

# Maths Calculation Policy

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# Maths Calculation Policy

## Intent

Pupils having an appreciation of number and number operations, which enable mental calculations and written procedures to be performed efficiently, fluently and accurately is key to children being successful in mathematics.

We aim for all children to be:

- able to recall quickly and accurately basic number facts (e.g. number bonds, multiplication and division facts)
- fluent in applying quick, efficient mental and written methods of calculation.

## Implementation

- Before doing a calculation, all teachers and pupils look at a calculation and ask themselves *'What do I notice?'* and *'Can I do this in my head, with jottings or do I need to use a written method?'*
- All teachers use concrete and pictorial representations to teach conceptual understanding of mental and written calculation methods
- Drove's Mathematics Curriculum prioritises time for developing conceptual understanding of calculation methods and learning facts in daily Maths lessons and Maths on Track (MoT) sessions allow time for deliberate practice of calculation methods and recalling facts.

## Impact

- All teachers are confident and skilled to teach mental methods (in your head or with jottings) and written calculation methods
- All children have a secure understanding of mental and written methods of calculation suitable for their stage of learning.
- All children choose appropriate calculation methods depending on the numbers.
- All children can recall, understand and make connections by using facts suitable for their stage of learning.

## Appendix 1 - Age Related Expectations

### Mental and Written Methods (Addition and Subtraction)

Year					
1	2	3	4	5	6
<p>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \square - 9</math></p>	<p><i>Add and subtract two two-digit numbers using concrete objects, pictorial representations progressing to formal written methods</i></p> <p>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> <li>* a two-digit number and ones</li> <li>* a two-digit number and tens</li> <li>* two two-digit numbers</li> </ul> <p>adding three one-digit numbers</p>	<p>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> <p>Add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> <li>* a three-digit number and ones</li> <li>* a three-digit number and tens</li> </ul> <p>a three-digit number and hundreds</p>	<p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition where appropriate signs</p> <p>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</p>	<p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>Add and subtract numbers mentally with increasingly large numbers</p>	<p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p> <p>Perform mental calculations, including with mixed operations and large numbers</p>

### Mental and Written Methods (Multiplication and Division)

Year					
1	2	3	4	5	6
<p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (=) signs</p> <p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</p> <p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p>	<p>Write and calculate mathematical statements for <math>\div</math> using the <math>\times</math> tables they know progressing to formal written methods.</p> <p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods</p> <p>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers</p> <p>Recognise and use factor pairs and commutativity in mental calculations</p>	<p>Multiply two-digit and three-digit numbers by a one-digit number using formal written layout</p>	<p>Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers</p> <p>Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context</p> <p>Multiply and divide numbers mentally drawing upon known facts</p> <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p>	<p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</p> <p>Divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context</p> <p>Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context</p> <p>Perform mental calculations, including with mixed operations and large numbers</p>

### Mental and Written Methods (Number Facts)

Year					
1	2	3	4	5	6
<p>Represent &amp; use number bonds and related subtraction facts within 20</p> <p>Add and subtract one-digit and two-digit numbers to 20, including zero</p>	<p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>Recall and use <math>\times</math> and <math>\div</math> facts for the 2, 5 and 10 <math>\times</math> tables, including recognising odd and even numbers.</p>	<p>Recall and use <math>\times</math> and <math>\div</math> facts for the 3, 4 and 8 times tables.</p>	<p>Recall <math>\times</math> and <math>\div</math> facts for <math>\times</math> tables up to <math>12 \times 12</math>.</p>	<p>Recall prime numbers up to 19</p> <p>Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers</p> <p>Recognise and use square numbers and cube numbers, and the notation for squared (<math>^2</math>) and cubed (<math>^3</math>)</p>	<p>Recall <math>\times</math> and <math>\div</math> facts for <math>\times</math> tables up to <math>12 \times 12</math> and use to find other related facts</p>

### How shall I add?

**4 + 1, 6 + 3, 10 + 4**  
Number facts  
Single digit numbers  
Doubles  
Ten and single digits

**3 + 7**  
Use known addition facts

**7 + 8**  
Use near doubles

**7 = 3 + 4**  
Secure addition bonds of single digits and ten

**37 + 10**  
Add ten

**12 + 4**  
Counting on in 1s

**24 + 1**  
Find one more

**7 + 4**  
Count all

**Notice the relationships**  
24 + 1  
1 more than 4 is 5  
1 more than 14 is 15  
1 more than 24 is 25

**3 + 7**  
If I know  $3 + 7 = 10$  then I know  $3 + 8 = 11$  because it is 1 more

**7 + 8**  
If I know  $7 + 7 = 14$  then I know  $7 + 8 = 15$  because it is 1 more

**16 - 4**  
Counting back in 1s

**23 - 1**  
Find one less

**37 - 10**  
Take away ten

**37 + 10**  
Add ten

**7 + 4**  
Count all

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### How shall I subtract?

**5 - 1, 7 - 3, 10 - 6**  
Number facts  
Single digit numbers  
Teens subtract single digits

**3 + 7**  
Use known addition facts to derive subtraction facts

**9 - 7**  
Find the difference between two numbers

**7 - 3 = 4**  
Secure subtraction facts of single digits and ten

**16 - 4**  
Counting back in 1s

**23 - 1**  
Find one less

**37 - 10**  
Take away ten

**9 - 3**  
Take away

**Notice the relationships**  
23 - 1  
Find one less

**1 less than 4 is 3**  
**1 less than 14 is 13**  
**1 less than 24 is 23**

**9 - 7**  
9 is 2 more than 7  
7 is 2 less than 9 so the difference between 7 and 9 is 2

**37 - 10**  
Take away ten

**37 + 10**  
Add ten

**7 + 4**  
Count all

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### How shall I multiply?

**Equal groups**  
3 people each have 4 cats. How many cats are there in total?

**Count in ones**  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Repeated addition**  
 $4 + 4 + 4 = 12$

**Arrays**

**There are 3 groups with 4 cats in each group**

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### How shall I divide?

**Sharing**  
12 shared into 3 equal groups  
There are 12 cats. Three people each have the same number of cats. How many do they have each?

**Grouping**  
How many groups of 3 are there in 12?  
There are 12 cats. Each person owns 3 cats. How many people are there?

**12 ÷ 3 = 4**

**12 can be described as 3 columns of 4 or 4 rows of three**

**Bar model**

**12**

**Grab a group of 3, grab a group of 3.**

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### How shall I add?

**8 + 7, 9 + 9, 14 + 3**  
Number facts  
Single digit numbers  
Doubles  
Teens and single digits

*I just knew it!*

**13 + 17**  
Use known facts  
30 + 70

If I know 3 + 7 = 10 then I know 13 + 17 is 2 tens more

If I know 3 + 7 = 10 then I know 3 tens + 7 tens = 10 tens

**35 + 20**  
Add multiples of ten

If I know 3 + 2 = 5 then I know 3 tens + 2 tens = 5 tens so 30 + 20 = 50

**5 + 18**  
Greatest number first then bridge

**35 + 27**  
Count on in tens then ones

**37 + 19**  
Round then adjust

Add 20 then subtract 1

**25 + 43**  
Partition and recombine

20 + 5 + 40 + 3 = 60 + 8 = 68

**42 - 37**  
Find the difference between two numbers

42 is 5 more than 37, 37 is 5 less than 42 so the difference between 37 and 42 is 5

**47 - 19**  
Round then adjust

Take away 20 then add 1

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### How shall I subtract?

**9 - 4, 13 - 5, 18 - 9**  
Number facts  
Single digit numbers  
Halves  
Teens and single digits

*I just knew it!*

**30 - 7**  
Use known facts  
100 - 70

If I know 10 - 7 = 3 then I know 30 - 7 is 2 tens and 3

**46 - 20**  
Count back: multiples of ten

If I know 4 - 2 = 2 then I know 4 tens - 2 tens = 2 tens so 40 - 20 = 20

**23 - 5**  
Count back: bridge through a multiple of ten

**55 - 24**  
Count back in tens then ones

**42 - 37**  
Find the difference between two numbers

42 is 5 more than 37, 37 is 5 less than 42 so the difference between 37 and 42 is 5

**30 - 7**  
Use known facts  
100 - 70

If I know 10 - 7 = 3 then I know 30 - 7 is 2 tens and 3

**47 - 19**  
Round then adjust

Take away 20 then add 1

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### How shall I multiply?

**Equal groups**  
There are 3 groups with 4 cats in each group

Four cats, multiplied by 3

4 x 3 = 12

**One to many correspondence**  
If each person has 4 cats, there are 4 times as many cats as people

**Recall of 2x, 5x and 10x tables**

People	Cats
1	4
2	8
3	12

**Count in ones**  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Count in fours**  
4, 8, 12

**Use a known fact**  
If 2 x 3 is 6, then 4 x 3 is double 6.

**Repeated addition**

4 + 4 + 4 = 12

**Arrays**

4 x 3 = 12  
3 x 4 = 4 x 3

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### How shall I divide?

**Sharing**  
12 shared into 3 equal groups

There are 12 cats. Three people each have the same number of cats. How many do they have each?

1 for you, 1 for you, 1 for you...

**Grouping**  
How many groups of 3 are there in 12?

There are 12 cats. Each person owns 3 cats. How many people are there?

Grab a group of 3, grab a group of 3...

**Recall and use 2x, 5x and 10x tables**

12 can be described as 3 columns of 4 or 4 rows of three

**Bar model**

**Link to fractions.**  
One third of 12 is 4

**If I know 3 x 4 = 12 then I know 12 ÷ 3 = 4**

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**How shall I add?**

**8 + 7, 9 + 9, 14 + 3**  
Number facts  
Single digit numbers  
Doubles  
Tens to make 100  
*I just knew it!*

**243 + 7**  
Use known facts  
300 + 700  
*If I know 3 + 7 = 10 then I know 243 + 7 makes the next multiple of 10*  
*If I know 3 + 7 = 10 then I know 3 hundreds + 7 hundreds = 10 hundreds*

**325 + 200**  
Add multiples of ten and hundred  
*If I know 3 + 2 = 5 then I know 3 hundreds + 2 hundreds = 5 hundreds*

**150 + 80**  
Bridging boundaries  
*100 100 100 100 100*

**262 + 152**  
Formal written method  
6 tens add 5 tens = 11 tens or 110

**237 + 199**  
Round then adjust

**250 + 360**  
Partition and recombine

**235 + 250**  
Count on in hundreds then tens

**235 + 250**  
Add 200 then subtract 1

**200 + 50 + 300 + 60**  
**500 + 110 = 610**

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**How shall I subtract?**

**15 - 8, 18 - 5**  
Number facts  
Single digit numbers  
Teens and single digits  
*I just knew it!*

**240 - 7**  
Use known facts  
1000 - 700  
*If I know 10 - 7 = 3 then I know 10 hundreds - 7 hundreds = 3 hundreds*

**525 - 300**  
Take away multiples of ten and a hundred  
*If I know 5 - 3 = 2 then I know 5 hundreds - 3 hundreds = 2 hundreds*

**230 - 80**  
Bridging boundaries by counting back in efficient steps  
**230 - 30 - 50 = 150**  
**20 - 7 = 13**  
*If I know 10 - 7 = 3 then I know any multiple of 10, take away 7 leaves 3 in the ones*

**234 - 152**  
Formal written method  
**234 = 100 + 130 + 4**

**335 - 326**  
Find the difference between two numbers  
**335 is 9 more than 326**  
**326 is 9 less than 335**  
so the difference between them is 9

**435 - 199**  
Round then adjust  
**Take away 200 then add 1**

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**How shall I multiply?**

**Rapid recall of 2x, 5x, 10x (year 2) 3x, 4x, 8x (year 3) multiplication tables**

**6 x 4**  
Use known facts and place value  
**6 x 4 = 24**  
**60 x 4 = 240**  
**6 x 40 = 240**  
**6 x 10 x 4 = 24 x 10**

**8 x 3**  
Repeated addition  
**8 + 8 + 8 = 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3**

**40 is ten times greater than 4**

**Multiply by 10**

**15 x 16**  
Double and halve  
**15 x 16 = 15 x 2 x 16 ÷ 2 = 30 x 8 = 10 x 3 x 8 = 10 x 24 = 240**

**17 x 4**  
Partition and recombine  
**10 x 4 + 7 x 4 = 40 + 28 = 68**

**Arrays**  
*If I know 3 x 8 then I know 8 x 3*

**Scaling**  
The red tower is 3 times taller than the grey tower  
**24cm**  
**8cm**

**17 x 4**  
Formal written method

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**How shall I divide?**

**24 ÷ 4**  
Use known facts and place value  
**24 ÷ 4 = 6**  
**240 ÷ 40 = 6**  
**240 ÷ 4 = 60**  
24 biscuits shared between 4 people means they will get 6 biscuits each.  
If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

**240 ÷ 10**  
Divide by 10  
A tenth of 100 is 10  
A tenth of 1 is 1 tenth so  $1 \div 10 = \frac{1}{10}$

**200 ÷ 10**  
Divide by 10  
**200 ÷ 10 = 20** so 20 is ten times smaller than 200

**45 ÷ 3**  
Sharing equally  
**45 ÷ 3 = 15**  
Ten for you, ten for you, ten for you...

**52 ÷ 4**  
Partition and recombine  
**ten lots and the rest**  
**52 ÷ 4 = 10 + 3 = 13**

**42 ÷ 6**  
Double and halve  
**42 ÷ 6 = 21 ÷ 3 = 7**  
*If there are half as many biscuits and half as many people...*

**45**  
Link to fractions

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### How shall I add?

**0.8 + 0.7, 45 + 45**  
Number facts  
Single digit decimals  
Doubles  
Bonds of 1 and 100

*I just knew it!*  
*Rapid fluency of 2 digit add 2 digit numbers*

**7 + 8**  
Use known facts

*If I know 7 + 8 = 15 then I know 0.7 + 0.8 = 1.5*

$7,000 + 8,000 = 15,000$   
 $70,000 + 80,000 = 150,000$   
 $700,000 + 800,000 = 1,500,000$

**12,403 + 3,020**  
Use place value to add

*If I know 2 + 3 = 5 then I know 2000 + 3000 = 5000*  
*I have noticed, one number has no hundreds or ones, the other has no tens*

**0.016 + 0.007**  
Bridge through boundaries by counting in efficient steps

**25,748 + 46,374**  
Formal written method

*Exchange ten of these for one of those!*  
*Regroup and rename*

$$\begin{array}{r} 25,748 \\ + 46,374 \\ \hline 72,122 \\ 1\ 1\ 1\ 1 \end{array}$$

**35,040 + 22,070**  
Partition and recombine

$30,000 + 5,000 + 40 + 20,000 + 2,000 + 70$   
 $50,000 + 7,000 + 110 = 57,110$

**32,356 + 19,998**  
Round then adjust

*Add 20,000 then subtract 2*

### How shall I subtract?

**9 - 4, 13 - 5, 18 - 9**  
Number facts  
Single digit decimals  
Halves  
Subtract from 1 and 100

*I just knew it!*  
*Rapid fluency of 2 digit subtract 2 digit numbers*

**15 - 8 = 7**  
Use known facts

*If I know 15 - 8 = 7 then I know 1.5 - 0.8 = 0.7*

$15,000 - 8,000 = 7,000$   
 $150,000 - 80,000 = 70,000$   
 $1,500,000 - 800,000 = 700,000$

**40,012 - 3,005**  
Use place value to subtract

*5 less than 12 is 7 Now it is easy to take away 3000*  
*If I know 40 - 3 = 37 then I know that 40 thousand take away 3 thousand is 37 thousand*

$40,000 = 4 \text{ tens of thousands or } 40 \text{ thousands}$   
 $12 = 1 \text{ ten and } 2 \text{ ones or } 12 \text{ ones}$

$40,012 = 40 \text{ thousands and } 12 \text{ ones}$   
take away 3 thousands and 5 ones equals 37 thousands and 7 ones.

**0.54 - 0.17**  
Bridge through boundaries by counting in efficient steps

**45,748 - 26,374**  
Formal written method

*Exchange ten of these for one of those!*  
*Regroup and rename*

$$\begin{array}{r} 45,748 \\ - 26,374 \\ \hline 19,374 \end{array}$$

**20,045 - 19,989**  
Find the difference between two numbers

*Take away 20,000 then add 2*

**43,453 - 19,998**  
Round then adjust

*Take away 20,000 then add 2*

### How shall I multiply?

**Known facts:**  
Rapid recall of all multiplication tables up to 12 x 12

**6 x 4**  
Use known facts and place value

$6 \times 4 = 24$   
 $60 \times 4 = 240$   
 $60 \times 40 = 2400$

*40 is ten times greater than 4*  
*0.6 is ten times smaller than 6*

**6 x 4**  
Use known facts and place value

$0.6 \times 4 = 2.4$   
4 jumps of 0.6

$0.6 \times 0.4 = 24 \text{ hundredths}$   
 $0.6 \times 0.4 = 0.24$

**2.34 x 1000**  
Multiply by 10, 100, 1000

**15 x 42**  
Using factors and distributive law

$15 \times 42 = 15 \times (6 \times 7) = 90 \times 7 = 630$

$15 \times 14 = 15 \times (10 + 4) = 150 + 60 = 210$

**427 x 38**  
Formal written method

400	20	7
30	12,000	600
8	3,200	160
		56

### How shall I divide?

**Known facts:**  
Use recall of all multiplication tables up to 12 x 12 to derive division facts

*Include calculations where remainders occur*

**24 ÷ 4**  
Use known facts and place value

$24 \div 4 = 6$   
 $240 \div 40 = 6$   
 $2400 \div 400 = 6$   
 $24,000 \div 4000 = 6$

$24,000 \div 400 = \frac{24 \times 1000}{4 \times 100} = 60$

**24 ÷ 0.6**  
Use known facts and place value

$24 \div 0.6 = 40$   
How many steps of 0.6 make 24?

*0.6 is ten times smaller than 6*  
*24,000 is a thousand times greater than 24*

**5724 ÷ 4**  
Formal written method

$$\begin{array}{r} 1431 \\ 4 \overline{) 5724} \end{array}$$

**496 ÷ 8**  
Partition and recombine

$480 \div 8 = 60$   
 $16 \div 8 = 2$   
 $60 + 2 = 62$

**1512 ÷ 24**  
Using factors

$1512 \div 6 \div 4 = 62$



### How shall I add?

**44 + 56, 27 + 27**  
Number facts  
Single digit decimals  
Doubles  
Bonds of 1 and 100  
I just knew it!  
Rapid fluency of 2 digit add 2 digit numbers

**17 + 17**  
Use known facts  
If I know  $17 + 17 = 34$  then I know  $17 + 17 = 34$

**1,102,403 + 50,020**  
Use place value to add  
I have noticed, one number has no hundreds or ones, the other has no tens

**17,000 + 17,000 = 34,000**  
**170,000 + 170,000 = 340,000**  
**1,700,000 + 1,700,000 = 3,400,000**

**0.028 + 0.015**  
Bridge through boundaries by counting in efficient steps

**307,040 + 206,070**  
Partition and recombine

**432,356 + 99,000**  
Round then adjust

**325,748 + 246,374**  
Formal written method  
Exchange ten of these for one of those!  
Regroup and rename

**307,040 + 206,070**  
Partition and recombine  
 $300,000 + 7,000 + 40 + 200,000 + 6,000 + 70$   
 $500,000 + 13,000 + 110 = 513,110$

**445,748 - 126,374**  
Formal written method  
Exchange ten of these for one of those!  
Regroup and rename

**200,450 - 199,989**  
Find the difference between two numbers

**243,453 - 99,900**  
Round then adjust

**243,453 - 99,900**  
Take away 100,000 then add 100

**0.054 - 0.017**  
Bridge through boundaries by counting in efficient steps

**0.028 + 0.015**  
0.028 0.038 0.040 0.043

**325,748 + 246,374**  
572,122

**432,356 + 99,000**  
531,356

**445,748 - 126,374**  
319,374

**200,450 - 199,989**  
461

**243,453 - 99,900**  
143,553

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### How shall I subtract?

**0.9 - 0.4, 100 - 65**  
Number facts  
Single digit decimals  
Halves  
Bonds of 1 and 100  
I just knew it!  
Rapid fluency of 2 digit subtract 2 digit numbers

**36 - 18 = 18**  
Use known facts  
If I know  $36 - 18 = 18$  then I know  $36 - 18 = 18$

**400,032 - 30,005**  
Use place value to subtract  
5 less than 32 is 27

**36,000 - 18,000 = 18,000**  
**360,000 - 180,000 = 180,000**  
**3,600,000 - 1,800,000 = 1,800,000**

**400,000 = 4 hundreds of thousands or 400 thousands**  
**400 - 30 = 370 so 400,000 - 3,000 = 370,000**

**400,032 = 400 thousands and 32 ones**  
take away 30 thousands and 5 ones = 370,027

**0.054 - 0.017**  
Bridge through boundaries by counting in efficient steps

**243,453 - 99,900**  
Round then adjust

**445,748 - 126,374**  
Formal written method  
Exchange ten of these for one of those!  
Regroup and rename

**200,450 - 199,989**  
Find the difference between two numbers

**243,453 - 99,900**  
Take away 100,000 then add 100

**0.054 - 0.017**  
0.037 0.040 0.044 0.054

**445,748 - 126,374**  
319,374

**200,450 - 199,989**  
461

**243,453 - 99,900**  
143,553

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### How shall I multiply?

**Known facts:**  
Rapid recall of all multiplication tables up to 12 x 12

**6 x 4**  
Use known facts and place value  
40 is ten times greater than 4  
 $60 \times 40 = 2400$   
 $600 \times 400 = 240,000$   
 $6000 \times 4000 = 24,000,000$

**0.6 is ten times smaller than 6**  
**6 x 4**  
Use known facts and place value  
 $0.06 \times 4 = 2.4$   
4 jumps of 0.06

**234 x 1000**  
Multiply by 10, 100, 1000

**15 x 42**  
Using factors and distributive law  
 $15 \times 48 = 15 \times 6 \times 8 = 90 \times 8 = 720$

**4203 x 4**  
Partition and recombine  
 $4000 \times 4 = 16,000$   
 $200 \times 4 = 800$   
 $3 \times 4 = 12$   
 $16,000 + 800 + 12 = 16,812$

**15 x 14**  
 $15 \times 14 = 15 \times 6 + 15 \times 8 = 90 + 120 = 210$

**2427 x 38**  
Formal written method

**0.6 x 0.4 = 24 hundredths**  
 $0.6 \times 0.4 = 0.24$

**2427 x 38**  
Formal written method

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### How shall I divide?

**Known facts:**  
Use recall of all multiplication tables up to 12 x 12 to derive division facts

**24 ÷ 4**  
Use known facts and place value  
240 is ten times greater than 24  
 $240 \div 40 = 6$   
 $2400 \div 400 = 6$   
 $24,000 \div 4000 = 6$   
 $240,000 \div 40,000 = 6$   
 $2,400,000 \div 400,000 = 6$   
 $240,000 \div 400 = 24 \times 10,000$   
 $2400 = 600$

**0.6 is ten times smaller than 6**  
**24 ÷ 0.6**  
Use known facts and place value  
 $24 \div 0.6 = 4$   
How many steps of 0.6 make 24?

**24 ÷ 1000**  
Divide by 10, 100, 1000

**7182 ÷ 21**  
Formal written method

**1512 ÷ 24**  
Using factors

**496 ÷ 8**  
Partition and recombine  
 $4800 \div 8 = 600$   
 $160 \div 8 = 20$   
 $600 + 20 = 620$

**1512 ÷ 6 ÷ 4**

**24 ÷ 4**  
24 biscuits shared between 4 people means they will get 6 biscuits each. If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

**7182 ÷ 21**  
1431

**1512 ÷ 24**  
63

**496 ÷ 8**  
620

**1512 ÷ 6 ÷ 4**  
63

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## Compact vertical

$$23454 + 596$$

$$\begin{array}{r} 23454 \\ + \quad 596 \\ \hline 24050 \\ \hline \end{array}$$

$$23.7 + 48.56$$

$$\begin{array}{r} 23.70 \\ + 48.56 \\ \hline 72.26 \\ \hline \end{array}$$



## Decomposition

$$2748 - 364$$

$$\begin{array}{r} \overset{6}{2}\overset{1}{7}48 \\ - \quad 364 \\ \hline 2384 \\ \hline \end{array}$$

$$72.5 - 45.73$$

$$\begin{array}{r} \overset{6}{7}\overset{1}{2}\overset{1}{.}\overset{4}{5}\overset{1}{0} \\ - \quad 45.73 \\ \hline 26.77 \\ \hline \end{array}$$

## Written Methods



## Long multiplication

$$5172 \times 38$$

$$\begin{array}{r} 5172 \\ \times 38 \\ \hline 41376 \\ + 155160 \\ \hline 196536 \\ \hline \end{array}$$



## Short Division

$$559 \div 13$$

$$\begin{array}{r} \overset{0}{0}\overset{4}{4}\overset{3}{3} \\ 13 \overline{) 559} \\ \underline{55} \phantom{9} \\ 9 \phantom{9} \\ \underline{9} \\ 0 \phantom{9} \end{array}$$

$$\begin{aligned} 562 \div 13 \\ = 43 \text{ r } 2 &= 43 \frac{2}{13} \\ = 43.2 \text{ (to 1 dp)} \end{aligned}$$

$$562 \div 13$$

$$\begin{array}{r} \overset{0}{0}\overset{4}{4}\overset{3}{3}\overset{2}{.}\overset{3}{3} \\ 13 \overline{) 562.30} \\ \underline{55} \phantom{30} \\ 12 \phantom{30} \\ \underline{11} \phantom{30} \\ 20 \phantom{30} \\ \underline{26} \phantom{30} \\ 40 \phantom{30} \\ \underline{39} \\ 10 \phantom{30} \\ \underline{13} \\ 0 \phantom{30} \end{array}$$

1	13
2	26
4	52
5	65
8	104
10	130

Using known multiplication facts