# Year 5

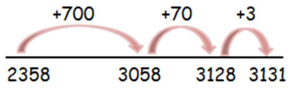
## Number – addition and subtraction

add numbers mentally with increasingly large numbers ( *e.g. 12 462 – 2300 = 10 162*)

Partition both numbers and recombine

2358 + 773
= 2000 + 300 + 50 + 8 + 700 +70 + 3
= 2000 + 1000 + 120 + 11
= 3000 + 100 + 30 + 1
=3131

Partitioning with number lines




Partition second number only into hundreds, tens and ones and recombine

2358 + 773 = 2358 + 700 + 70 + 3
= 3058 + 70 + 3
= 3128 + 3
= 3131

Add the nearest multiple of 10 or 100, then adjust

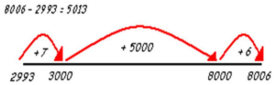
458 + 79 = 458 + 80 - 1

subtract numbers mentally with increasingly large numbers ( *e.g. 12 462 – 2300 = 10 162*)

Subtract the nearest multiple of 10 or 100, then adjust

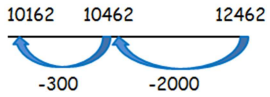
458 – 79 = 458 - 80 + 1
= 378 + 1
= 379

Find a difference by counting up




Use known number facts and place value to subtract (partition second number only)

12 462 – 2300
= 12 462 – 2000 – 300
= 10 462 – 300
= 10 162




add numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction – *see Appendix 1*)

Column addition

124.90
+ 117.25
242.15
11

(add in a zero to keep the place value)

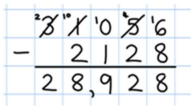
To ensure conceptual understanding, it is essential that place value is reinforced by frequently.
Discuss the value of each digit.
Use base 10 (Diennes) to support understanding of exchanging and to ensure conceptual understanding of place value.
Where there is an 'empty' space in a decimal column, pupils should insert a zero to show the value.
Children should be made aware that it is essential to align the columns carefully.

Pupils should be able to add more than 2 numbers using the compact column method.

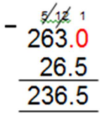
3.25
+ 4.13
0.76
8.14
1 1

subtract numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction – *see Appendix 1*)

Revision of **formal compact column method** extending to calculations involving numbers with more than 4 digits (use Diennes to support understanding of decomposition and place value).




When confident in using **formal compact column method** with integers and decimals involving money (always 2 decimal places), extend to subtraction with mixtures of integers and decimals. A clear understanding of place value is essential. Align the decimal point and use '***place holders***', if needed.




Use Diennes or place value counters (add counters with 0.1) to support understanding of decomposition and place value.

## Number – multiplication and division

multiply numbers mentally drawing upon known facts

*Partition*

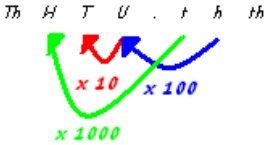
*47 x 6 = (40 x 6) + (7 x 6)*
*= ( 240 ) + ( 42 )*
*= 282*

*Double and halve*

*25 x 16 = 50 x 8 = 100 x 4 = 200 x 2 = 400*

multiply whole numbers and those involving decimals by 10, 100 and 1000

Place Value




identify multiples, (*and use them to construct equivalence statements, e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9² x 10)*

Use a variety of resources (including a calculator) to investigate multiples. Make models and images to display facts.

recall prime numbers up to 19
establish whether a number up to 100 is prime

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within primes.

*recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)*

Use a variety of resources (including a calculator) to investigate square and cubed numbers. Make models and images to display facts.
Investigate the patterns within squared and cubed numbers.

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

Review formal method of short multiplication (for multiplying by one digit numbers) when proficient

452
X 3
1356
1

1243
X 8
9624
1 3 2

Start with grid method when multiplying by 2 digit numbers
72 x 38 is approximately 70 x 40 = 2800

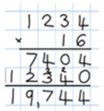
| x | 70 | 2 |
|---|---|---|
| 30 | 2100 | 60 |
| 8 | 560 | 16 |

2160 +
576
2736
1

Move onto formal long multiplication

34
X 13
102
1
340
442

Then formal multiplication with more complex numbers:



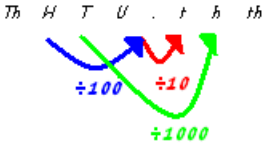

divide numbers mentally drawing upon known facts

Partitioning

72 ÷ 3 = (60 ÷ 3 ) = (12 ÷ 3)
= 20 + 4
= 24

divide whole numbers and those involving decimals by 10, 100 and 1000

Place Value




identify factors, including finding all factor pairs of a number, and common factors of two numbers (*and use them to construct equivalence statements, e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9² x 10*)

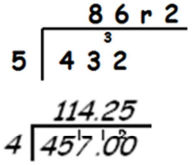
Use a variety of resources (including a calculator) to investigate factors. Make models and images to display facts.

recall prime numbers up to 19
establish whether a number up to 100 is prime

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within primes.

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 (*as fractions, as decimals or by rounding (for example, 98 ÷ 4 = 98/4 = 24 r 2 = 24 ½ = 24.5 ≈ 25)*)

Bus shelter method (short division)




Pupils should consider whether remainders should be left as a reminder, rounded to the nearest whole or converted into a decimal or fraction.

Introduce long division (dividing by single digits)

256 ÷ 7 lies between 210 ÷ 7 = 30 and 280 ÷ 7 = 40

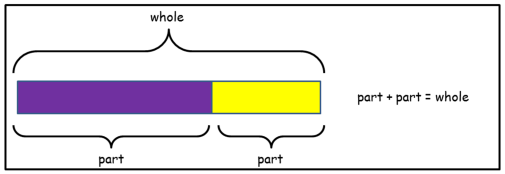
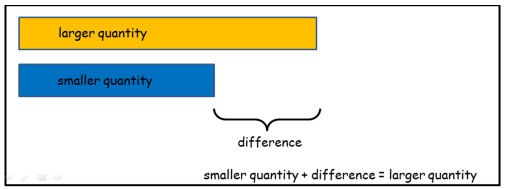
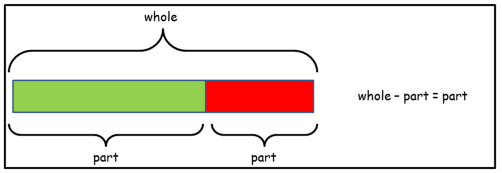
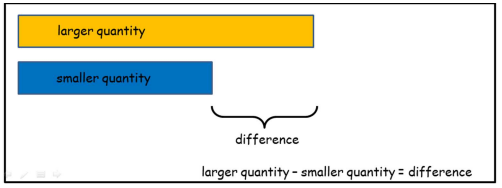
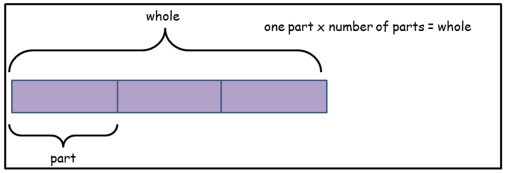
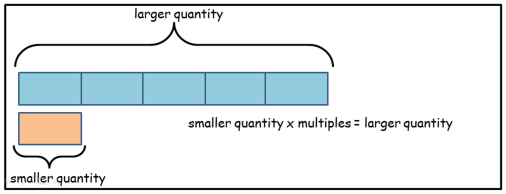
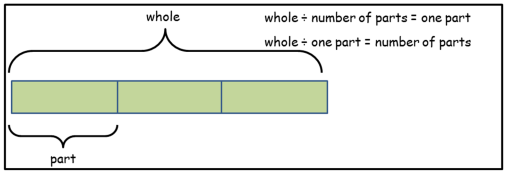
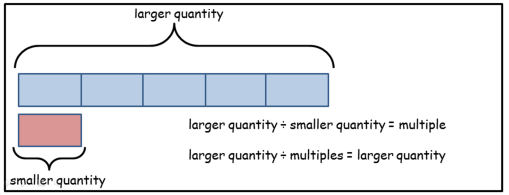
256
- 70 (10 groups) or (10 x 7)
186
140 (20 groups) or (20 x 7)
46
- 42 (6 groups) or (6 x 7)
4 (36 groups) or (36)

Answer: 36 remainder 4

# Year 5

## Number – addition and subtraction

## Number – multiplication and division

| | | | |
|---|---|---|---|
| solve addition multi-step problems in contexts, deciding which operations and methods to use and why<br><br>Use all the models and images mentioned above. Discuss which is most effective and why.<br><br>Singapore Bar Method<br><br>  <br>  | solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why<br><br>Use all the models and images mentioned above. Discuss which is most effective and why.<br><br>Singapore Bar Method<br><br>  <br>  | *Solve problems that use multiplication and division as inverses, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres*<br><br>Use all the models and images mentioned above. Discuss which is most effective and why.<br><br>Singapore Bar Method<br><br>  <br>  <br><br>*use and explain the equals sign to indicate equivalence, including missing number problems (e.g, 13+24 = 12+25; 33 = 5 x [ ] )*<br>*express distributivity, for example as a(b + c) = ab + ac*<br><br>Use all of the models and images above to investigate a range of statements, ensuring the equals sign is in different positions. Allow time for discussion and reasoning. Display solutions and reasoning. Also use errors or misconceptions as a starting point. | *Solve problems that use multiplication and division as inverses, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres*<br><br>Use all the models and images mentioned above. Discuss which is most effective and why.<br><br>Singapore Bar Method<br><br>  <br>  <br><br>*use and explain the equals sign to indicate equivalence, including missing number problems (e.g, 13+24 = 12+25; 33 = 5 x [ ] )*<br><br>Use all of the models and images above to investigate a range of statements, ensuring the equals sign is in different positions. Allow time for discussion and reasoning. Display solutions and reasoning. Also use errors or misconceptions as a starting point. |
| use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br><br>Estimate answers before solving any calculation.<br>Check against estimate after calculating (and use inverse check). | use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br><br>Estimate answers before solving any calculation.<br>Check against estimate after calculating (and use inverse check). | use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br><br>Estimate answers before solving any calculation.<br>Check against estimate after calculating (and use inverse check). | use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br><br>Estimate answers before solving any calculation.<br>Check against estimate after calculating (and use inverse check). |
| *use a variety of language to describe addition*<br><br>+ add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse<br><br>= equals, sign, is the same as | *use a variety of language to describe subtraction*<br><br>- subtract, subtraction, take (away), minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/fewer is… than…? how much more/less is…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse<br><br>= equals, sign, is the same as | *use a variety of language to describe multiplication*<br>know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers<br><br>lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double,, inverse, prime,<br><br>equals, sign, is the same as | *use a variety of language to describe division*<br><br>Array, row, column, halve, share, share equally one each, two each, three each… group in pairs, threes… tens, equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse. Prime, factors<br><br>equals, sign, is the same as |