MATHEMATICS GUIDANCE AND ANSWERS – MONDAY

TBAT add Two 4-digit Numbers

Question 1 - This question requires children to complete **formal written calculations** (also known as column method). The number to be added is written directly under the first number so that the digits line up in columns. To calculate the answer, you begin with adding the ones column (formerly known as units), then move through the columns from right to left until all have been added. If the answer in any column is more than 9, there needs to be an **exchange** (also be known as 'carrying'). This happens when a place value column has a value of 10 or more. For example, if there are 8 ones + 2 ones, the ones column will have a total of 10 ones. You cannot have 10 ones in that column, so 10 ones must be exchanged for 1 ten, leaving 0 ones. This is the case for any column: if there is a value of 10 or more in one column, the 10 is exchanged for one in the column to the left.

Completed calculations shown below. Choose the calculation which has the fewest exchanges: the correct answer is B.

A.

	4	8	6	1
+	3	1	3	9
	8	0	0	0
		1	1	1

B.

	7	5	8	2
+	1	6	2	7
	9	2	0	9
		1	1	

C.

	5	2	0	8
+	3	7	9	2
	9	0	0	0
		1	1	1

Question 2 – In this question, the addition calculations are shown in a different format. A is shown as a **formal written calculation** but uses **place value counters** to replace each digit. The **counters** can be used for support or can be replaced by the digits they represent. B shows a **part-whole model** which shows the two parts to be added together to find the whole, which can be written in the empty circle. C shows a **bar model** which also gives two parts to be added together to find the whole. They require children to write an answer in the space after completing the **formal written calculations**.

True or false? C totals the largest number: the correct answer is true. The completed calculations are: A. 5,100, B. 6,211, C. 7,217

Question 3 – This question asks children to decide whether the digits Arthur has added to the **formal written calculation** are correct or not. They must explain why they have made their choice using a sentence.

Is he correct? The correct answer is Arthur is incorrect because 3,754 + 3,778 = 7,432. The numbers should be: 3,654 + 2,768 = 6,422

TBAT Multiply 2 Digits by 1 Digit

A **place value chart** is used to identify the value of the digits that make up a number. The chart is broken up into columns which represent 'ones', 'tens', 'hundreds', 'thousands', 'ten thousands', and so on. It can also represent decimal numbers such as 'tenths', 'hundredths', 'thousandths', and so on.

The **formal written method** is also known as the column method. Starting with the ones column, each digit is multiplied by the number on the second row (the multiplier) in turn, and the answer is recorded directly beneath that digit. When the answer is greater than 9, and therefore has 2 digits, the tens in the answer will be transferred to the column to the left, and added after the next multiplication. This is known as an **exchange**.

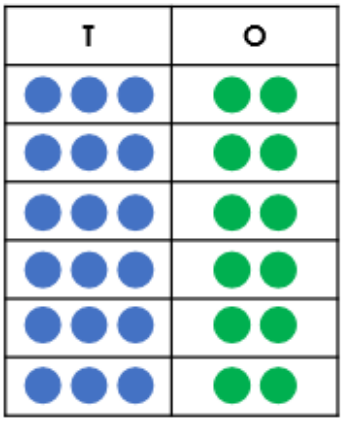
A **part-whole model** is a concept to show how numbers can be split into different parts. They can be used to represent numbers, as well as a wide variety of calculations. The concept follows the structure part + part = whole, but this may change depending on how many parts there are.

Exchanging can occur when completing calculations. It may also be known as 'carrying' or 'borrowing'. In division, an exchange happens when the number in a place value column cannot be divided exactly. For example, if dividing the hundreds gives a remainder of 1 or more hundreds, the remaining hundreds are exchanged for tens. If dividing the tens gives a remainder of 1 or more tens, the remaining tens are exchanged for ones.

Question 1 - This question uses 3 different methods: a **formal written calculation** (also known as column method), a **place value chart** and a **part-whole** model. In each calculation, the number 32 is being multiplied.

A uses a **place value chart**.

Six rows of three blue counters in the tens column (T) are used and two green counters in the ones column (O). This represents 32 x 6.
Counting up the blue counters (tens) and green counters (ones) separately gives a total of 18 tens (180) and 12 ones (12).
From this, 180 + 12 = 192.



> < = are comparison symbols used to represent more than (>), less than (<) and equal to (=).

Question 2 – This question is asking for the calculations to be compared using the comparison symbols. The same calculation has been represented in a **place value chart** and as a **formal written calculation**. For a reminder about how to complete a formal written calculation, please see page 3. These can be calculated to complete the statement which leads to 33 x 5 = 165 and 41 x 3 = 123.

165 is greater than 123, so we complete the box using the > (greater than) symbol.

Question 3 – This question asks children to decide if Cerys's statement is correct. Children can use the method they're most comfortable with to check the answers but they may need to some help devising a strategy. The calculations can be checked in either order. To check the smallest possible total, children will need to chose the digit cards that will have the lowest possible value: 1,3 and 5.

Digit cards: 3 5 1 6

To create a calculation with the lowest possible total, we multiply the smallest 1-digit number by the smallest 2-digit number. The smallest possible calculation would be 35 x 1 or 1 x 35 = 35

To check the largest possible total, we can select the digit cards with the highest possible value: 6, 5 and 3. To find the largest possible number, we multiply the largest 1-digit number by the largest possible 2-digit number left. 6 x 53 or 53 x 6 = 318.

Is Cerys correct? Cerys is incorrect because the smallest possible number is 35, not 75. The largest possible number is 318, not 315.

MATHEMATICS GUIDANCE AND ANSWERS – TUESDAY

TBAT subtract two 4-digit Numbers

Question 1 – This question requires children to look at two calculations and decide which is incorrect. A uses the **formal written subtraction** method (also known as column subtraction). The number to be subtracted is written directly under the first number so that the digits line up in columns. If a digit in the second number is larger than the digit above it, you can increase the value by taking from the next column. This is called an **exchange** (also known as 'borrowing'). An exchange happens when a place value column has a digit on the top row that is lower than the digit on the bottom. For example, we cannot subtract 7 ones from 5 ones. This means a tens counter from the column to the left needs to be exchanged for ten ones in order to complete the subtraction. This makes 15 ones – 7 ones which equals 8 ones. B shows the calculation using **place value counters** which replace each digit of the numbers in the calculation. Children will need to work out the calculations in order to identify the mistake.

Choose the incorrect calculation: the correct answer is B. The correct answer 819.

Question 2 – Children are required to complete the three subtraction calculations using **column subtraction** to match them to the correct answer.

Complete the calculations and match to the correct answer.

A.

	3	14	1	
	4	0	6	6
–		6	9	5
	3	3	7	1

B.

	6	14	1	
	7	5	0	4
–	2	6	8	1
	4	8	2	3

C.

		2	15	1
	5	3	6	1
–	2	0	7	9
	3	2	8	2

4,823 3,282 3,371

Question 3 – This question requires children to check Trovak's statement by using the information to complete a subtraction calculation. They must identify the whole (the number they are subtracting from) and the part (the number being subtracted) in order to check whether Trovak is correct. They will also need to write a sentence to explain this alongside their calculation.

Is he correct? Trovak is incorrect. The correct calculation is 8,405 – 3,686 = 4,719. Accept correctly formatted column subtraction.

	7	13	19	1
	8	4	0	5
–	3	6	8	6
	4	7	1	9

TBAT multiply 3 Digits by one Digit

Question 1 – This question requires children to complete three multiplication calculations and then order them from smallest to largest. Each calculation is represented by a **formal written calculation** with a **place value chart** for support. If you need further information on both of these terms, turn to page 2 for a reminder.

To solve 234 x 4, we first start by multiplying the ones column by 4 (4 x 4). This is 16, which is written as shown in the image below. The 10 in 16 much be **exchanged** or "carried".

	2	3	4
x			4
			6
		1	

Next, we move along to the tens column where we multiply the tens by 4 (3 tens x 4). This is 12 tens, but we have 1 ten from our **exchange** that we must add on (12 + 1 = 13).

	2	3	4
x			4
		3	6
	1	1	

Finally, we move onto the hundreds column where we multiply the 2 hundreds by 4. This is 8 hundreds, but we have 1 hundred from our exchange that needs to be included (8 +1 = 9).

	2	3	4
x			4
	9	3	6
	1	1	

506 x 3 and 140 x 6 can be solved in the same way.

Order these calculations from smallest to largest. A. 140 x 6 = 840. B. 506 x 3 = 1,518. C. 234 x 4 = 936. Order: A, C, B.

Question 2 – Children are asked to identify which calculation is the odd one out. Children may provide you with different reasons, such as the number of **exchanges** in the calculations.

The answer is; calculation C is the odd on out as this has been completed incorrectly. In the ones column, 0 x 3 = 0, not 3. This is also shown in the place value as there are no counters in the ones column.

Question 3 – This question requires children to check Adam's calculations using the formal written method and write a sentence to explain whether or not they agree.

The answer is; No, the second multiplication is incorrect because the 15 (5 x 3) has been recorded incorrectly in the answer. The 5 should be in the ones column in the answer and the 1 should be carried over to the tens column, to be added to the 24 (8 x 3). The answer should be 1,455.

Incorrect:

	4	8	5
x			3
1	4	9	1
	2	5	

Correct:

	4	8	5
x			3
1	4	5	5
	3	1	

MATHEMATICS GUIDANCE AND ANSWERS – WEDNESDAY

TBAT demonstrate sufficient subtraction

Question 1 – Children can choose to use a **formal written method** (see Tuesday's maths explanation), **counting on**, **partitioning** or another method they are already familiar with to complete the subtraction calculation. **Counting on** is a subtraction strategy using a number line to count from the smallest number to the largest number. A horizontal line is drawn with the smallest number written at the beginning and the largest number at the end of the line. Small jumps are then made towards the larger number to break up the subtraction into more manageable chunks. **Partitioning** is where a number is split into different parts, usually into hundreds, tens and ones. For example, the number 547 can be partitioned into 500, 40 and 7. Each part can then be subtracted separately before putting the number back together to find the answer.

Solve the calculation and explain the method chosen: the correct answer is 1,200. Children should identify the method they have chosen. Methods may include column method, partitioning or counting on (using a number line, if necessary).

Question 2 – As with question one, children can choose three different methods to complete the calculation to help them think about which is most efficient.

Show three different methods to solve the calculation: the correct answer is: 3,334. Methods may include column method, partitioning or counting on (using a number line, if necessary).

Question 3 – Children must think about the methods of subtracting that they know and decide which one will be most efficient to complete the word problem. They must read the problem and identify the whole (the number they are subtracting from) and the part (the number being subtracted) to complete the calculation using their chosen method.

Solve the word problem: the correct answer is 2,411; calculation method will vary according to preference.

Question 4 – Children must think about which method is going to work best with each calculation.

Match the calculation to the chosen method. Suggested answers, discuss reasons why:

Counting On	2,347 – 1,847
Column Method	8,394 – 3,023
Partitioning	7,835 – 6,804

Question 5 – Children must think about whether the **formal written method** is the most efficient method for the given calculation or whether another method would be more efficient. They must write a sentence to explain their choice and then create a calculation where the **column method** would be most efficient.

Is this method efficient? The correct answer is No, the method is not efficient. Counting on in hundreds would be more efficient as the numbers are close and the tens and ones have the same value. A calculation where numbers are not easily subtracted mentally is an appropriate answer.

Question 6 – Children must read Alan's statement and decide if they agree or disagree with him about the need to use the **column method** to check all subtractions. They must then write a sentence to explain their choice.

Do you agree with Alan? An example correct answer is the column method is for a specific type of subtraction, not just for checking. However, column method can be used for efficient subtraction.

Question 7 – Children must read both Ivy and Ted's statements and complete the given calculation using both methods. Then they must decide whose method was quickest and write a sentence to explain why. Ivy's method is to add one to each number in the calculation and **partition** into thousands, hundreds, tens and ones to subtract each separately. Ted's method is to **count on** using a number line.

Which was quickest? The correct answer is Ivy's method should be quicker as 7,284 – 5,180 requires no exchanges and can easily be done using partitioning. This can be done on a number line, but is less efficient.

TBAT divide 2 Digits by 1 Digit

A **remainder** is the number that is left over when dividing. For example 12 ÷ 5 = 2 r2. 12 cannot be shared out equally and there will be 2 left over.

Factors are numbers we can multiply together to get another number. For example, 2 and 3 are factors of 6 because 2 x 3 = 6.

Question 1 – This task is to help children to practise dividing 2-digit numbers by a 1-digit number where a **remainder** will be produced. As the question uses dice, only certain numbers will be available. This can be used to help children narrow down which numbers to test.

Guide children to divide a number that is not a **factor** of the divisor (the number you are dividing by) to ensure there is a remainder. The calculation can then be done by counting in multiples of the number you are dividing by and counting how many groups of this number can be made. For example, 54 ÷ 5 could be calculated by counting in 5s: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50. We do not carry on to 55 as this is past 54. This gives 10 'groups of' 5 with 4 left over. This means that 54 ÷ 5 = 10 r4.

There are five possible answers below, but there are other correct answers.

Nina							Leroy						
5	4	÷	5	=	10	r4	3	4	÷	4	=	8	r2
1	6	÷	6	=	2	r4	5	3	÷	3	=	17	r2
4	6	÷	6	=	7	r4	2	6	÷	6	=	4	r2
6	4	÷	5	=	12	r4	2	2	÷	4	=	5	r2
3	4	÷	6	=	5	r4	6	2	÷	5	=	12	r2

MATHEMATICS GUIDANCE AND ANSWERS – THURSDAY

TBAT check my strategies

Question 1 – Children are required to match the calculation in the first column to its **inverse** in the second column. The **inverse** operation to addition is subtraction and is used to check working out or to find a starting number. For example, the inverse of the addition 13 + 7 = 20 would be 20 – 7 = 13 or 20 – 13 = 7.

Match each calculation to its inverse: the correct answer is A and F, B and D, C and E

Question 2 – Children must identify which of the given **formal written calculations** (also known as the column method)can be used to check the answer to the addition calculation. In **formal written calculations** the numbers are written directly under each other so that the digits line up in columns. In addition, if the answer in any column is more than 9, there needs to be an **exchange**. For example, if there are 8 ones + 4 ones, the ones column will have a total of 12 ones. You cannot have 12 ones in that column, so 10 ones must be exchanged for 1 ten, leaving 2 ones in the ones column. This is the case for any column: if there is a value of 10 or more in one column, the 10 is exchanged for one hundred or thousand in the column to the left. In subtraction, if a digit in the second number is larger than the digit above it, you can increase the value by **exchanging** from the next column. For example in 447 - 225, 5 is smaller than 7 so you need to take 10 from the 40, to turn 5 into 15.

Circle the calculation(s) that can be used to check 3,765 + 5,906 = 9,671: the correct answer is B and C. A is incorrectly adding the whole to one of the parts.

Question 3 – Children must read the statements and decide whether they agree with George or Samira. They must then write a sentence to explain who they agree with and why.

Who do you agree with? Explain why. They are both correct. George will use an addition as the inverse of the subtraction whilst Samira will subtract the other part from the whole.

TBAT divide 3 Digits by 1 Digit

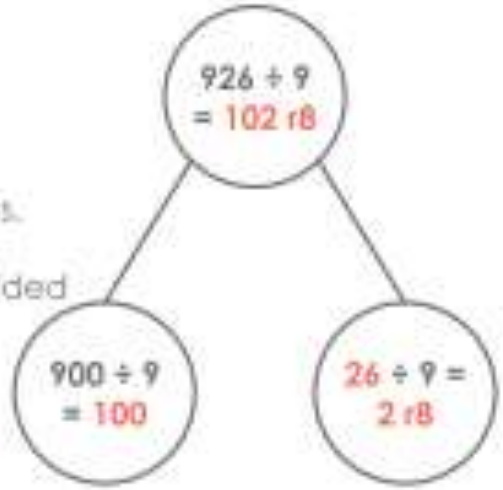
Question 1 – Children must find the mistake in a statement and correct it. The calculation has been set out using a **part-whole model**. If you need further information on part-whole models, turn to page 2 for a reminder.

926 has been partitioned into two parts.
One part is 900, so the remaining part must be 26 (926 – 900 = 26).

This is then completed as two separate division calculations.

900 ÷ 9 = 100 and 26 ÷ 9 = 2 r8. These two parts are then added together. Therefore, 926 ÷ 9 equals 102 r8 (100 + 2 r8).

The answer is. Suzy's says there would be no remainders, but there should be a remainder of 8.



Question 2 – This question requires children to compare the answers for two calculations.

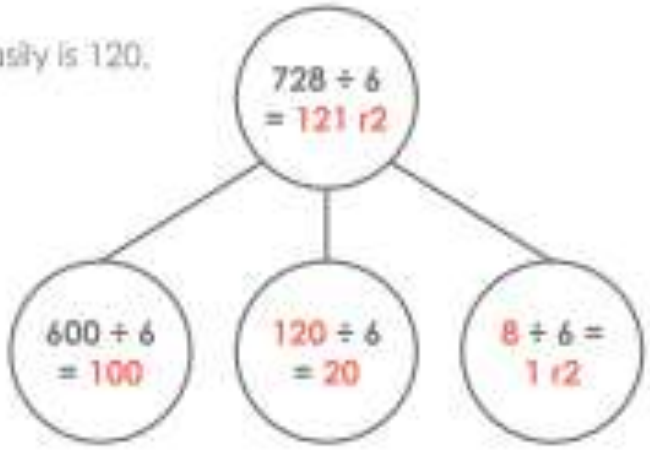
The first is a **part-whole model** split into three parts to make the calculation easier. As the calculation uses dividing by 6, encourage children to partition the 726 into smaller multiples of 6.

The first part has 600 in it, so that means we have two more parts to partition 128 into (728 – 600 = 128).

The largest multiple of 6 that can be divided easily is 120, so write this into the second part.

This leaves 8 (128 – 8 = 8) for the last part.

We then complete these calculations:
600 ÷ 6 = 100, 120 ÷ 6 = 20 and 8 ÷ 6 = 1 r2
Finally, add the answers together:
(100 + 20 + 1 r2 = 121 r2).



The second is given as a **place value chart** showing 736 ÷ 6 (the counters are evenly distributed across 6 rows because we are dividing by 6). There are 7 hundreds counters. As 1 hundreds counter cannot be split, it is **exchanged** for 10 tens counters, giving 13 tens counters. After sharing the tens, 1 tens counter is left. This counter is **exchanged** for 10 ones counters, leaving 16 ones. As 16 cannot be distributed evenly across the 6 rows, there is a remainder. 4 ones counters are left over.

Finally children complete the comparison statement using **<** (less than), **>** (greater than) or **=** (equal). The completed comparison statement is 121 r2 < 122 r4

Question 3 – This question requires children to explain whether they agree or disagree with a statement about a calculation being the odd one out. They must explain their answer in a sentence. Children can complete the calculations using a method of their choice. however using the part-whole model would be most efficient.

The correct answers are A. 219 ÷ 9 = 24 r3; B. 159 ÷ 6 = 26 r3; C. 170 ÷ 7 = 24 r2

Children may agree with Navdeep as he is correct that this is the only answer with a whole number of 26. Children may also say they disagree as C is the only calculation that has a remainder of 2, rather than 3.