Year 6 Formal Methods of Calculation

Addition

- Add several numbers of increasing complexity
- Add money, measures and numbers of different decimal points.

4214 + 3936 = 8150.

Step 1

Th	H	T	O
4,	2	1	4
+ 3,	9	3	6
			0
		1	

As always, start by adding the ones column. 4 + 6 = 10. Place a 0 in the ones column and re-group 10 to the tens column.

Step 2

Th	H	T	O
4,	2	1	4
+ 3,	9	3	6
		5	0
		1	

Add up all the digits in the tens column. Don't forget about the 10 that was re-grouped.

Step 3

Th	H	T	O
4,	2	1	4
+ 3,	9	3	6
	1	5	0
1		1	

Move on to the hundreds column. 200 + 900 = 1100. Put the 1 in the hundreds column and re-group the 1 in the thousands .

Step 4

Th	H	T	O
4,	2	1	4
+ 3,	9	3	6
8,	1	5	0
1		1	

Add up all the thousands to find the answer!

4000 + 3000 + 1000

= 8000.

Final

Th	H	T	O
4,	2	1	4
+ 3,	9	3	6
8,	1	5	0

Decimal Addition

```
 23·361
  9·080
 59·770
+ 1·300
 93·511
 21  2
```

Complex Numbers

```
 81,059
  3,668
 15,301
+20,551
120,579
 1 1 1 1
```

Subtraction

- Subtract with increasingly large and more complex numbers
- Subtract with decimal values

Step 1

Th	H	T	O
4,	3	2	8
- 1,	4	3	6
			2

Start with the ones column and subtract the two numbers.

Step 2

Th	H	T	O
	2	1	
4,	3	2	8
- 1,	4	3	6
		9	2

Moving on to the tens column, exchange from the hundreds column since you cannot subtract 3 tens from 2 tens. Once you have exchanged, you now have 12 tens minus 3 tens.

Step 3

Th	H	T	O
	3	12	1
4,	~~3~~	2	8
- 1,	4	3	6
		8	9 2

In the hundreds column, exchange again from the thousands column so the subtraction becomes 12 hundred minus 4 hundred.

Final

Th	H	T	O
	3	12	1
4,	~~3~~	2	8
- 1,	4	3	6
2,	8	9	2

Finally, subtract in the thousands column. 3 thousand take away 1 thousand. Then you have your final answer!

Decimal Subtraction

```
 ~~15~~·~~3~~11 kg
-  36·080 kg
   69·339 kg
```

Complex Numbers

```
 ~~8~~10,699
-  89,949
   60,750
```

Multiplication

- Long multiplication up to 4-digits by 2 digits
- Multiply decimal up to 2 decimal places by a single digit.

Step 1

	Th	H	T	O
	3,	8	6	2
x			3	4
				8

Start by multiplying the ones digits.

2 x 4 = 8

Step 2

	Th	H	T	O
		2		
	3,	8	6	2
x			3	4
			4	8

Now multiply the tens digit in the ten column by 4.

60 x 4 = 240

Multiply the rest of the digits by the 4.

Step 3

	Th	H	T	O
	3,	8	6	2
x			3	4
	1	5	4	8
				0

Now we are multiplying each digit by the 3 in the tens column, as this digit is in the tens column it has a value of 30, so we need to use a '0' as a place holder in the ones column.

Step 4

	Th	H	T	O
		2	1	
	3,	8	6	2
x			3	4
	1	5	4	8
1	1	5	8	6	0

Multiply the rest of the digits by the tens.

Decimal Multiplication

Final

	Th	H	T	O
		2	1	
		3,	8	6	2
x				3	4
		1	5,	4	8
	1	1	5,	8	6	0
	1	3	1,	3	0	8

Add both multiplications together to get your answers .

	0	th
	3 ·	1 9
x	8	
	2 5 ·	5 2
	1	7

Division

- Divide numbers up to 4 digits by a one digit number, using the formal method of short division.
- Formal written method of long division
- Interpret remainders as fractions and decimals.

Step 1

7580 ÷ 5 = ?

$$5\overline{)\,7^{2}580}\quad 15$$

5

5 divided into 7 (thousands) goes once.

Step 2

$$5\overline{)\,7^{2}5^{3}80}\quad 151$$

5 divided into 7 (thousands) goes once (one thousand) and 2 (thousands) left over.

Final

7580 ÷ 5 = 1516

$$5\overline{)\,7^{2}5^{3}80}\quad 1516$$

5 divided into 25 (hundreds) goes exactly 5 (hundreds) - no remainder.

Remainders as Fractions and Decimals

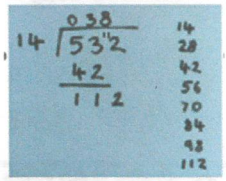
$$6\overline{)\,6\ 2\ 7^{3}\ 9}\quad 4\ 6\ \tfrac{1}{2}$$

$$15\overline{)\,4,3^{2}2\cdot0}\quad 2\ 8\cdot8$$

30 ↓ | 132 | 120 ↓ | 120 | 120 | 0

Answer: 28·8

Long division



Step 1- How many lots of 14 in 5? (no need for '500' as Year 6 children have a secure knowledge of place value).

Step 2- How many lots of 14 in 53? (= 3). This makes 42 - how much remains?, 11

Step 3- Don't forget the ones. How many lots of 14 in 112? There are 8, which makes the answer 38.