Calculation Methods – Year 6

Compact Column Addition Methods

Column Addition of Whole Numbers

	8	4	1	6	7	+	2	7	4	9	2		
				8	4	1	6	7					
			+	2	7	4	9	2					
			1	1		1							
			1	1	1	6	5	9					

When adding whole numbers, it is important to ensure that the digits are lined up in the correct columns so that, for example, the digits in the tens column are lined up vertically. We 'carry' the smaller '1s' above the answer row. You start adding from the 'ones' end and work your way along, going left.

Column Addition of Decimal Numbers

	2	6	.	1	5	4	+	4	9	.	4	8	
				2	6	.	1	5	4				
			+	4	9	.	4	8	0				
				1			1						
				7	5	.	6	3	4				

When adding decimal numbers, it is important to line up the decimal points (shown in light yellow) above each other so that all of the other columns are then lined up correctly. If one number has fewer digits after the decimal point, it is useful to put a place holder zero in the 'empty' position (as with the red zero above). You start adding from the 'ones' end and work your way along, going left.

Compact Column Subtraction Methods

Compact Subtraction of Whole Numbers

	5	4	6	8	4	-	8	2	9	1			
				$^{4}\not{5}$	$^{1}4$	$^{5}\not{6}$	$^{1}8$	4					
			-		8	2	9	1					
				4	6	3	9	3					

When subtracting whole numbers, it is important to ensure that the digits are lined up in the correct columns so that, for example, the digits in the hundreds column are lined up vertically. The larger number goes on top. When one number has fewer digits, it is important that the ones are in the first column, lined up above each other – this will ensure that all other digits are lined up correctly.
When we subtract using this method, you are subtracting the lower number from the top number. In the example above, the first subtraction you do is 4-1 (which you can do without going into a negative number). The next calculation, 8-9, you cannot do without going into negatives. This is where you exchange from the column to the left so that the calculation becomes 18-9 (or in reality 180-90).
You start subtracting from the 'ones' end and work your way along, going left.

Compact Subtraction of Decimal Numbers

	1	5	2	.	0	8	-	4	5	.	1	2	
				1	$^{4}\not{5}$	$^{11}\not{2}$	.	$^{1}0$	8				
			-		4	5	.	1	2				
				1	0	6	.	9	6				

When subtracting decimal numbers, it is important to line up the decimal points (shown in light yellow) above each other so that all of the other columns are lined up correctly. The larger number goes on top.
Similar to subtracting whole numbers, you exchange from the column to the left if you 'cannot do' the subtraction without going into negative numbers.

Compact Multiplication Methods

Compact Long Multiplication of Whole Numbers

				5	7	6	9	x	8	7			
						5	7	6	9				
				x				8	7				
					4	5	4	6					
					4	0	3	8	3				
				4	6	5	7						
			+	4	6	1	5	2	0				
				1			1						
				5	0	1	9	0	3				

Long Multiplication is where you multiply a whole number by a number greater than 9 (in this case a two-digit number, 87).
Starting from the 9 (of 5769), you multiply each digit by the 7 (of 87). You always 'carry' the tens digit to the column to the left. For example, with the first calculation (9 x 7), you write the ones digit (3) in the first column, and 'carry' the 6 to the next column; this then gets added to the answer of the next multiplication you do.
When you start to multiply by the 8 (80) of 87, you first need to put a place holder zero as your first digit (seen in red in the example above). You then carry on multiplying like above. Finally, you add the two 'green' answers together to get your final answer, seen in blue above.

Compact Multiplication of Decimal Numbers

			8	.	5	7	x	9					
					8	.	5	7					
				x				9					
				7	5		6						
				7	7	.	1	3					

The method for multiplying decimal numbers by a whole number is exactly the same as the long multiplication method to the left. This method is particularly useful for multiplying money (e.g. £8.57 x 9). The main thing to remember for this method is to put the decimal point in your answer at the bottom, which is directly below the decimal point in the number you are multiplying (shown in light yellow).

Division Methods

Short Division

1 3 6 8 ÷ 3

0 4 5 6

3 | 1 ¹3 ¹6 ¹8

Short division is where you are dividing a single digit number, in this case 3.

1. How many 3s go into 1? None! Carry the 1 across.
2. How many 3s go into 13? Four! Carry the 1 left over.
3. How many 3s go into 16? Five! Carry the 1 left over.
4. How many 3s go into 18? Six!
5. The answer is 456.

Long Division

3 8 4 ÷ 1 6

2 4

1 6 | 3 8 4

\- 1 6 0 (**10** x 16)

2 2 4

\- 1 6 0 (**10** x 16)

0 6 4

\- 6 4 (**4** x 16)

0

Long division is where you are dividing by a two-digit number. We do this method by taking away 'chunks' of that two digit number, in this case 16.

1. You could take away 10 lots of 16, getting you to 224.
2. You could then take away another 10 lots of 16, getting you to 64.
3. You could then take away your final 4 lots of 16, getting you to 0.

However, if you wanted, rather than taking away two lots of 10 in the first two steps, you could've taken away 20 lots in one go.

Similarly, if the number is bigger, you might want to take away 100, 200 etc lots of the number you are dividing by to make it easier for you, rather than taking away smaller 'chunks' like 10. This works in the question 8,892 ÷ 38 shown on the next page.

Long Division with Larger Numbers

	8	8	9	2	÷	3	8						
						2	3	4					
			3	8	8	8	9	2					
				-	3	8	0	0	(**100** x 38)				
					5	0	9	2					
				-	3	8	0	0	(**100** x 38)				
					1	2	9	2					
				-	1	1	4	0	(**30** x 38)				
					0	1	5	2					
				-		1	5	2	(**4** x 38)				
								0					