# Supporting your child with Maths Homework

# A guide for parents

Dear Parent/Carer,

In recent years our understanding of how best to teach mathematics has increased significantly. Research has confirmed the importance of homework at secondary school and the positive impact it has. What has also been established is the importance of revisiting topics that have been previously taught. The idea of 'spaced-retrieval practice' and its importance in supporting learning and memory has been demonstrated clearly and many schools are now making changes to their curriculum and practice in order to utilise the latest findings. At Brockington College we have embedded these ideas in multiple ways, and one of the most important is through our development of the homework booklet.

The purpose of this guide is to explain how the maths homework booklets work, what is expected of pupils at different stages of the year, and the benefits of structuring homework in the way that we do.

I hope you find this guide useful. If you require further support than please contact your child's maths teacher by email from the list below.

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Yours sincerely,

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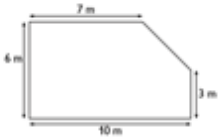
## *How the Homework booklets work*

Each year group has 3 homework booklets throughout the year. The first homework booklet runs from broadly September to Christmas, the second from Christmas to Easter, the third from Easter until the end of the academic year. Due to the slight differences in term length each year these are only approximate time periods.

Each homework booklet consists of pages of 20 questions on a variety of topics, similar to the page below. Pupils will be asked to complete a page a week, and most teachers will provide a week or so to do this. Many teachers will also have a particular day each week when they expect homework from their pupils, so if your child doesn't know which day this is I would suggest checking the Show My Homework site for details, or speaking to your child's teacher.

| Homework Sheet 15 | |
|---|---|
| C1: The voltage across a wire is directly proportional to the current passing through the wire. A voltage of 1.5V causes a current of 0.4A. Work out the voltage across the wire if the current through the wire is 0.7A | 11: Write down the name of this sequence:<br>1, 4, 9, 16, 25, .... |
| C2: Find the size of a single exterior angle of a regular polygon with 24 sides. | 12: Find the next term of the sequence:<br>4, 7, 10, 13, .... |
| C3: Find the area of this shape.<br>  <br> | 13: Find the next term of the Fibonacci sequence:<br>1, 1, 2, 3, 5, 8, 13, ... |
| 4: Expand and simplify $3x(x-4)+2(3x+5)$ | C14: Calculate 17% of £63 |
| 5: $f(x) = 12 + 4x^2$. Find $f(2)$ | C15: Complete the sentence: "81 is 90% of..." |
| 6: Find the prime factorisation of $135^3$ | 16: A straight line has equation y = 3. Fill in the blank in the coordinate:<br>(2, .....) |
| 7: 4 positive whole numbers have a mode, median and range all equal to 1. List the 4 numbers. | 17: Work out the y-intercept of the line $y - 3x = 5$ |
| C8: Change 4.6 hours into hours and minutes. | 18: $y = 2x - 1$ $y = x + 1$<br>By drawing the graphs or otherwise find the coordinate of the point of intersection between the two lines. |
| 9: Round 3.75 to 1 decimal place | 19: Give the position of the coordinate (7, 3) when translated using the vector $\begin{pmatrix}2\\5\end{pmatrix}$ |
| 10: A room is measured as 4.7 metres to 1 decimal place. What is the smallest possible length of the room? | 20: Describe the meaning of the vector $\begin{pmatrix}2\\5\end{pmatrix}$ |
| Mark: | Effort: |

The questions will be drawn from the topics that are to be taught in the term, as well as topics taught in previous terms. There is a grid towards the back of the booklet that states which topic each question comes from – this will be the same topic for each sheet in the booklet (i.e. in the booklet shown below question 3 on every sheet will be about area). In addition, for Years 7, 8 and 9 question 1 will always be a question designed to test and practice a basic numeracy skill, and question 20 will always be a question designed to test and practice recall of times tables.

| Sheet | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mark | | | | | | | | | | |

| Question | Topic | Homework 15 | Homework 16 | Homework 17 | Homework 18 | Homework 19 | Homework 20 | Homework 21 | Homework 22 | Homework 23 | Homework 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Proportion and Inverse Proportion | | | | | | | | | | |
| 2 | Polygon properties | | | | | | | | | | |
| 3 | Area | | | | | | | | | | |
| 4 | Expressions | | | | | | | | | | |
| 5 | Functions & Formulae | | | | | | | | | | |
| 6 | Understanding Products | | | | | | | | | | |
| 7 | Raw Numerical Data | | | | | | | | | | |
| 8 | Units and Scales | | | | | | | | | | |
| 9 | Rounding & Estimation | | | | | | | | | | |
| 10 | Bounds | | | | | | | | | | |
| 11 | Number Patterns | | | | | | | | | | |
| 12 | nth terms | | | | | | | | | | |
| 13 | Recurrence relations | | | | | | | | | | |
| 14 | Percentage calculations | | | | | | | | | | |
| 15 | Reverse percentage calculations | | | | | | | | | | |
| 16 | Straight line graphs | | | | | | | | | | |
| 17 | Gradients and straight lines | | | | | | | | | | |
| 18 | Simultaneous equations and graphs | | | | | | | | | | |
| 19 | Transformations | | | | | | | | | | |
| 20 | Vectors | | | | | | | | | | |

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|---|---|
| Homework 15 Target | |
| Homework 16 Target | |
| Homework 17 Target | |
| Homework 18 Target | |
| Homework 19 Target | |
| Homework 20 Target | |
| Homework 21 Target | |
| Homework 22 Target | |
| Homework 23 Target | |
| Homework 24 Target | |

In the booklet from the first term all of the questions (with the exception of question 1 and 20 in Years 7, 8 and 9 as made clear earlier) refer to topics that are to be taught from September. The booklets in terms 2 and 3 start with questions taught in the previous term(s) before introducing questions on topics to be taught in that term. For example the grid above is taken from a homework booklet used between Christmas and Easter. In that booklet roughly the first 7 questions refer to topics that would have been taught before Christmas, with the final 13 questions referring to topics that would be taught between Christmas and Easter.

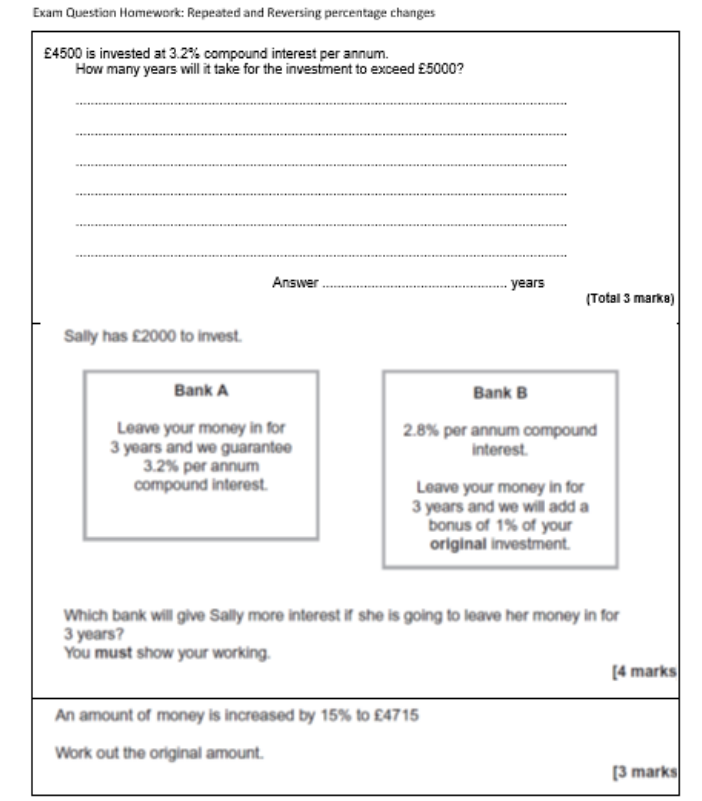
This of course means that earlier in a term pupils will not be able to access many of the questions, as they have not seen those topics. This is not an issue, as it means that it is much easier to see pupils improving as the term goes on. Your child should start the term by spending a longer time on fewer questions, and then by the end of the term they should be able to answer most of the questions. What is important is the amount of time that your child spends on homework. In Years 7, 8 and 9 we would expect 45 minutes to an hour, and at GCSE we would require an hour to 90 minutes. Earlier in each this will give time for your child to review the material they have recently studied using their book or using the websites we provide for their support. If your child finds the earlier questions straightforward we would strongly suggest that they spend the time using the websites to review and prepare for upcoming topics (they can find out the names of the topics using the grid at the end of their booklet). By the end of a term your child should be able to answer the earlier questions fairly quickly and correctly as they will have spent a lot of time reviewing the topic and answering questions on it, and will spend the majority of the time on the more recent topics and questions.

In addition to the 20 questions each week, the GCSE homework booklets (issued in Year 10 and 11) have exam questions included. These questions come in two types:

1) Weekly exam questions for each topic.

2) Review exam questions for each half term.

In the weekly exam question set (example below) your child will need to complete 3 exam questions on a recent topic of study. These questions are designed to ensure that your child is practising exam materials related the topics they are studying all the way through the course. Due to the differing rates that classes cover the GCSE content, it may not always be possible for a teacher to set the exam question homework that would naturally follow in the booklet. In this case your child's teacher may choose to set different exam question homework, or not set one at all. If not set at all it would be expected that your child seek out and attempt further questions from a different source based on the topic they have most recently been studying (for examples of where to seek further questions, please see the guide "Supporting your child with GCSE Maths: A guide for parents of pupils in Year 10 and 11").



Exam Question Homework: Repeated and Reversing percentage changes

£4500 is invested at 3.2% compound interest per annum.
How many years will it take for the investment to exceed £5000?

Answer ..... years

(Total 3 marks)

Sally has £2000 to invest.

**Bank A**

Leave your money in for 3 years and we guarantee 3.2% per annum compound interest.

**Bank B**

2.8% per annum compound interest.

Leave your money in for 3 years and we will add a bonus of 1% of your **original** investment.

Which bank will give Sally more interest if she is going to leave her money in for 3 years?
You **must** show your working.

**[4 marks**

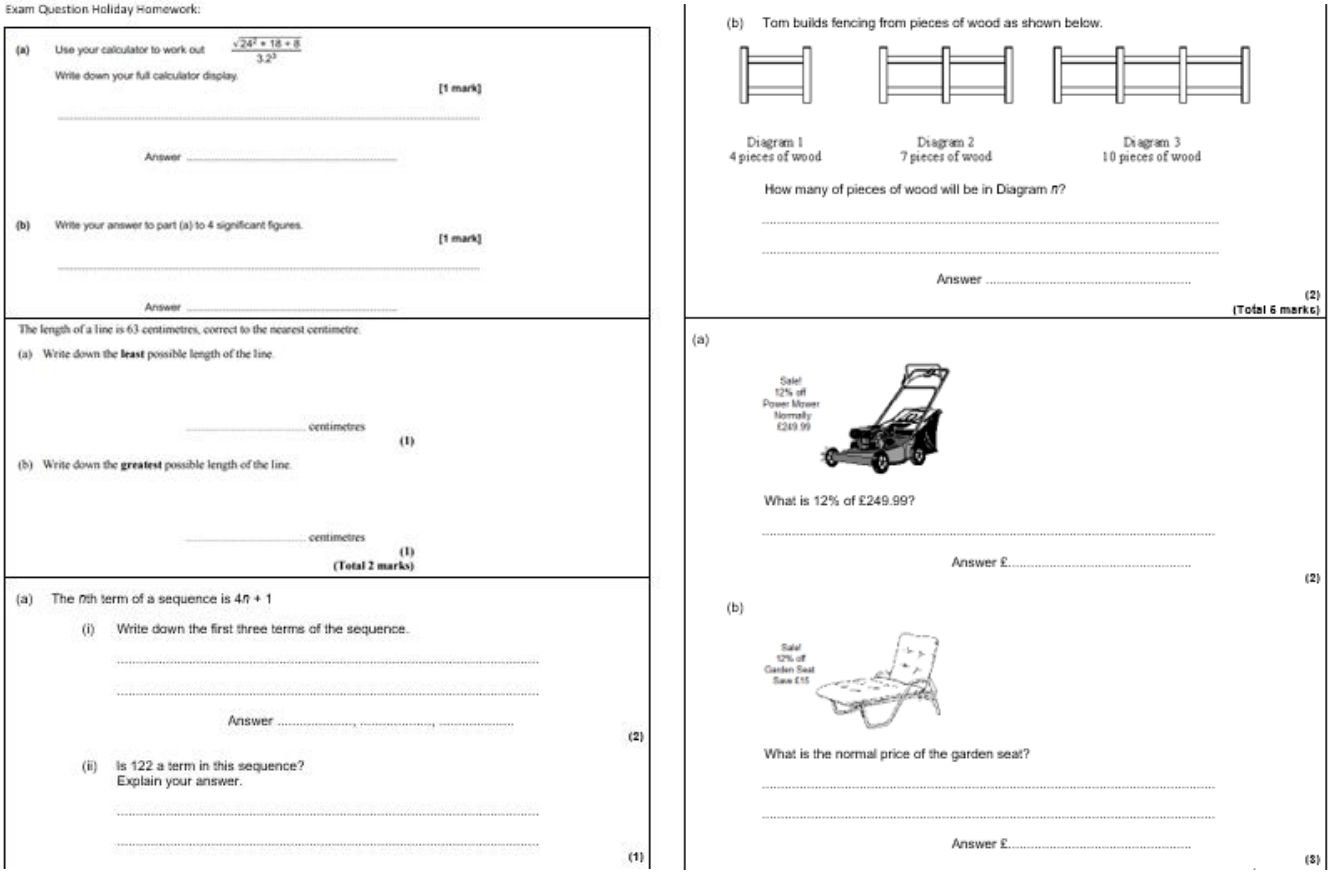
An amount of money is increased by 15% to £4715

Work out the original amount.

**[3 marks**

The exam questions are intended to take between 15 and 30 minutes (including time taken to review support material if needed) and account for the increased homework time at GCSE, so it is important it is used even if exam questions are not set that week.

The review exam questions appear roughly every 6 to 7 weeks, and are designed to be used in the school holiday periods to ensure your child continues to practice topics previously taught. The review consists of 5 exam questions drawn from topics that will have been taught in the previous 6 to 7 weeks (example below).



Exam Question Holiday Homework:

(a) Use your calculator to work out $\frac{\sqrt{24^2 + 18 + 8}}{3.2^3}$

Write down your full calculator display.

[1 mark]

Answer .....

(b) Write your answer to part (a) to 4 significant figures.

[1 mark]

Answer .....

The length of a line is 63 centimetres, correct to the nearest centimetre.

(a) Write down the **least** possible length of the line.

..... centimetres

(1)

(b) Write down the **greatest** possible length of the line.

..... centimetres

(1)

**(Total 2 marks)**

(a) The $n$th term of a sequence is $4n + 1$

(i) Write down the first three terms of the sequence.

Answer ....., ....., .....

(2)

(ii) Is 122 a term in this sequence?
Explain your answer.

(1)

(b) Tom builds fencing from pieces of wood as shown below.

Diagram 1
4 pieces of wood

Diagram 2
7 pieces of wood

Diagram 3
10 pieces of wood

How many of pieces of wood will be in Diagram $n$?

Answer .....

(2)

**(Total 6 marks)**

(a)

Sale!
12% off
Power Mower
Normally
£249.99

What is 12% of £249.99?

Answer £.....

(2)

(b)

Sale!
12% off
Garden Seat
Save £15

What is the normal price of the garden seat?

Answer £.....

(3)

Again due to the fact that different classes will move through the course content at different paces, it may be that not all of the exam questions are appropriate for your child to be working on in the holiday. In that case your child's teacher may choose to set only some of the questions. Similarly to above, in this case it would be expected that your child would attempt further questions from other sources to ensure they are getting the required practice. Given that all 5 questions will only take between 60 and 90 minutes it is strongly recommended that your child would spend more time reviewing material from different sources outside of the homework time allotted.

Children in Year 10 will also be set homework for the summer holiday. This will be based on their performance in the end of Year 10 mock exam. A separate email will be sent to both yourself and your child with the details of this homework once the mock exam has been marked and analysed (assuming you have provided the school with your email address at the beginning of the year).

## *What is expected?*

As stated above, the key requirement for maths homework is the amount of time spent on it rather than the amount completed. It would be very helpful if you could ensure that your child is setting aside the correct amount of time each week to complete their maths homework, and that they are using the time properly as outlined above. If it is difficult to ensure your child is able to do this at home, there are homework clubs and other support that your child can access at school in order to make sure they spend the requisite time on their homework.

In practice, the style of the homework booklet means that the general expectation would be that your child will score less out of 20 at the beginning of a term, and that their score improves as the term goes on. If you find your child is scoring similar scores each week (particularly low scores), or struggling to answer the first questions in the booklet even after a few weeks, this would be a possible cause for concern and you might want to talk to your child about their approach to the homework. It might be helpful to then direct your child to one of the online sites we provide for pupils to seek help with their homework, such as Hegarty Maths or MyMaths, or contact your child's teacher for advice.

Your child's teacher should also share with them roughly what scores they should be aiming for each week, based on the topics covered. This may well be done through Show My Homework, so if your child doesn't know how many questions they are expected to aim for that it would be worth first checking that site. If the expected score is not on Show My Homework, and you are unsure whether your child is performing as they should, then please do contact your child's teacher to check if they are happy with your child's progress. with the homework.

In order to fit 20 questions onto a single page, it was necessary to make the space to answer quite small. This doesn't mean that we are discouraging working out or that we value answers over effort. We expect pupils to work out answers fully using their book or separate paper. Your child should do their working out in a suitable space, and then write the answer from their working in the booklet. If your child then gets an answer wrong and is unclear as to why, they can bring their working into class to discuss with their teacher where they wrong and how to improve. We also encourage your child to make notes when their teacher goes through any homework questions to support future attempts on questions on the same topic.

## *The benefits of our homework approach*

As suggested, the primary benefit of this homework approach is that it means that your child will be constantly revisiting the maths that they study. This has proven benefits over the 'fire and forget' approach that was common in many schools where homework would be set on a topic whilst that topic was being taught, and then when the topic is over it is not looked at again until revision for end of year exams, if at all. Provided your child is disciplined and approaches the homework in the way we have outlined then they should find that this helps them understand more of the mathematics that they study, and that they retain this understanding for longer. The other benefits are

- Routine – because it is very clear precisely what is required for homework, and that this requirement is consistent each week (including when the homework is handed in) it much more straightforward for your child to settle into a good routine with their homework. You may find that they need help from you establishing this routine at the beginning, but provided you support them in developing good homework habits they should settle into a routine for maths homework quite quickly.
- Independence – because the expectations are clear, and the online support for maths homework quite substantial, your child should be able to manage most of their maths homework independently. Independent study skills are crucial for higher education and the ability to work independently is one that is sought after in the work place so developing these skills now in a controlled way is a big benefit of our homework approach.
- Revision and Exam preparation – typically revision and exam preparation are something that happens when the taught course is finished. Because of the exam questions embedded in the GCSE homework booklet this preparation is happening every week over the entire GCSE course. Combined with the need to constantly revisit topics within the 20 questions, and the fact that our GCSE scheme of work has been designed to overlap key ideas and allow them to be reviewed, this means that there are very few weeks where GCSE pupils are not revising most of the content in the GCSE course.
- Success – the fact there are a wide range of questions every week means that there should always be something your child can be successful with. Whether your child generally attains well in maths or finds it more difficult, provided your child understands that it is not the raw score that they get but rather how they improve. A good analogy to use is the idea of 'personal best' from athletics, some athletes know that they cannot win a medal, but still compete to try and improve, in order secure their 'personal best' score. If your child can see this as success, then this approach to homework will mean that they are more likely to gain success from their homework rather than typical tasks which they might struggle to access and 'fail' at.