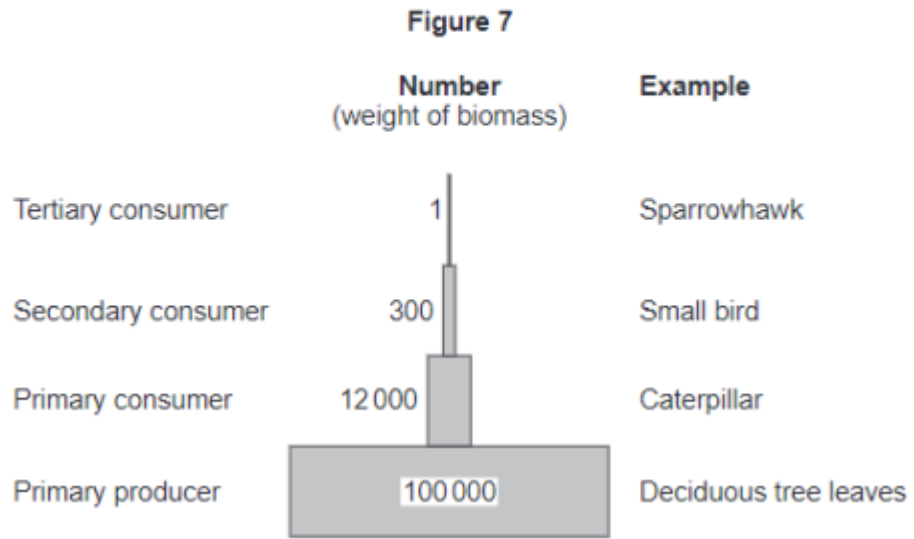


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Study **Figure 7**, a graph showing the biomass at different levels of a food chain.



Biomass is the total quantity or weight of organisms in a given area.

2.4

Calculate the percentage loss in biomass between the primary consumer and secondary consumer levels.

Shade **one** circle only.

[1 mark]

- A 2.5%
- B 97.5%
- C 25.2%
- D 95.5%





Study **Figure 8**, information about the planned spending on transport infrastructure in England's regions 2016–2021.

**Figure 8**



0 2 . 9

Using **Figure 8**, calculate the mean planned spending per person per year 2016–2021 in the nine English regions.

[2 marks]

4363 / 9  
485



# Bigger hitters

- topics to prioritise that span multiple subjects

- Percentages of amounts and percentage change

When we calculate percentage change, we are calculating by what percentage of its original value something has increased or decreased.

To do this we use the percentage change formula:

$$\text{Percentage change} = \frac{\text{Change}}{\text{Original}} \times 100$$

- Averages, especially calculating the mean

## Mean

Add up all the data points and then divide by the total number of numbers.

1, 2, 3, 4, 5

$$1 + 2 + 3 + 4 + 5 = 15$$

$$15 \div 5 = 3$$

- Standard Form for large and small numbers

Numbers in standard form are written in this format:

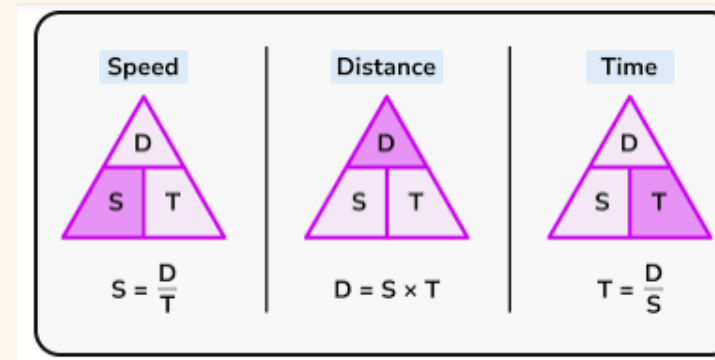
$$a \times 10^n$$

Where **a** is a number  $1 \leq a < 10$  and **n** is an integer.

$$230000000000 = 2.3 \times 10^{11}$$

$$0.00000000000002 = 2 \times 10^{-13}$$

- Speed/Distance/Time



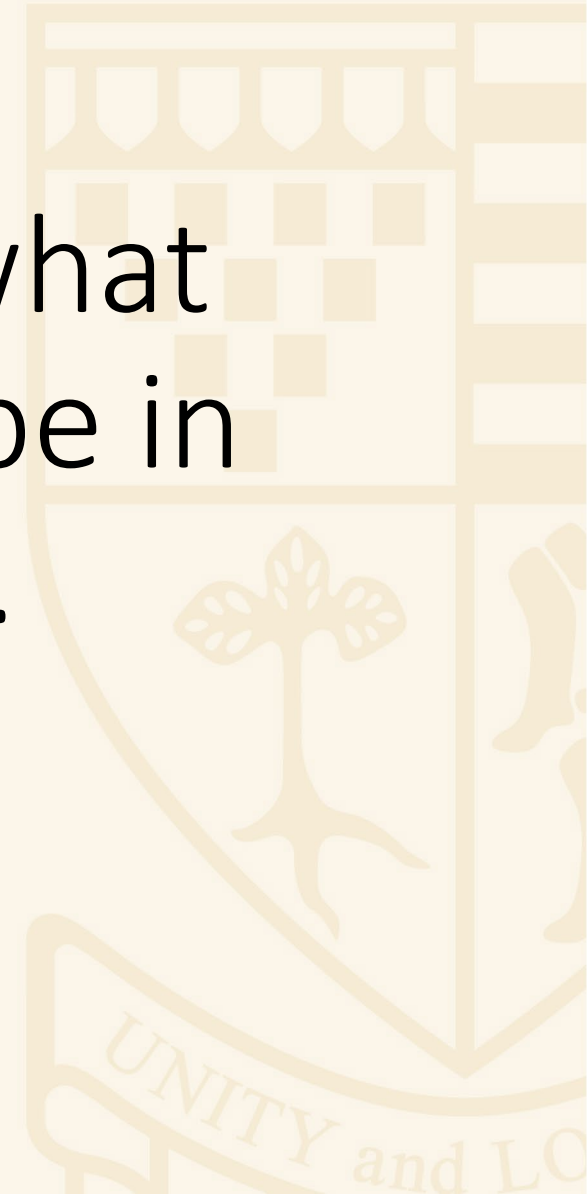
Get in the habit of writing what  
format your answer should be in  
next to the answer line...

E.g.



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22 Work out  $4\frac{1}{5} - 2\frac{2}{3}$

Give your answer as a mixed number.

(Total for Question 22 is 3 marks)

*mixed number*

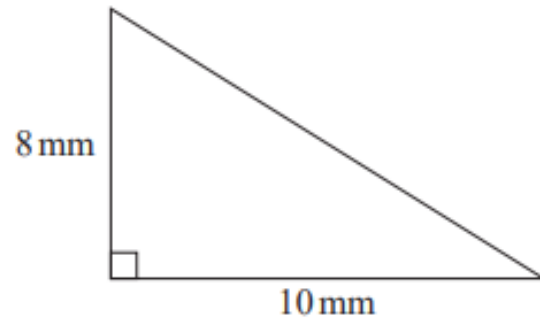


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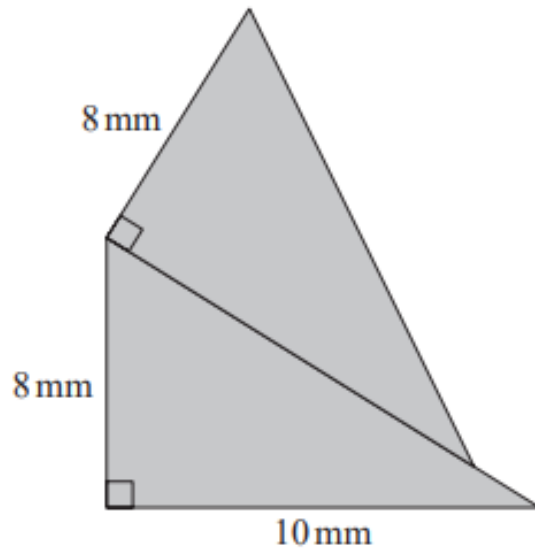
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25 Here is a right-angled triangle.



The shaded shape below is made from two of these triangles.



Work out the perimeter of the shaded shape.  
Give your answer correct to 3 significant figures.



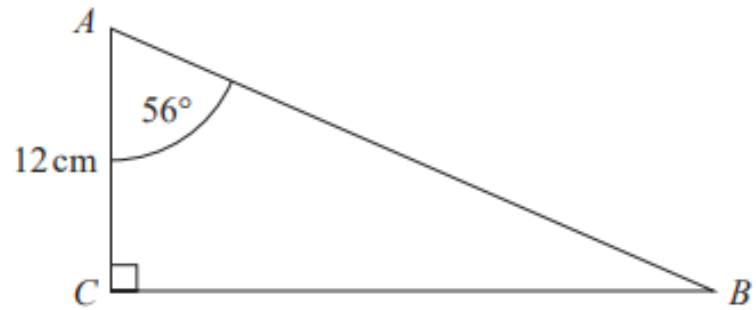
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3.s.f.  
..... mm

(Total for Question 25 is 4 marks)

26  $ABC$  is a right-angled triangle.



- (a) Work out the length of  $BC$ .  
Give your answer correct to 1 decimal place.

..... cm  
(2)

1d.p



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(c) Work out  $4.2 \times 10^3 + 5.3 \times 10^2$   
Give your answer in standard form.



*in standard form*

.....  
(2)



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24 A water tank is empty.

Anil needs to fill the tank with 2400 litres of water.

Company A supplies water at a rate of 8 litres in 1 minute 40 seconds.

Company B supplies water at a rate of 2.2 gallons per minute.

1 gallon = 4.54 litres

Company A would take more time to fill the tank than Company B would take to fill the tank.

How much more time?

Give your answer in minutes correct to the nearest minute.

nearest  
minute

..... minutes



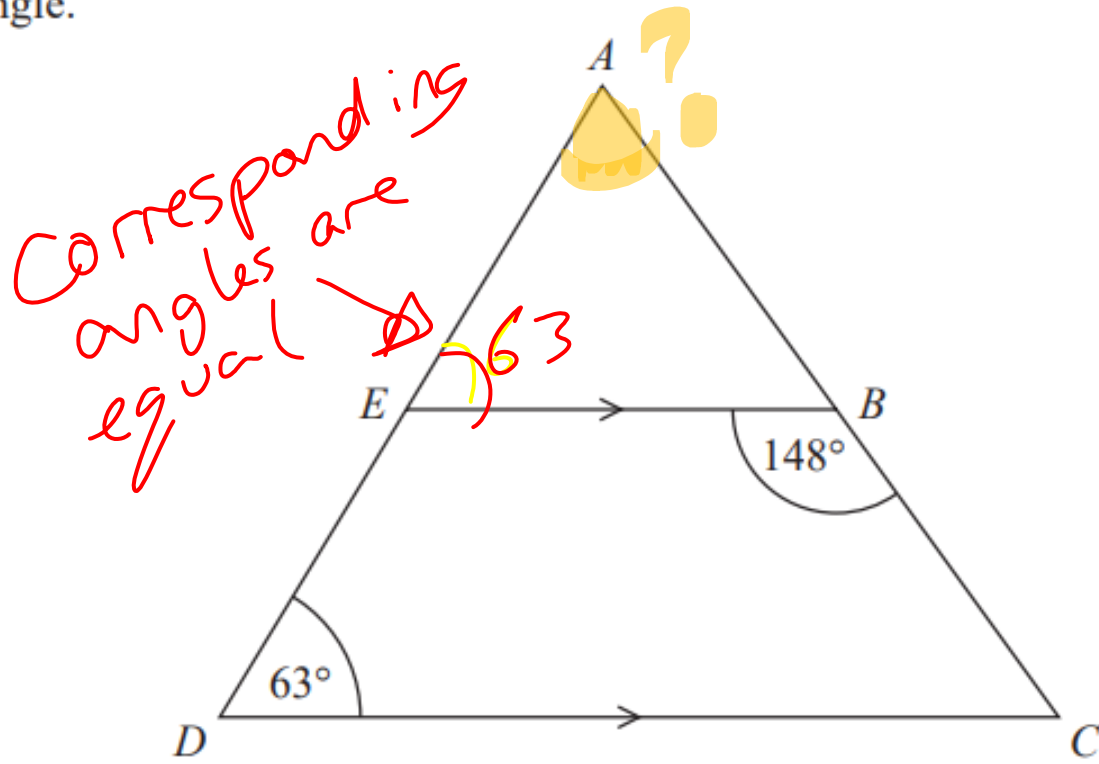
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**(Total for Question 24 is 4 marks)**



25  $ADC$  is a triangle.



$AED$  and  $ABC$  are straight lines.

$EB$  is parallel to  $DC$ .

Angle  $EBC = 148^\circ$

Angle  $ADC = 63^\circ$

Work out the size of angle  $EAB$ .

You must give a reason for each stage of your working.



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# Formula sheets – HOT OF THE PRESS!!

Students set to sit their GCSE exams in 2024 could receive additional support materials, as the Department for Education (DfE) asks Ofqual to make arrangements to continue providing formulae and equation sheets for one more year.

Following a consultation, the proposal would see students provided with enhanced formulae and equation sheets to support them in mathematics, physics, and combined science GCSEs, as was the case for 2023 exams. This means students will not have to memorise formulae, as they need to in a normal year.

These proposed arrangements recognise the disruption this cohort of students experienced during their secondary education due to national school closures during the pandemic while these pupils were in year 7 and 8.

Maths Exam Aid:

<https://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015/2023-support.html>

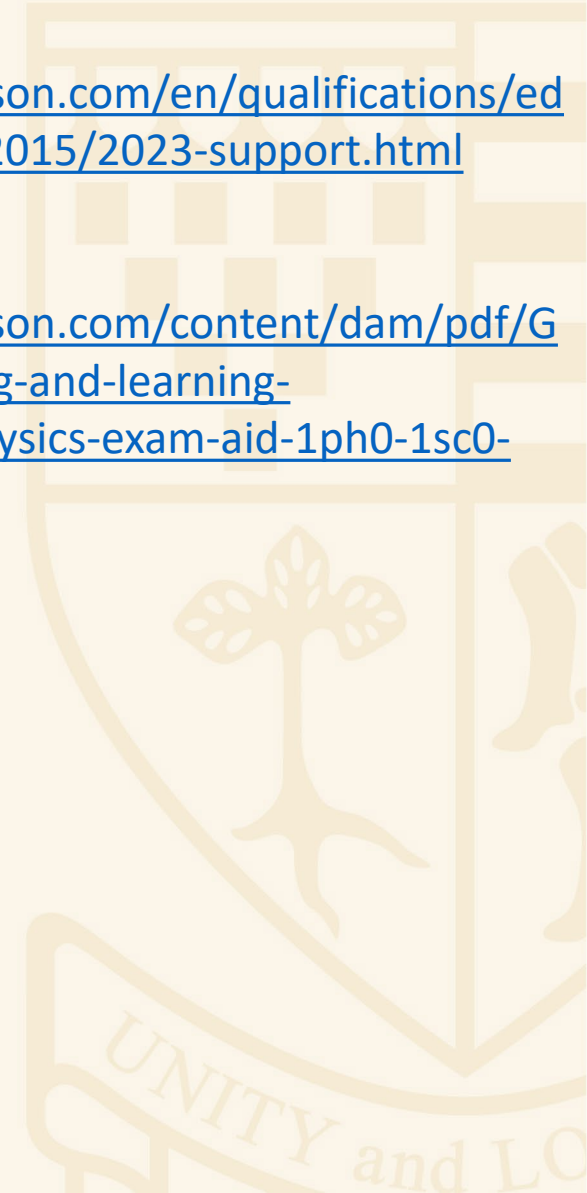
Science Exam Aid:

<https://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/teaching-and-learning-materials/w77378-gcse-physics-exam-aid-1ph0-1sc0-exam-aid.pdf>



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# Songs and mnemonics

Averages song - <https://www.youtube.com/watch?v=maKjEISDOko>

SOH CAH TOA - She Offered Her Cat A Heaping Teaspoon Of Applejuice



# Revision

- Keep doing your Sparx homework each week. This practices older content and interleaves different things to support revision. You can also do the Target and XP Boost tasks as extra revision.
- Do multi-topic revision (e.g. past or practice papers) & mark them. There are hand-written and video solutions to support you.

<https://www.mathsgenie.co.uk/papers.html>

- Use this to guide your targeted topic revision – e.g. Corbett Maths, MathsGenie (this is in the revision booklet)

<https://www.mathsgenie.co.uk/gcse.html>

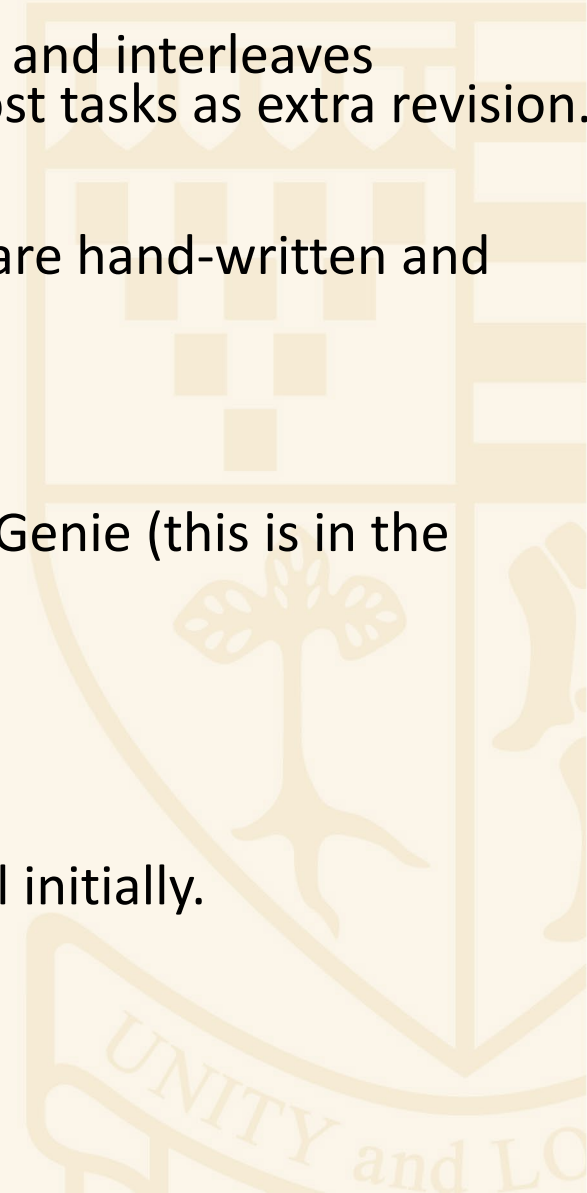
<https://corbettmaths.com/contents/>

- Think about the grade your aiming for and prioritise the topics at this level initially.



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# Maths Exam information

- 3 papers, each 1.5 hrs long
- Paper 1 is Non-calculator
- Papers 2 and 3 are Calculator

Any topics could theoretically come up on any paper. We then have some 'best guess' papers after Papers 1 & 2.

## Maths Revision and support

- See the new revision booklet with loads of information
- After school in M9 every Tuesday and Thursday
- Mon PM tutor time – alternate weeks of maths and English revision – use this time effectively!!



# Science Exam information

- 6 papers; 2 for each of Biology, Chemistry and Physics
  - Combined science is 1 hour 15 mins per paper
  - Separate is 1 hour 45 mins per paper

