Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Understand the operation of addition and the associated vocabulary, and its relationship to subtraction	Use, read and write: *more, add, sum, total, altogether, increase, equals, sign, inverse...* and the plus (+) and equals (=) signs. Understand and use when appropriate the principles (but not the names) of the commutative and associative laws as they apply to addition. *Example of commutative law* 95 + 86 = 86 + 95 *Example of associative law* 25 + 17 + 18 = (25 + 17) + 18 or 25 + (17 + 18) = 42 + 18 = 60 or 25 + 35 = 60 Understand that: • the sum of two positive numbers is greater than either number. Understand that addition is the inverse of subtraction (addition reverses subtraction and vice versa) and use this to check results. Respond rapidly to oral or written questions, explaining the strategy used. For example: • 654 add 50... Add 68 to 74... • 7 add 12 add 9... Add 15, 6, 4, 15 and 1... • What is the sum/total of 26 and 39? And of 13, 62 and 3? • How many altogether are 121 and 35? And 61, 37 and 6? • Increase 48 by 22. • Which three numbers could have a total of 103? Are there any others? Complete written questions, for example: • working rapidly, using known facts: 27 + 8 = □ □ + 12 = 19 • using 10p and 1p coins, or a number line or square, progressing to mental strategies: 76 + 58 = □ □ + △ + ○ = 100 • using jottings or a pencil and paper method: 4136 + 3258 = □ △ + □ = 1000 Use mental or written methods to: • find the missing number in: 91 + □ + 48 = 250 • find all the different totals you can make by using three of these five numbers: 219, 193, 74, 156, 97 • total a shopping bill such as: 45p + 55p + 32p + 12p **See also mental calculation strategies (pages 40–47) and checking results of calculations (page 72).**

As outcomes, Year 5 pupils should, for example:

Respond rapidly to oral or written questions, explaining the strategy used. For example:

- 3754 add 30... Add 700 to 9764...
- 18 add 30 add 29... Add 250, 60, 40, 150 and 3...
- What is the sum/total of 226 and 39?
  And of 13, 64 and 153?
- How many altogether are 121 and 345?
  And 61, 237 and 6?
- Increase 190 by 37.
- Which three numbers could have a total of 450?
  Are there any others?

Complete written questions, for example:

- working rapidly, using known facts:
  □ + 62 = 189 7.6 + 5.8 = □
- using informal pencil and paper jottings:
  □ + 756 = 924 □ + △ = 1
- using a standard written method:
  14 136 + 3258 + 487 = □

Use mental or written methods or a calculator to:

- find the missing number in:
  531 + □ + 160 = 746
- total a shopping bill or set of measurements such as:
  £12.45, £7.36, £24.50
  17.5 km, 55 km, 4.5 km, 28 km
- find all the different totals you can make by using three of these five numbers:
  8, 4008, 562, 3103, 95

See also mental calculation strategies (pages 40–47) and checking results of calculations (page 73).

As outcomes, Year 6 pupils should, for example:

Respond rapidly to oral or written questions, explaining the strategy used. For example:

- Add 4250 to 3536... 66 add 314 add 750...
- Add 1200, 400, 600, 1200 and 15.
- What is the sum/total of 753 and 227?
  And of 93, 62 and 25?
- How many altogether are 854 and 622?
  And 91, 88 and 6?
- Increase 250 by 420.
- Which three numbers could have a total of 1?
  Are there any others?

Complete written questions, for example:

- working rapidly, using known facts:
  □ + 2.56 = 5.38 91 + □ + 48 = 250
- using informal pencil and paper jottings:
  □ + 1475 = 6924 □ + △ = 0.1
- using a standard written method:
  421.36 + 25.7 + 53.25 = □

Use mental or written methods or a calculator to:

- find the missing number in:
  287 + □ + 2485 = 6128
- find all the different totals you can make by using three of these five numbers:
  14 721, 76, 9534, 788, 6
  1.07, 0.3, 37.03, 17.73, 31.7
- find the average (mean): for example, the average price of some goods, the average of a set of measurements or a set of numbers...

See also mental calculation strategies (pages 40–47) and checking results of calculations (page 73).

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Understand the operation of subtraction and the associated vocabulary, and its relationship to addition	Use, read and write: *take away, subtract, how many are left, how much less, difference between, how much more, how many more to make, decrease, inverse…* and the minus (–) sign. Consolidate understanding of subtraction as: • taking away; • finding the difference between; • complementary addition. Understand that: • subtraction is non-commutative: that is, 5 – 7 is not the same as 7 – 5; • when a larger number is subtracted from a smaller number, the answer is negative: for example, 3 – 8 = –5. Understand that: • subtracting a (positive) number makes a number less: for example, 260 – 129 is less than 260; • subtracting zero leaves a number unchanged. Understand that subtraction is the inverse of addition and use this to check results. Respond rapidly to oral or written questions, explaining the strategy used. For example: • 93 take away 8… Take 7 from 62… • 63 subtract 46… Subtract 120 from 215… • 170 less than 250… 1000 less than 5437… • What must I take from 84 to leave 26? • What is the difference between 28 and 65? • How many more than 234 is 249? • How many less than 68 is 42? • What must I add to 54 to make 93? • Decrease 72 by 34. • 28 add a number is 43. What is the number? • Find pairs of numbers with a difference of 79… Complete written questions, for example: • with rapid mental recall: 27 – 19 = □ 43 – □ = 4 □ – △ = 11 • using a number line or square, then mental strategies: 136 – 78 = □ □ – 65 = 87 △ – □ = 54 • using jottings or a pencil and paper method: 1258 – 576 = □ 1258 – □ = 682 □ – △ = 682 Use mental or written methods to: • find the missing number in: 91 – □ = 48 • find all the different differences you can make by using two of these five numbers: 219, 193, 74, 156, 97 **See also mental calculation strategies (pages 40–47) and checking results of calculations (page 72).**

As outcomes, Year 5 pupils should, for example:

Respond rapidly to oral or written questions, explaining the strategy used. For example:

- 127 take away 35… Take 80 from 373…
- 678 subtract 105… Subtract 50 from 225…
- 500 less than 720.
- What must I take from 220 to leave 55?
- What is the difference between 155 and 390?
- How many more than 952 is 1050?
- How many less than 305 is 94?
- What must I add to 720 to make 908?
- Decrease 92 by 78.
- 570 add a number is 620. What is the number?
- Find pairs of numbers with a difference of 599…

Complete written questions, for example:

- working rapidly, using known facts:
  □ – 62 = 189 7.6 – 5.8 = □
- using informal pencil and paper jottings:
  □ – 256 = 424 □ – △ = 1.2
- using a standard written method:
  141.36 – 32.58 = □

Use mental or written methods or a calculator to:

- find the missing number in:
  931 – □ = 746
- find all the different differences you can make by using two of these five numbers:
  8, 4008, 562, 3103, 95

See also mental calculation strategies (pages 40–47) and checking results of calculations (page 73).

As outcomes, Year 6 pupils should, for example:

Respond rapidly to oral or written questions, explaining the strategy used. For example:

- 750 take away 255… Take 300 from 1240…
- 3500 subtract 2050… Subtract 2250 from 8500…
- 1700 less than 2500… 3000 less than 10 220…
- What must I take from 8.4 to leave 2.6?
- What is the difference between 2.2 and 6.5?
- How much more than 23.4 is 24.9?
- How much less than 6.8 is 4.2?
- What must I add to 5.4 to make 9.3?
- Decrease 5.6 by 1.9.
- 2.8 add a number is 4.3. What is the number?
- Find pairs of numbers with a difference of 13.5…

Complete written questions, for example:

- working rapidly, using known facts:
  □ – 2.56 = 5.38 7.65 – 6.85 = □
- using informal pencil and paper jottings:
  □ – 1475 = 2924 □ – △ = 0.03
- using a standard written method:
  421.3 – 82.57 = □

Use mental or written methods or a calculator to:

- find the missing number in:
  □ – 2485 = 4128
- find all the different differences you can make by using two of these five numbers:
  1.07, 0.3, 37.03, 17.73, 31.7

See also mental calculation strategies (pages 40–47) and checking results of calculations (page 73).

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:

Know, with rapid recall, addition and subtraction facts	Consolidate knowing by heart all addition and subtraction facts to 20. For example, recall rapidly all the pairs for 15:
	
	10 + 5 = 15 5 + 10 = 15
	9 + 6 = 15 6 + 9 = 15
	8 + 7 = 15 7 + 8 = 15
	
	15 – 5 = 10 15 – 10 = 5
	15 – 6 = 9 15 – 9 = 6
	15 – 7 = 8 15 – 8 = 7
	
	For example, with rapid recall:
	• say pairs of numbers with a total of 18;
	• given a number, say how many more will make 17 altogether;
	• say how many steps must be taken to get from 4 to 17 on a number line, or from 17 back to 4.
	
	Derive quickly related facts such as:
	
	70 + 90 = 160 160 – 90 = 70
	700 + 900 = 1600 1600 – 900 = 700
	
	Derive quickly:
	
	• number pairs that total 100:
	for example, 36 + 64 or 18 + 82;
	
	• pairs of multiples of 50 that total 1000:
	for example, 250 + 750 or 150 + 850.
	
	Derive quickly addition doubles:
	
	• doubles from 1 + 1 to 50 + 50:
	for example, 38 + 38 = 76;
	
	• multiples of 10 from 10 + 10 to 500 + 500:
	for example, 290 + 290 = 580;
	
	• multiples of 100 from 100 + 100 to 5000 + 5000:
	for example, 1900 + 1900 = 3800.
	
	See also doubling (page 58).

As outcomes, Year 5 pupils should, for example:

Derive quickly related facts such as:

70 + 90 = 160 160 – 90 = 70
700 + 900 = 1600 1600 – 900 = 700

0.7 + 0.9 = 1.6 1.6 – 0.9 = 0.7

Derive quickly, or continue to derive quickly:

- two-digit pairs that total 100:
  for example, 36 + 64 or 18 + 82;
- pairs of multiples of 50 that total 1000:
  for example, 250 + 750 or 150 + 850;
- decimals (tenths) with a total of 1:
  for example, 0.7 + 0.3 or 0.1 + 0.9;
- decimals (ones and tenths) with a total of 10:
  for example, 3.7 + 6.3 or 8.5 + 1.5.

Derive quickly addition doubles:

- doubles from 1 + 1 to 100 + 100:
  for example, 78 + 78 = 156;
- multiples of 10 from 10 + 10 to 1000 + 1000:
  for example, 780 + 780 = 1560;
- multiples of 100 from 100 + 100 to 10 000 + 10 000:
  for example, 6900 + 6900 = 13 800.

See also doubling (page 59).

As outcomes, Year 6 pupils should, for example:

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Find a difference by counting up through the next multiple of 10, 100 or 1000	For example, work out mentally by counting up from the smaller to the larger number: • 92 – 89, 403 – 386, 4000 – 3993
Count on or back in repeated steps of 1, 10, 100, 1000	For example, work out mentally that: • 2003 – 8 = 1995 by counting back in ones from 2003; • 643 + 50 = 693 by counting on in tens from 643; • 387 – 50 = 337 by counting back in tens from 387; • 460 + 500 = 960 by counting on in hundreds from 460.
Partition into hundreds, tens and ones	For example, work out mentally that: • 24 + 58 = 82 because it is 20 + 50 = 70 and 4 + 8 = 12, making 70 + 12 = 82, or it is 24 + 50 + 8 = 74 + 8 = 82; • 98 – 43 = 98 – 40 – 3 = 58 – 3 = 55.
Identify near doubles	For example, work out mentally that: • 38 + 36 = 74 double 40, subtract 2, subtract 4, or double 37; • 160 + 170 = 330 two 160s plus 10, or two 170s minus 10; • 380 + 380 = 760 double 350 plus double 30, or double 400 minus double 20.
Add or subtract the nearest multiple of 10, 100 or 1000 and adjust	Add 9, 19, 29… or 11, 21, 31… to any two-digit number: • 63 + 29 = 92 because it is the same as 63 + 30 – 1; • 58 + 71 = 129 because it is the same as 58 + 70 + 1. Subtract 9, 19, 29… or 11, 21, 31… from any two- or three-digit number: • 84 – 19 = 65 because it is the same as 84 – 20 + 1; • 283 – 71 = 212 because it is the same as 283 – 70 – 1. For example, work out mentally that: • 74 + 58 = 132 because it is 74 + 60 – 2 = 134 – 2 = 132; • 128 – 67 = 61 because it is 128 – 70 + 3 = 58 + 3 = 61.

As outcomes, Year 5 pupils should, for example:

For example, work out mentally by counting up from the smaller to the larger number:
- 705 – 287, 8006 – 2993

For example, work out mentally that:
- 324 + 58 = 382 because it is
  320 + 50 = 370 and 4 + 8 = 12, or 370 + 12 = 382,
  or it is 324 + 50 + 8 = 374 + 8 = 382;

- 428 – 43 = 428 – 40 – 3 = 388 – 3 = 385,
  or it is 430 – 45 = 430 – 40 – 5 = 390 – 5 = 385.

For example, work out mentally that:
- 1.5 + 1.6 = 3.1
  double 1.5 plus 0.1.

Continue to add/subtract 9, 19, 29... or 11, 21, 31... by adding/subtracting 10, 20, 30... then adjusting by 1.
- 458 + 71 = 529
  because it is the same as 458 + 70 + 1;
- 583 – 71 = 512
  because it is the same as 583 – 70 – 1.

For example, work out mentally that:
- 274 + 96 = 370 because it is
  274 + 100 – 4 = 374 – 4 = 370;

- 4005 – 1997 = 2008 because it is
  4005 – 2000 + 3 = 2005 + 3 = 2008.

As outcomes, Year 6 pupils should, for example:

For example, work out mentally by counting up from the smaller to the larger number:
- 8000 – 2785 is 5 + 10 + 200 + 5000 = 5215

For example, work out mentally that:
- 421 + 387 = 808
  double 400 plus 21 minus 13.

Add/subtract 0.9, 1.9, 2.9... or 1.1, 2.1, 3.1... by adding or subtracting 1, 2, 3... then adjusting by 0.1.

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use the relationship between addition and subtraction	Continue to recognise that knowing one of: 36 + 19 = 55 19 + 36 = 55 55 – 19 = 36 55 – 36 = 19 means that you also know the other three.
	Work out mentally one fact such as 58 + 27 or 91 – 25, and then state three other related facts.
	Working mentally, answer oral questions like: • You know that 56 + 14 = 70. What is: 14 + 56, or 70 – 56, or 70 – 14? • You know that 83 – 25 = 58. What is: 83 – 58, or 25 + 58, or 58 + 25?
	Use the numbers 25, 37, 52, 77, 87. Write as many different addition or subtraction statements as you can.
Add several numbers	Add mentally several small numbers: for example, 7 + 12 + 9 or 4 + 7 + 9 + 1.
	Work mentally to complete questions like: 1 + □ + 6 + 9 + 7 = 37 40 + 90 + 60 = □ using strategies such as: • looking for pairs that make 10 or 100 and doing these first; • starting with the largest number; • looking for pairs that make 9 or 11, and adding these to the total by adding 10 and then adjusting by 1.
	Add a set of numbers such as 6 + 6 + 5 + 7, recognising this as equivalent to 6 × 4. Explain your strategies.

As outcomes, Year 5 pupils should, for example:

Recognise that knowing a fact such as 136 + 319 = 455 makes it possible to find:
455 – 318 or 455 – 137.

Work out mentally one fact such as 15.8 + 9.7 or 101 – 25, and then state three other related facts.

Working mentally, answer oral questions like:
- You know that 560 + 140 = 700. What is:
  140 + 560, or 700 – 560, or 700 – 140?
- You know that 835 – 25 = 810. What is:
  835 – 810, or 25 + 810, or 810 + 25?

Given the numbers 135, 228 and 363, say or write four different sentences relating these numbers. For example:

228 add 135 equals 363,	228 + 135 = 363;
135 add 228 equals 363,	135 + 228 = 363;
363 subtract 228 equals 135,	363 – 228 = 135;
363 subtract 135 equals 228,	363 – 135 = 228.

Use the numbers 125, 237, 352, 77, 202, 477. Write as many different addition or subtraction statements as you can.

Add mentally:
- several small numbers, such as 3 + 5 + 7 + 2 + 9;
- three multiples of 10, such as 80 + 70 + 40.

Work mentally to complete questions like:
27 + 36 + 13 = □
using strategies such as:
- looking for pairs that make 10 and doing these first;
- starting with the largest number.

Add a set of numbers such as 26 + 28 + 30 + 32 + 34, recognising this as equivalent to 30 × 5.

Explain your strategies.

As outcomes, Year 6 pupils should, for example:

Continue to make use of the relationship between addition and subtraction. For example:

- Work out mentally one fact such as 1.58 + 4.97 or 1001 – 250, and then state three other related facts.

- Use 8036 – 1275 = 6761 to work out:
  8036 – 6760
  6761 + 1270

Add mentally:
- three or more multiples of 10, such as 80 + 70 + 40 + 90.

Work mentally to complete questions like:
31 + □ + 29 = 87 36 + 19 + 24 = □
using strategies such as:
- looking for pairs that make multiples of 10 and doing these first;
- starting with the largest number.

Add sets of numbers such as 70 + 71 + 75 + 77, recognising this as equivalent to (70 × 4) + (1 + 5 + 7).

Explain your strategies.

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use known number facts and place value to add or subtract a pair of numbers mentally	*Continue to add or subtract two-digit multiples of 10* • Respond to oral questions like: 40 + 70 130 – 50 and explain method. • Work mentally to complete written questions like: 90 + ☐ = 130 ☐ – 50 = 80 then explain method in writing. *Add or subtract a pair of multiples of 100, crossing 1000* • Respond to oral questions like: 500 + 700 1200 – 500 and explain method. • Work mentally to complete written questions like: 200 + 900 = ☐ 800 + ☐ = 1300 ☐ – 600 = 900 then explain method in writing. *Revise adding/subtracting a multiple of 10 to/from a two- or three-digit number, without crossing the hundreds boundary* • Respond to oral questions like: 52 + 30 582 – 30 and explain method. • Work mentally to complete written questions like: 52 + 30 = ☐ 52 + ☐ = 82 ☐ + 30 = 82 76 – 40 = ☐ 76 – ☐ = 36 ☐ – 40 = 36 then explain method in writing. *Revise adding a two- or three-digit number to a multiple of 10, 100 or 1000* • Respond to oral questions like: 90 + 18 350 + 16 200 + 364 4000 + 518 and explain method. • Work mentally to complete written questions like: 430 + 54 = ☐ 430 + ☐ = 484 ☐ + 54 = 484 610 + 27 = ☐ 610 + ☐ = 637 ☐ + 27 = 637 then explain method in writing. *Find what to add to a two- or three-digit number to make 100 or the next higher multiple of 100* • Respond to oral questions and explain method: What must be added to 37 to make 100? 432 to make 500? • Work mentally to complete written questions like: 58 + ☐ = 100 486 + ☐ = 500 731 + ☐ = 800 then explain method in writing. *Find what to add to a four-digit multiple of 100 to make the next higher multiple of 1000* • Respond to oral questions like: What must be added to 7300 to make 8000? and explain method. • Work mentally to complete written questions like: 3200 + ☐ = 4000 8400 + ☐ = 9000 Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 5 pupils should, for example:

Add or subtract three-digit multiples of 10

- Respond to oral questions like:
  570 + 250 620 – 380
  and explain method.
- Work mentally to complete written questions like:
  240 + 370 = ☐ 610 – ☐ = 240 ☐ – 370 = 240
  then explain method in writing.

Add three or more three-digit multiples of 100

- Respond to oral questions like:
  500 + 700 + 400
  and explain method.
- Work mentally to complete written questions like:
  800 + ☐ + 300 = 1500
  then explain method in writing.

Add/subtract a single-digit multiple of 100 to/from a three- or four-digit number, crossing 1000

- Respond to oral questions like:
  638 + 500 1263 – 400
  and explain method.
- Work mentally to complete written questions like:
  300 + 876 = ☐ 300 + ☐ = 1176 ☐ + 876 = 1176
  1382 – 400 = ☐ 1382 – ☐ = 982 ☐ – 400 = 982
  then explain method in writing.

Add/subtract a three-digit multiple of 10 to/from a three-digit number, without crossing the hundreds boundary

- Respond to oral questions like:
  230 + 364 460 + 518
  and explain method.
- Work mentally to complete written questions like:
  538 + 120 = ☐ 538 + ☐ = 658 ☐ + 120 = 658
  742 – 210 = ☐ 742 – ☐ = 532 ☐ – 210 = 532
  then explain method in writing.

Continue to find what to add to a three-digit number to make the next higher multiple of 100

- Respond to oral questions and explain method:
  What must be added to 734 to make 800?
- Work mentally to complete written questions like:
  651 + ☐ = 700 247 + ☐ = 300
  then explain method in writing.

Find what to add to a decimal with units and tenths to make the next higher whole number

- Respond to oral questions like:
  What must be added to 3.4 to make 4?
  and explain method.
- Work mentally to complete written questions like:
  4.8 + ☐ = 5 7.3 + ☐ = 8
  then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 6 pupils should, for example:

Add or subtract four-digit multiples of 100

- Respond to oral questions like:
  5700 + 2500 6200 – 3800
  and explain method.
- Work mentally to complete written questions like:
  2400 + 8700 = ☐ 6100 – ☐ = 3700
  then explain method in writing.

Find what to add to a decimal with units, 10ths and 100ths to make the next higher whole number or 10th

- Respond to oral questions and explain method:
  What must be added to 6.45 to make 7?
  And to 2.78 to make 2.8?
- Work mentally to complete written questions like:
  4.81 + ☐ = 5 7.36 + ☐ = 7.4
  then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use known number facts and place value to add or subtract a pair of numbers mentally (continued)	*Add a single digit to any three- or four-digit number, crossing the tens boundary* • Respond to oral questions like: 629 + 3 6745 + 8 and explain method. • Work mentally to complete written questions like: 357 + 7 = ☐ 368 + ☐ = 372 ☐ + 5 = 893 2397 + 9 = ☐ 4128 + ☐ = 4135 ☐ + 5 = 1254 then explain method in writing. *Subtract a single digit from a multiple of 100 or 1000* • Respond to oral questions like: 900 – 7 4000 – 3 and explain method. • Work mentally to complete written questions like: 600 – 7 = ☐ 600 – ☐ = 593 ☐ – 7 = 593 5000 – 3 = ☐ 5000 – ☐ = 4997 ☐ – 3 = 4997 then explain method in writing. *Subtract a single digit from a three- or four-digit number, crossing the tens boundary* • Respond to oral questions like: 905 – 7 4641– 3 7003 – 6899 and explain method. • Work mentally to complete written questions like: 626 – 7 = ☐ 626 – ☐ = 619 ☐ – 7 = 619 5952 – 3 = ☐ 5952 – ☐ = 5949 ☐ – 3 = 5949 then explain method in writing. *Find a small difference between a pair of numbers lying either side of a multiple of 1000* • For example, work out mentally that: 7003 – 6988 = 15 by counting up 2 from 6988 to 6990, then 10 to 7000, then 3 to 7003. • Work mentally to complete written questions like: 6004 – 5985 = ☐ 6004 – ☐ = 19 ☐ – 5985 = 19 *Add or subtract any pair of two-digit numbers, including crossing the tens boundary* • Respond to oral questions like: 45 + 27 62 – 27 and explain method. • Work mentally to complete written questions like: 45 + 39 = ☐ 45 + ☐ = 84 ☐ + 39 = 84 92 – 25 = ☐ 92 – ☐ = 67 ☐ – 25 = 67 then explain method in writing. Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 5 pupils should, for example:

Find the difference between a pair of numbers lying either side of a multiple of 1000

- For example, work out mentally that:
  7003 – 6899 = 104
  by counting up 1 from 6899 to 6900, then 100 to 7000, then 3 to 7003.
- Work mentally to complete written questions like:
  8004 – 7985 = ☐ 8004 – ☐ = 19 ☐ – 7985 = 19

Add or subtract a pair of decimal fractions each with units and tenths, or with tenths and hundredths, including crossing the units boundary or the tenths boundary

- Respond to oral questions like:
  5.7 + 2.5 6.2 – 3.8 0.56 + 0.72 0.63 – 0.48
  and explain method.
- Work mentally to complete written questions like:
  2.4 + 8.7 = ☐ 0.24 + ☐ = 0.78
  6.1 – 2.4 = ☐ 0.95 – ☐ = 0.67
  then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 6 pupils should, for example:

Add or subtract a pair of decimal fractions each less than 1 and with up to two decimal places

- Respond to oral questions like:
  0.05 + 0.3 0.7 – 0.26
  and explain method.
- Work mentally to complete written questions like:
  0.67+ 0.2 = ☐ 0.67 + ☐ = 0.87
  0.5 – 0.31 = ☐ 0.5 – ☐ = 0.19
  then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

Pupils should be taught to:

Develop and refine written methods for addition, building on mental methods

As outcomes, Year 4 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy.
Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, tens under tens, and so on...

HTU + TU, then HTU + HTU

Do this crossing the tens boundary, or the hundreds boundary, or both. For example:

A: adding the most significant digits first

```
  625       783       367       205
+  48     +  42     +  85     + 176
  600       700       300       300 ]
   60       120       140        70 ] add mentally
   13         5        12        11 ] from top
  673       825       452       381
```

B: compensation (add too much, take off)

```
   754
+   86
   854   (754 + 100)
   -14   (86 - 100)
   840
```

Standard written methods

Develop an efficient standard method that can be applied generally. For example:

C: adding the least significant digits, preparing for 'carrying'

```
  358
+  73
   11
  120
  300
  431
```

leading to 'carrying' below the line

```
  625       783       367
+  48     +  42     +  85
  673       825       452
    1         1       1 1
```

Using similar methods, add several numbers with different numbers of digits. For example, find the total of:

83, 256, 4, 57.

Extend to decimals

Using methods similar to those above, begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds. Know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as £3.59 ± 78p.
For example:

£4.21 + £3.87
£2.24 + £5.23 + £1.36

As outcomes, Year 5 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, and so on...

HTU + HTU, then ThHTU + ThHTU

For example:

A: adding the most significant digits first

```
   587          7587
+  475       +  675
   900          7000 ]
   150          1100 ] add mentally
    12           150 ] from top
  1062           12 ]
                8262
```

B: compensation (add too much, take off)

```
   654
+  286
   954 (654 + 300)
   −14 (286 − 300)
   940
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally. For example:

C: using 'carrying'

```
   587          3587
+  475       +  675
  1062          4262
    11          111
```

Extend method to numbers with at least four digits.

Using similar methods, add several numbers with different numbers of digits. For example, find the total of:

58, 671, 9, 468, 2187.

Extend to decimals

Using the chosen method, add two or more decimal fractions with up to three digits and the same number of decimal places. Know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as 3.2 m ± 350 cm. For example:

£6.72 + £8.56 + £2.30
72.5 km + 54.6 km

As outcomes, Year 6 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, and so on...

ThHTU + ThHTU, then numbers with any number of digits

For example:

A: adding the most significant digits first

```
   7648          6584
+  1486       +  5848
   8000          11000 ]
   1000           1300 ] add mentally
    120            120 ] from top
     14             12 ]
   9134          12432
```

B: compensation (add too much, take off)

```
   6467
+  2684
   9467 (6467 + 3000)
   −316 (2684 − 3000)
   9151
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally. For example:

C: using 'carrying'

```
   7648          6584
+  1486       +  5848
   9134          12432
    111          111
```

Extend method to numbers with any number of digits.

Using similar methods, add several numbers with different numbers of digits. For example, find the total of:

42, 6432, 786, 3, 4681.

```
   42
 6432
  786
    3
 4681
11944
```

Extend to decimals

Using the chosen method, add two or more decimal fractions with up to four digits and either one or two decimal places. Know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as 14.5 kg ± 750 g. For example:

124.9 + 7.25
401.2 + 26.85 + 0.71

Pupils should be taught to:

Develop and refine written methods for subtraction, building on mental methods

As outcomes, Year 4 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy.
Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, tens under tens, and so on...

HTU – TU, then HTU – HTU

Do this crossing the tens or the hundreds boundary, or both.

A: counting up (complementary addition)

```
   754
–   86
     4    to make 90
    10    to make 100
   600    to make 700
    50    to make 750
     4    to make 754
   668
```

B: compensation (take too much, add back)

```
   754
–   86
   654   (754 – 100)
  +14    (since 100 – 86 = 14)
   668
```

Standard written methods

Develop an efficient standard method that can be applied generally. For example:

C: decomposition leading to

```
  754  =   700 + 50 + 4
–  86     –      80 + 6

       =   700 + 40 + 14   adjust from T to U      1
           –      80 +  6                        744
                                                – 86

       =   600 + 140 + 14  adjust from H to T    1 1
           –      80 +  6                        644
                                                – 86
           600 +  60 +  8 = 668
```

Subtract numbers with different numbers of digits.
For example, find the difference between:

671 and 58, 46 and 518.

Extend to decimals

Using methods similar to those above, begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds. Know that decimal points should line up under each other. For example:

£8.95 – £4.38
£7.50 – £2.84

As outcomes, Year 5 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, and so on...

HTU – HTU, then ThHTU – ThHTU

For example:

A: counting up

```
    754
-   286
     14   to make 300
    400   to make 700
     54   to make 754
    468
```

leading to

```
    754
-   286
     14 (300)
    454 (754)
    468
```

B: compensation (take too much, add back)

```
    754
-   286
    454 (754 – 300)
   +14 (since 300 – 286 = 14)
    468
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally. For example:

C: decomposition

```
  754  =  700 + 50 + 4
- 286     200 + 80 + 6
```

leading to

```
       =  700 +  40 + 14
          200 +  80 +  6

       =  600 + 140 + 14
          200 +  80 +  6
          400 +  60 +  8
```

```
   1
  744
- 286

 1 1
  644
- 286
  468
```

```
6 14 14
 7 5 4
-2 8 6
 4 6 8
```

Subtract numbers with different numbers of digits. For example, find the difference between:

764 and 5821, 4567 and 893.

Extend to decimals

Using the chosen method, find the difference between two decimal fractions with up to three digits and the same number of decimal places. Know that decimal points should line up under each other. For example:

£9.42 – £6.78
72.5 km – 4.6 km

As outcomes, Year 6 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Where calculations are set out in columns, know that units should line up under units, and so on...

ThHTU – ThHTU, then with any number of digits

For example:

A: counting up (complementary addition)

```
   6467
-  2684
     16 (2700)
    300 (3000)
   3467 (6467)
   3000
    700
     70
     13
   3783
```

or

```
   6467
-  2684
     16  (2700)
    300  (3000)
   3467  (6467)
   3783
```

B: compensation (take too much, add back)

```
   6467
-  2684
   3467 (6467 – 3000)
   +316 (since 3000 – 2684 = 316)
   3783
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally. For example:

C: decomposition

```
 5 13 16
 6 4 6 7
-2 6 8 4
 3 7 8 3
```

Subtract numbers with different numbers of digits. For example, find the difference between:

782 175 and 4387.

Extend to decimals

Using the chosen method, subtract two or more decimal fractions with up to three digits and either one or two decimal places. Know that decimal points should line up under each other. For example:

324.9 – 7.25
14.24 – 8.7

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Understand the operation of multiplication and the associated vocabulary, and its relationship to addition and division	Use, read and write: *times, multiply, multiplied by, product, multiple, inverse…* and the × sign. Understand and use when appropriate the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication: *Example of commutative law* $8 \times 15 = 15 \times 8$ *Example of associative law* $6 \times 15 = 6 \times (5 \times 3) = (6 \times 5) \times 3 = 30 \times 3 = 90$ *Example of distributive law* $18 \times 5 = (10 + 8) \times 5 = (10 \times 5) + (8 \times 5) = 50 + 40 = 90$ Understand that: • 86 + 86 + 86 is equivalent to 86×3 or 3×86; • multiplication by 1 leaves a number unchanged; • multiplication of zero results in zero. Understand that multiplication is the inverse of division (multiplication reverses division and vice versa) and use this to check results. **See also mental calculation strategies (pages 60–65) and checking results of calculations (page 72).** Respond rapidly to oral or written questions, explaining the strategy used. For example: • Two elevens. • Double 16. • 7 times 4… 9 multiplied by 3. • Multiply 15 by 6… by zero… by 1. • Is 40 a multiple of 5? How do you know? • What is the product of 15 and 6? • Find all the different products you can make by using two of these five numbers: 2, 3, 4, 5, 10. Complete written questions, for example: • working rapidly, using known facts: $7 \times 2 = \square$ $10 \times \square = 80$ $\square \times 5 = 35$ $4 \times 9 = \square$ $3 \times \square = 24$ $\square \times 4 = 20$ • using pencil and paper jottings and/or mental strategies: $90 \times 6 = \square$ $8 \times \square = 560$ $\square \times 90 = 720$ $4 \times \square + 8 = 24$ progressing to: $36 \times 18 = \square$ $\square \times \triangle = 720$ $5 \times 35 + \square = 180$

As outcomes, Year 5 pupils should, for example:

Use, read and write, spelling correctly:
times, multiply, multiplied by, product, multiple, inverse... and the × sign.

Understand and use as appropriate the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:
Example of commutative law
$8 \times 65 = 65 \times 8$
Example of associative law
$14 \times 12 = (2 \times 7) \times 12 = 2 \times (7 \times 12) = 2 \times 84 = 168$
Examples of distributive law
$26 \times 7 = (20 + 6) \times 7 = (20 \times 7) + (6 \times 7) = 182$
$(6 \times 15) + (4 \times 15) = 10 \times 15 = 150$

Understand that, with positive whole numbers, multiplying makes a number larger.

Understand that multiplication is the inverse of division and use this to check results.

See also mental calculation strategies (pages 60–65) and checking results of calculations (page 73).

Start to use brackets: know that they determine the order of operations, and that their contents are worked out first. For example:
$3 + (6 \times 5) = 33$, whereas $(3 + 6) \times 5 = 45$.

Respond rapidly to oral or written questions, explaining the strategy used. For example:
- Two twelves.
- Double 32.
- 7 times 8... 9 multiplied by 7.
- Multiply 31 by 8... by zero... by 1.
- Is 81 a multiple of 3? How do you know?
- What is the product of 25 and 4?
- Find all the different products you can make by using three of these: 6, 7, 8, 9, 11.

Complete written questions, for example:
- working rapidly, using pencil and paper jottings and/or mental strategies:
  $70 \times 6 = \square$ $11 \times \square = 88$ $\square \times 9 = 0.36$
  $80 \times 9 = \square$ $6 \times \square = 4.8$ $\square \times 7 = 0.49$
- using informal or standard written methods:
  $72 \times 6 = \square$ $180 \times \square = 540$ $\square \times 9 = 189$
  $14 \times \square + 8 = 50$ $46 \times 28 = \square$

Use written methods or a calculator to work out:
$132 \times 46 = \square$ $\square \times \triangle = 162$
$2.7 \times 8 = \square$ $(14 \times 60) + \square = 850$

As outcomes, Year 6 pupils should, for example:

Use, read and write, spelling correctly:
times, multiply, multiplied by, product, multiple, inverse... and the × sign.

Understand and use when appropriate the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:
Example of commutative law
$95 \times 78 = 78 \times 95$
Example of associative law
$10.4 \times 40 = 10.4 \times (10 \times 4)$ or $(10.4 \times 10) \times 4$
Example of distributive law
$46 \times 98 = 46 \times (100 - 2)$
$= (46 \times 100) - (46 \times 2)$
$= 4600 - 92 = 4508$

Understand that multiplication is the inverse of division and use this to check results.

See also mental calculation strategies (pages 60–65) and checking results of calculations (page 73).

Use brackets: know that they determine the order of operations, and that their contents are worked out first.

Respond rapidly to oral or written questions, explaining the strategy used. For example:
- Two nineteens.
- Double 75.
- 11 times 8... 9 multiplied by 8.
- Multiply 25 by 8... by zero... by 1.
- Is 210 a multiple of 6? How do you know?
- What is the product of 125 and 4?
- Find all the different products you can make using two of these: 0.2, 1.4, 0.03, 1.5, 0.5.

Complete written questions, for example:
- working rapidly, using pencil and paper jottings and/or mental strategies:
  $0.7 \times 20 = \square$ $20 \times \square = 8000$ $\square \times 5 = 3.5$
  $4 \times 0.9 = \square$ $0.3 \times \square = 2.4$ $\square \times 0.4 = 2$
- using informal or standard written methods:
  $132 \times 46 = \square$ $\square \times 9 = 18.9$
  $24 \times \square + 8 = 3008$ $38 \times \square = 190$

Use written methods or a calculator to work out:
$738 \times 639 = \square$ $\square \times \triangle = 9506$
$(41 \times 76) + \square = 4000$ $78 \times (97 - 42) = \square$

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Understand the operation of division and the associated vocabulary, and its relationship to subtraction and multiplication	Use, read and write: *share, group, divide, divided by, divided into, divisible by, factor, quotient, remainder, inverse…* and the division signs ÷ or /. Understand the operation of division either as sharing equally or as grouping (that is, repeated subtraction). For example, 30 ÷ 6 can be modelled as: • sharing among 6 and the number given to one person counted; or • groups or lots of 6 being taken and the number of groups or lots counted. Understand that: • division by 1 leaves a number unchanged. Understand that division is the inverse of multiplication (division reverses multiplication and vice versa) and use this to check results. **See also mental calculation strategies (pages 60–65) and checking results of calculations (page 72).** Respond to oral or written questions, explaining the strategy used. For example: • Share 44 between 4. • Divide 69 by 3. 69 divided by 3. Divide 3 into 69. • How many groups of 6 can be made from 48? • How many lengths of 10 cm can you cut from 183 cm? • Is 72 divisible by 3? How do you know? • What are the factors of 12? • Tell me two numbers with a quotient of 5. Are there any other possibilities? Begin to relate division and fractions. Understand that: • ½ of 10 is the same as 10 ÷ 2; • ¼ of 3 is the same as 3 ÷ 4. Complete written questions, for example: • with rapid mental recall: 36 ÷ 4 = ☐ 60 ÷ ☐ = 6 ☐ ÷ 3 = 7 • using pencil and paper jottings and/or mental strategies: 320 ÷ 4 = ☐ 240 ÷ ☐ = 60 ☐ ÷ 30 = 8 (25 ÷ ☐) + 2 = 7 (☐ ÷ 5) – 2 = 3 progressing to: 1456 ÷ 4 = ☐ 156 ÷ ☐ = 26 ☐ ÷ 9 = 460

As outcomes, Year 5 pupils should, for example:

Use, read and write, spelling correctly:
share, group, divide, divided by, divided into, divisible by, factor, quotient, remainder, inverse...
and the division signs ÷ or /.

Understand the operation of division as either sharing equally or repeated subtraction (grouping):
- sharing is better for dividing by small numbers;
- grouping is better for dividing by larger numbers.

Understand that:
- with positive whole numbers, division makes a number smaller;
- division is non-commutative: that is, 72 ÷ 9 is not the same as 9 ÷ 72;
- a number cannot be divided by zero.

Understand that division is the inverse of multiplication and use this to check results.

See also mental calculation strategies (pages 60–65) and checking results of calculations (page 73).

Respond to oral or written questions, explaining the strategy used. For example:
- Share 48 between 8.
- Divide 56 by 7. Divide 3 into 72.
- How many groups of 8 can be made from 73?
- What is the remainder when 74 is divided by 8?
- How many lengths of 20 cm can you cut from 270 cm?
- Is 156 divisible by 6? How do you know?
- What are the factors of 36?
- Tell me two numbers with a quotient of 100.

Relate division and fractions. Understand that:
- ⅓ of 24 is equivalent to 24 ÷ 3 or $^{24}/_{3}$;
- 16 ÷ 5 is equivalent to $^{16}/_{5}$ or $3\frac{1}{5}$.

Complete written questions, for example:
- with rapid mental recall:
  $^{63}/_{7}$ = ☐ 56 ÷ ☐ = 8 ☐ ÷ 9 = 8
- using pencil and paper jottings and/or mental strategies:
  172 ÷ 4 = ☐ $^{54}/_{\square}$ = 18 ☐ ÷ 21 = 90

Use written methods or a calculator to work out:
(125 ÷ ☐) + 2 = 27 (☐ ÷ 5) – 22 = 30
900 ÷ 36 = ☐ 1560 ÷ ☐ = 120
$^{\square}/_{28}$ = 46

As outcomes, Year 6 pupils should, for example:

Use, read and write, spelling correctly:
share, group, divide, divided by, divided into, divisible by, factor, quotient, remainder, inverse...
and the division signs ÷ or /.

Continue to understand the operation of division as either sharing or repeated subtraction (grouping):
- sharing is better for dividing by small numbers;
- grouping is better for dividing by larger numbers.

Understand that division is the inverse of multiplication and use this to check results.

See also mental calculation strategies (pages 60–65) and checking results of calculations (page 73).

Respond to oral or written questions, explaining the strategy used. For example:
- Share 108 between 9.
- Divide 112 by 7. Divide 15 into 225.
- How many groups of 16 can be made from 100?
- What is the remainder when 104 is divided by 12?
- How many lengths of 25 cm can you cut from 625 cm?
- Is 156 divisible by 8? How do you know?
- What are the factors of 98?
- Tell me two numbers with a quotient of 0.5.

Relate division and fractions. Understand that:
- ⅛ of 72 is equivalent to 72 ÷ 8 or $^{72}/_{8}$;
- 4 ÷ 7 is equivalent to $^{4}/_{7}$;
- 13 ÷ 7 is equivalent to $1\frac{6}{7}$.

Complete written questions, for example:
- with rapid mental recall:
  6.3 ÷ 7 = ☐ 9.9 ÷ ☐ = 1.1 ☐ ÷ 5 = 0.8
- using pencil and paper jottings and/or mental strategies:
  17.2 ÷ 4 = ☐ $^{\square}/_{25}$ = 39

Use written methods or a calculator to work out:
4123 ÷ 365 = ☐ ☐ ÷ 2.8 = 4.6
(☐ ÷ 25) – 22 = 30 (56 + 97)/(133 – 85)
(100 ÷ ☐) + 5 = 7.5

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Understand the idea of a remainder, and when to round up or down after division	Give a remainder as a **whole number**. For example: • 41 ÷ 4 is 10 remainder 1 — 28 = (5 × 5) + ☐ • 72 ÷ 5 is 14 remainder 2 — 97 = (9 × 10) + ☐ • 768 ÷ 100 is 7 remainder 68 — 327 = (3 × 100) + ☐ • There are 64 children in Year 5. How many teams of 6 children can be made? How many children will be left over? Divide a whole number of pounds by 2, 4, 5 or 10. For example: • Four children collected £19 for charity. They each collected the same amount. How much did each one collect? (£4.75) *Decide what to do after division and round up or down accordingly* Make sensible decisions about rounding up or down after division. For example, 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context. *Examples of rounding down* • I have £62. Tickets cost £8 each. 62 ÷ 8 = 7 remainder 6. I can buy only 7 tickets. • I have 62 cakes. One box holds 8 cakes. I could fill only 7 boxes of cakes. *Examples of rounding up* • I have 62 cakes. One box holds 8 cakes. I will need 8 boxes to hold all 62 cakes. • There are 62 people. There are 8 seats in a row. 8 rows of seats are needed to seat everyone. **See also rounding whole numbers (page 12).**

As outcomes, Year 5 pupils should, for example:

Begin to give a quotient as a **fraction** when dividing by a whole number. For example:

43 ÷ 9 = 4⅞

Begin to give a quotient as a **decimal fraction**:

- when dividing by 10, 5, 4 or 2, for example:
  351 ÷ 10 = 35.1 61 ÷ 4 = 15.25
- when dividing pounds and pence by a small whole number, for example:
  It cost 4 children a total of £5.40 to swim. What did it cost each child? (£1.35)

When dividing with a calculator, interpret the quotient displayed. For example:

- interpret 8.4 as £8.40 in the context of money;
- round other decimals to the nearest whole number, recognising, say, 9.714 285 after dividing 68 by 7 as 'between 9 and 10'.

Decide what to do after division, and round up or down accordingly

Make sensible decisions about rounding down or up after division. For example, 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Examples of rounding down

- I have saved £240. A train ticket to Durham is £52. 240 ÷ 52 is 4.615 384 on my calculator. I can buy only 4 tickets.
- I have 240 cakes. One box holds 52 cakes. I could fill only 4 boxes of cakes.

Examples of rounding up

- I have 240 cakes. One box holds 52 cakes. I will need 5 boxes to hold all 240 cakes.
- There are 240 people. One bus holds 52 people. 5 buses are needed to hold them all.

See also rounding whole numbers (page 13) and rounding decimals (page 31).

As outcomes, Year 6 pupils should, for example:

Give a quotient as a **fraction** when dividing by a whole number. For example:

90 ÷ 7 = 12⅚

Give a quotient as a **decimal fraction**:

- when dividing by a whole number, for example:
  676 ÷ 8 = 84.5 612 ÷ 100 = 6.12
  rounding where appropriate to 1 decimal place:
  85 ÷ 7 = 12.1 to 1 decimal place
- when dividing pounds and pence, for example:
  It cost 15 people a total of £78.75 for a theatre trip. What did it cost each one? (£5.25)

When dividing with a calculator, interpret the quotient displayed. For example:

- interpret halves, quarters, tenths and hundredths as either decimals or fractions;
- recognise one third, two thirds and one ninth;
- round decimals to the nearest whole number or the nearest tenth.

Decide what to do after division, and round up or down accordingly

Make sensible decisions about rounding down or up after division. For example: 1000 ÷ 265 3.8, but whether the answer should be rounded up to 4 or rounded down to 3 depends on the context.

Examples of rounding down

- Dad has saved £5000. An air fare to Sydney is £865. 5000 ÷ 865 is 5.780 346 on my calculator. He can buy 5 tickets.
- I have 5 metres of rope. I need lengths of 865 cm. I can cut off 5 lengths.

Examples of rounding up

- I have 5000 sheets of paper. A box holds 865 sheets. I will need 6 boxes to hold all 5000 sheets.
- 5000 football fans have tickets for a match. Each stand seats 865 people. They can all sit in 6 stands.

See also rounding whole numbers (page 13) and rounding decimals (page 31).

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Know multiplication facts by heart and derive quickly the corresponding division facts	Know by heart multiplication facts for the 2, 3, 4, 5 and 10 times-tables, up to ×10, including multiplication by 0 and 1, and begin to know them for the 6, 7, 8 and 9 times-tables. Derive quickly the corresponding division facts. Respond rapidly to oral or written questions like: • Nine fives. • 3 times 7... times 0. • 4 multiplied by 8... by 0. • Multiply 9 by 5... by 1. Respond quickly to questions like: • Divide 36 by 4. • What is 24 shared between 3? • How many fives in 55? • Half of 17. • One quarter of 3.
Know by heart or derive rapidly doubles and halves	Use, read and write: *double, twice, half, halve, whole, divide by 2, divide into 2...* and ½ as one half. Understand that halving is the inverse of doubling: for example, if half of 18 is 9, then double 9 is 18. Know by heart or derive quickly: • doubles of all numbers 1 to 50; • doubles of multiples of 10 up to 500; • doubles of multiples of 100 up to 5000; and all the corresponding halves. Respond rapidly to oral or written questions like: • Double 19... 75... 350... 4200... • Half of 38... of 150... of 700... of 8400... • ½ of 700... of 34... • Twice 95. • Jo spent half of her £21.60 savings. How much did she spend? • How many metres is half a kilometre? Complete written questions, for example: • working quickly, using known facts: 60 × 2 = □ 160 ÷ □ = 80 • using cubes or a number line, then mental strategies: 74 × 2 = □ 72 ÷ 2 = □ □ × 2 = 126 □ ÷ 2 = 37

As outcomes, Year 5 pupils should, for example:

Know by heart all multiplication facts up to 10×10, including multiplication by 0 and 1.

Derive quickly the corresponding division facts.

Know by heart the squares of all numbers from 1×1 to 10×10.

Respond rapidly to oral or written questions like:
- Nine sevens.
- How many eights in 48?
- 6 times 7.
- 5 multiplied by 9.
- Multiply 9 by 6.
- 7 multiplied by 0.

Respond quickly to questions like:
- Divide 38 by 9.
- What is 48 shared between 8?
- Three divided by 5.
- One seventh of 35.

Use, read and write, spelling correctly:
double, twice, half, halve, whole, divide by 2, divide into 2... and ½ as one half.

Understand that halving is the inverse of doubling: for example, if half of 72 is 36, then double 36 is 72.

Know by heart or derive quickly:
- doubles of all numbers 1 to 100;
- doubles of multiples of 10 up to 1000;
- doubles of multiples of 100 up to 10 000;

and all the corresponding halves.

Respond rapidly to oral or written questions like:
- Double 7½... 98... 680... 8500...
- Half of 154... of 820... of 5600...
- Twice 85.
- ½ of 920.
- Half of one half.
- What is half of £71.30?
- How many millimetres is half a metre?

Complete written questions, for example:
- working quickly, using mental strategies:

$160 \times 2 = \square$	$1600 \div \square = 800$	$\frac{16}{\square} = \frac{1}{2}$
$134 \times 2 = \square$	$430 \div 2 = \square$	$\frac{\square}{2} = 65$
$\square \times 2 = 290$	$\square \div 2 = 330$	

As outcomes, Year 6 pupils should, for example:

Continue to know by heart all multiplication facts up to 10×10, including multiplication by 0 and 1.

Derive quickly the corresponding division facts.

Know by heart the squares of all numbers from 1×1 to 12×12.

Derive quickly squares of multiples of 10 to 100, such as 20^2, 80^2.

Respond rapidly to oral or written questions like:
- Nine eights.
- How many sevens in 35?
- 8 times 8.
- 6 multiplied by 7.
- Multiply 11 by 8.

Respond quickly to questions like:
- 7 multiplied by 0.8... by 0.
- Multiply 0.9 by 0.6... by 0.
- Divide 3.6 by 9... by 1.
- What is 88 shared between 8?
- Divide 6 into 39.
- 9 divided by 4.
- 0.6 times 7... times 2.
- One twentieth of 360.

Use, read and write, spelling correctly:
double, twice, half, halve, whole, divide by 2, divide into 2... and ½ as one half.

Understand that halving is the inverse of doubling: for example, if half of 0.3 is 0.15, then double 0.15 is 0.3.

Know by heart or derive quickly:
- doubles of two-digit whole numbers or decimals;
- doubles of multiples of 10 up to 1000;
- doubles of multiples of 100 up to 10 000;

and all the corresponding halves.

Respond rapidly to oral or written questions like:
- Double 37½... 3.7... 0.59...
- Twice 2.6.
- ½ of 9.5.
- Half of one eighth.
- What is half of £581?
- What fraction of 1 cm is half a millimetre?

Complete written questions, for example:
- working quickly, using mental strategies:

$370 \times 2 = \square$	$1750 \div \square = 875$	$\frac{190}{\square} = \frac{1}{2}$
$176 \times 2 = \square$	$570 \div 2 = \square$	$\frac{\square}{2} = 165$
$\square \times 2 = 3.9$	$\square \div 2 = 0.87$	

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use related facts and doubling or halving	Use related facts and doubling or halving. For example: • double 34 is double 30 add double 4, or 60 + 8 = 68; • half of 56 is half of 50 plus half of 6. For example: • To multiply by 4, double and double again. For example, to work out 12 × 4, say 12, 24, 48. • To multiply by 5, multiply by 10 and halve. For example: 14 × 5 = 14 × (10 ÷ 2) = (14 × 10) ÷ 2 = 140 ÷ 2 = 70 • To multiply by 20, multiply by 10 and then double. For example: 14 × 20 = 14 × (10 × 2) = (14 × 10) × 2 = 140 × 2 = 280 • Work out the 8 times-table facts by doubling the 4 times-table facts. • Work out some multiples of 15 by doubling: 1 × 15 = 15 so 2 × 15 = 30 4 × 15 = 60 8 × 15 = 120 16 × 15 = 240 … Use combinations of these facts to work out, say, 11 × 15 = (8 × 15) + (2 × 15) + (1 × 15) = 165. Explain how to find quarters and eighths by halving. For example, work out mentally that: • one eighth of 64 is 8 (half of 64 is 32, half again is 16, half again is 8); • one quarter of 600 is 150 (because one half of 600 is 300 and half again is 150).
Use factors	

As outcomes, Year 5 pupils should, for example:

Use related facts and doubling/halving. For example:
- double 78 = double 70 + double 8
  = 140 + 16 = 156;
- half of 256 = half of 200 + half of 50 + half of 6
  = 128.

For example:
- Double a number ending in 5, and halve the other number. For example:
  16 × 5 is equivalent to 8 × 10 = 80
  35 × 14 is equivalent to 70 × 7 = 490

- Halve an even number in the calculation, find the product, then double it. For example:
  13 × 14 13 × 7 = 91 91 × 2 = 182
  16 × 51 8 × 51 = 408 408 × 2 = 816

- To multiply by 50, multiply by 100, then halve. For example:
  36 × 50 36 × 100 = 3600 3600 ÷ 2 = 1800

- Work out the 16 times-table facts by doubling the 8 times-table facts.

- Work out:
  1 × 25 = 25 and so deduce that
  2 × 25 = 50
  4 × 25 = 100
  8 × 25 = 200
  16 × 25 = 400 …

  Use combinations of these facts to work out, say, 25 × 25 = (16 × 25) + (8 × 25) + (1 × 25) = 625.

Explain how to find sixths by halving thirds, or twentieths by halving tenths.
For example, work out mentally that:
- one sixth of 300 is 50
  (one third of 300 is 100, half of that is 50);
- one twentieth of 900 is 45
  (one tenth is 90, and half of that is 45).

Use factors. For example:
15 × 6 15 × 3 = 45
45 × 2 = 90 15 × 6 = 90

90 ÷ 6 90 ÷ 3 = 30
30 ÷ 2 = 15 90 ÷ 6 = 15

As outcomes, Year 6 pupils should, for example:

Use related facts and doubling/halving. For example:
- double 176 = 200 + 140 + 12 = 352;
- half of 948 = half of 900 + half of 40 + half of 8
  = 474.

For example:
- Double a number ending in 5, and halve the other number.

- Halve/double one number in the calculation, find the product, then double/halve it.

- To multiply by 15, multiply by 10, halve the result, then add the two parts together. For example:
  14 × 15 14 × 10 = 140
  140 ÷ 2 = 70
  14 × 15 = 210
  Alternatively, multiply by 30, then divide by 2.

- To multiply by 25, multiply by 100, then divide by 4. For example:
  39 × 25 39 × 100 = 3900 3900 ÷ 4 = 975

- Work out the 24 times-table facts by doubling the 6 times-table facts and doubling again.

- Work out:
  1 × 32 = 32 and so deduce that
  2 × 32 = 64
  4 × 32 = 128
  8 × 32 = 256
  16 × 32 = 512 …

  Use combinations of these facts to work out other multiples of 32.

Explain how to find sixths and twelfths by halving thirds, or twentieths by halving tenths.
For example, work out mentally that:
- one twelfth of 300 is 25
  (one third of 300 is 100, half is 50, half again is 25);
- one twentieth of 150 is 7½
  (one tenth is 15, and half of that is 7½).

Use factors. For example:
35 × 18 35 × 6 = 210
210 × 3 = 630 35 × 18 = 630

378 ÷ 21 378 ÷ 3 = 126
126 ÷ 7 = 18 378 ÷ 21 = 18

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use closely related facts already known	Work out the 6 times-table by adding 2 times-table facts to 4 times-table facts. To multiply a number by 9 or 11, multiply it by 10 and add or subtract the number. For example: $13 \times 11 = (13 \times 10) + 13$ $= 130 + 13$ $= 143$ $13 \times 9 = (13 \times 10) - 13$ $= 130 - 13$ $= 117$
Partition and use the distributive law	Begin to multiply a two-digit number by a single-digit number, multiplying the tens first. For example: $32 \times 3 = (30 \times 3) + (2 \times 3)$ $= 90 + 6$ $= 96$
Use the relationship between multiplication and addition, or multiplication and division	Continue to recognise that knowing one of: $12 \times 9 = 108$ $9 \times 12 = 108$ $108 \div 9 = 12$ $108 \div 12 = 9$ means that you also know the other three. Recognise and use, for example, $25 \times 4 = 25 + 25 + 25 + 25$. Answer oral or written questions like: • Given that $14 \times 6 = 84$, what is 6×14, or $84 \div 6$, or $84 \div 14$? • Given that $400 \div 5 = 80$, what is $400 \div 80$, or 5×80, or 80×5? • Use the numbers 2, 15 and 30. Say or write four different multiplication or division statements relating the numbers.

As outcomes, Year 5 pupils should, for example:

Work out the 12 times-table by adding 2 times-table facts to 10 times-table facts.

To multiply a number by 19 or 21, multiply it by 20 and add or subtract the number. For example:

$13 \times 21 = (13 \times 20) + 13$
$= 260 + 13$
$= 273$

$13 \times 19 = (13 \times 20) - 13$
$= 260 - 13$
$= 247$

Multiply a two-digit number by a single-digit number, multiplying the tens first. For example:

$47 \times 5 = (40 \times 5) + (7 \times 5)$
$= 200 + 35$
$= 235$

Continue to recognise that knowing one of:

$23 \times 3 = 69$ $3 \times 23 = 69$
$69 \div 3 = 23$ $69 \div 23 = 3$

means that you also know the other three.

Recognise, for example, that:

- if $12 \times 6 = 72$, then $\frac{1}{6}$ of 72 = 12 and $\frac{1}{12}$ of 72 = 6.

Answer oral or written questions like:

- Given that $14 \times 11 = 154$,
  what is 11×14, or $154 \div 11$, or $154 \div 14$?
- Given that $315 \div 15 = 21$,
  what is $315 \div 21$, or 15×21 or 21×15?
- Use the numbers 20, 15 and 300.
  Say or write four different multiplication or division statements relating the numbers.

As outcomes, Year 6 pupils should, for example:

Work out the 17 times-table by adding 7 times-table facts to 10 times-table facts.

To multiply a number by 49 or 51, multiply it by 50 and add or subtract the number. For example:

$13 \times 51 = (13 \times 50) + 13$
$= 650 + 13$
$= 663$

$13 \times 49 = (13 \times 50) - 13$
$= 650 - 13$
$= 637$

To multiply a number by 99 or 101, multiply it by 100 and add or subtract the number. For example:

$13 \times 101 = (13 \times 100) + 13$
$= 1300 + 13$
$= 1313$

$13 \times 99 = (13 \times 100) - 13$
$= 1300 - 13$
$= 1287$

Continue to multiply a two-digit number by a single-digit number, multiplying the tens first. For example:

$86 \times 7 = (80 \times 7) + (6 \times 7)$
$= 560 + 42$
$= 602$

Multiply a whole number and tenths by a single-digit number, multiplying the units first. For example:

$8.6 \times 7 = (8 \times 7) + (0.6 \times 7)$
$= 56 + 4.2$
$= 60.2$

Continue to recognise that knowing one of:

$0.75 \times 4 = 3$ $4 \times 0.75 = 3$
$3 \div 4 = 0.75$ $3 \div 0.75 = 4$

means that you also know the other three.

Recognise, for example, that:

- if $5 \times 60 = 300$, then $\frac{1}{5}$ of 300 = 60 and $\frac{1}{6}$ of 300 = 50;
- if $\frac{3}{4}$ of 4 = 3, then $4 \times \frac{3}{4} = 3$.

Answer oral or written questions like:

- Given that $1.4 \times 1.1 = 1.54$,
  what is 1.1×1.4, or $1.54 \div 1.1$, or $1.54 \div 1.4$?
- Given that $31.5 \div 15 = 2.1$,
  what is $31.5 \div 2.1$, or 15×2.1 or 2.1×15?
- Use the numbers 0.2, 0.3 and 0.06.
  Say or write four different multiplication or division statements relating the numbers.

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Use known number facts and place value to multiply or divide mentally	*Multiply a two- or three-digit number by 10 or 100* For example: 327×10 54×100 Work mentally to complete written questions like: $96 \times 100 = \square$ $82 \times \square = 8200$ *Divide a four-digit multiple of 1000 by 10 or 100* For example: $8000 \div 100$ $3000 \div 10$ Respond to oral questions like: • Find one tenth of 6000... • Find one hundredth of 4000... Work mentally to complete written questions like: $\square \div 100 = 60$ $9000 \div 100 = \square$ $6000 \div \square = 60$ *Double any multiple of 5 up to 100* Respond to oral questions such as double 30 or double 45, and explain method. Work mentally to complete written questions like: $55 \times 2 = \square$ $\square \times 2 = 150$ then explain method in writing. *Halve any multiple of 10 to 200* Respond to oral questions such as half of 70, halve 150, and explain method. Work mentally to complete written questions like: $150 \div 2 = \square$ $\square \div 2 = 65$ ½ of 80 = □ then explain method in writing. *Consolidate multiplying a two-digit multiple of 10 by 2, 3, 4, 5 or 10 and begin to multiply by 6, 7, 8 or 9* Respond to oral questions like: 20×3 40×5 90×10 70×6 and explain method. Work mentally to complete written questions like: $70 \times 2 = \square$ $20 \times \square = 100$ $\square \times 10 = 500$ $500 = 10 \times \square$ $121 = 60 \times \square + 1$ then explain method in writing. *Multiply a two-digit number by 2, 3, 4 or 5, crossing the tens boundary* Work mentally to complete written questions like: $13 \times 5 = \square$ $18 \times \square = 54$ $70 = 10 \times \square$ $22 = 5 \times \square + 2$ then explain method in writing. Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 5 pupils should, for example:

Multiply a two-digit multiple of 10 by a three-digit multiple of 100

For example:

30 × 400 40 × 700

Work mentally to complete written questions like:

50 × 900 = □ 60 × □ = 42 000

Divide a four-digit multiple of 100 by 1000, 100 or 10

For example:

8200 ÷ 100 3600 ÷ 10

Respond to oral questions like:

- Find one thousandth of 4000…
- Find one hundredth of 9000… of 5400…
- Find one tenth of 5000… of 6400…

Work mentally to complete written questions like:

□ ÷ 1000 = 6 3900 ÷ 10 = □ 6200 ÷ □ = 62

Double any multiple of 5 up to 500

Respond to oral questions such as double 420 or double 345, and explain method.

Work mentally to complete written questions like:

135 × 2 = □ □ × 2 = 630

then explain method in writing.

Halve any three-digit multiple of 10

Respond to oral questions such as half of 700, half of 650, and explain method.

Work mentally to complete written questions like:

150 ÷ 2 = □ □ ÷ 2 = 185

150 × ½ = □ □ × ½ = 75

then explain method in writing.

Multiply a two-digit multiple of 10 or a three-digit multiple of 100 by a single-digit number

Respond to oral questions like:

400 × 9 60 × 8

and explain method.

Work mentally to complete written questions like:

700 × 5 = □ 20 × □ = 180

2000 = 900 × □ + 200

then explain method in writing.

Multiply a two-digit whole number by any single-digit number, crossing the tens boundary

Respond to oral questions like:

24 × 3 17 × 4

and explain method.

Work mentally to complete written questions like:

49 × 6 = □ 28 × □ = 140

then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

As outcomes, Year 6 pupils should, for example:

Multiply a decimal fraction with one or two decimal places by 10 or 100

For example:

3.27 × 10 5.4 × 100

Work mentally to complete written questions like:

9.6 × 100 = □ 0.82 × □ = 82

Divide a one- or two-digit whole number by 100 or 10

For example:

84 ÷ 100 3 ÷ 10 7 ÷ 100

Respond to oral questions like:

- Find one hundredth of 91… of 5…
- Find one tenth of 52… of 6…

Work mentally to complete written questions like:

□ ÷ 100 = 0.6 39 ÷ 10 = □ 62 ÷ □ = 0.62

Double a decimal fraction less than 1 with one or two decimal places

Respond to oral questions such as double 0.75 or double 0.9, and explain method.

Work mentally to complete written questions like:

0.65 × 2 = □ □ × 2 = 1.6

then explain method in writing.

Halve a decimal fraction less than 1 with one or two decimal places

Respond to oral questions such as half of 0.7, half of 0.62, half of one quarter, and explain method.

Work mentally to complete written questions like:

0.15 ÷ 2 = □ □ ÷ 2 = 0.85

0.15 × 0.5 = □

then explain method in writing.

Multiply a decimal fraction such as 0.6 by a single-digit number

Respond to oral questions like:

0.4 × 9 0.7 × 8

and explain method.

Work mentally to complete written questions like:

0.7 × 5 = □ 0.2 × □ = 1.8 □ × 9 = 5.4

then explain method in writing.

Multiply a two-digit whole number or decimal fraction by any single-digit number

Respond to oral questions like:

83 × 7 39 × 6

and explain method.

Work mentally to complete written questions like:

3.7 × 5 = □ 4.2 × □ = 16.8 □ × 9 = 14.4

then explain method in writing.

Use and apply these skills in a variety of contexts, in mathematics and other subjects.

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:

Develop and refine written methods for multiplication

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy.
Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: grid method (TU × U)

For example, 23 × 8 is approximately 20 × 10 = 200.

×	20	3	
8	160	24	= 184

Standard written methods

Develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens…

B: partitioning

Short multiplication: TU × U
For example, 23 × 7 is approximately 20 × 10 = 200.

```
            23                    23
          ×  7   leading to    ×   7
20 × 7     140                   161
 3 × 7      21                    2
           161
```

As outcomes, Year 5 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: grid method (HTU × U and TU × TU)

346 × 9 is approximately 350 × 10 = 3500.

346 × 9

×	300	40	6	
9	2700	360	54	= 3114

72 × 38 is approximately 70 × 40 = 2800.

72 × 38

×	70	2	
30	2100	60	2160
8	560	16	+ 576
			2732

Standard written methods

Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens…

B: partitioning

Short multiplication: HTU × U

346 × 9 is approximately 350 × 10 = 3500.

```
  346                    346
×   9                  ×   9
300 × 9   2700   leading to  3114
 40 × 9    360               4 5
  6 × 9     54
          3114
```

Long multiplication: TU × TU

72 × 38 is approximately 70 × 40 = 2800.

```
    72
  × 38
72 × 30  2160
72 ×  8   576
         2736
          1
```

Extend to simple decimals with one decimal place

Multiply by a single digit, approximating first. Know that decimal points should line up under each other.

4.9 × 3 is approximately 5 × 3 = 15.

```
4.9 × 3   4.0 × 3 = 12.0
          0.9 × 3 =  2.7
                    14.7
```

As outcomes, Year 6 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: grid method (ThHTU × U and HTU × TU)

4346 × 8 is approximately 4500 × 10 = 45000.

4346 × 8

×	4000	300	40	6	
8	32000	2400	320	48	= 34768

372 × 24 is approximately 400 × 20 = 8000.

372 × 24

×	300	70	2	
20	6000	1400	40	7440
4	1200	280	8	+ 1488
				8928

Standard written methods

Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens…

B: partitioning

Short multiplication: ThHTU × U

4346 × 8 is approximately 4500 × 10 = 45000.

```
   4346                    4346
 ×    8                  ×    8
4000 × 8   32000   leading to  34768
 300 × 8    2400              2 3 4
  40 × 8     320
   6 × 8      48
            34768
```

Long multiplication: HTU × TU

352 × 27 is approximately 350 × 30 = 10500.

```
    352
  × 27
352 × 20  7040
352 ×  7  2464
          9504
           1
```

Extend to decimals with up to two decimal places

Multiply by a single digit, approximating first. Know that decimal points should line up under each other.

4.92 × 3 is about 5 × 3 = 15.

```
4.92 × 3   4.00 × 3 = 12.00
           0.90 × 3 =  2.70
           0.02 × 3 =  0.06
                      14.76
```

Begin to extend to multiplying by two-digit numbers: for example, 4.92 × 73 is about 5 × 70 = 350.

Pupils should be taught to:

Develop and refine written methods for division

As outcomes, Year 4 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy.
Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: using multiples of the divisor

TU ÷ U

For example, 72 ÷ 5 lies between 50 ÷ 5 = 10 and 100 ÷ 5 = 20.

```
72 ÷ 5        = (50 + 22) ÷ 5
              =  10 + 4 remainder 2
              or 14 remainder 2
or:
72 ÷ 5         72
           –  50      10 × 5
              22
           –  20       4 × 5
               2

          Answer:      14 remainder 2
```

Standard written methods

Develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens, and so on...

B: short division TU ÷ U

For example, 96 ÷ 6 is approximately 100 ÷ 5 = 20.

```
96 ÷ 6
                ____
             6) 96
              – 60      10 × 6
                36
              – 36       6 × 6
                 0

             Answer:     16
```

See also understanding remainders (page 56).

As outcomes, Year 5 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: using multiples of the divisor

HTU ÷ U

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

```
256 ÷ 7      256
           −  70      10 × 7
             186
           − 140      20 × 7
              46
           −  42       6 × 7
               4
         Answer:      36 remainder 4
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens...

B: short division HTU ÷ U

196 ÷ 6 is approximately 200 ÷ 5 = 40.

```
   32 R 4
6)196
  18
  16
  12
   4

  6) 196
   − 180   30 × 6
     16
   −  12    2 × 6
      4

Answer:  32 R 4
```

See also understanding remainders (page 57).

As outcomes, Year 6 pupils should, for example:

Informal written methods

Use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Discuss, explain and compare methods.

Approximate first. Explain orally how method works.

A: using multiples of the divisor

HTU ÷ TU

977 ÷ 36 is approximately 1000 ÷ 40 = 25.

```
977 ÷ 36     977
           − 360      10 × 36
             617
           − 360      10 × 36
             257
           − 180       5 × 36
              77
              72       2 × 36
               5
         Answer:      27 5/36
```

Standard written methods

Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens...

B: long division HTU ÷ TU

972 ÷ 36 is approximately 1000 ÷ 40 = 25.

```
   27
36) 972
  − 72
    252
  − 252
      0

 36) 972
  − 720    20 × 36
    252
  − 252     7 × 36
      0
Answer:     27
```

Extend to decimals with up to two decimal places

Approximate first. Know that decimal points should line up under each other.

87.5 ÷ 7 is approximately 80 ÷ 8 = 10.

```
  7) 87.5
 − 70.0     10 × 7
   17.5
   14.0      2 × 7
    3.5
    3.5      0.5 × 7
    0.0
 Answer:    12.5
```

See also understanding remainders (page 57).

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Develop calculator skills and use a calculator effectively	

As outcomes, Year 5 pupils should, for example:

Use, read and write, spelling correctly:
calculator, display, key, enter, clear, constant...

Know how to:

- clear the display before starting a calculation;
- use the [+], [–], [×] and [÷] keys, the [=] key and decimal point to calculate with realistic data;
- change an accidental wrong entry by using the [clear entry] key;
- recognise a negative number output;
- key in and interpret money calculations: for example, key in £4.35 + £3.85 as 4.35 [+] 3.85 [=], and interpret the outcome of 8.2 as £8.20;
  key in £6.30 + 85p as 6.3 [+] 0.85 [=], recognising that '0.' signals no pounds and only pence (alternatively, change money to pence and divide final answer by 100 to convert back to pounds);
- begin to select the correct key sequence to carry out calculations involving more than one step: for example, 8 × (37 + 58);
- know, for example, that a number such as 81.75 lies between 81 and 82;
- interpret a rounding error such as 6.9999999 as 7;
- have a feel for the approximate size of an answer, and check it by performing the inverse calculation or by clearing and repeating the calculation.

Use a calculator to respond to questions such as:

- The perimeter of a square is 274 cm.
  What is the length of each side?

- Julie is 92 cm tall. Tom is 184 cm tall.
  Lisa's height is half way between Julie's height and Tom's height.
  Calculate Lisa's height.

- Write the missing number: 3.42 + □ = 12.1.

- Emma saves £3.50 each week.
  How much has she saved after 16 weeks?

- Rupert saves the same amount of money each month.
  He saved £149.40 in a year.
  How much money does he save each month?

- There are 75 grams of rice in one portion.
  How many portions are there in a 3 kg bag of rice?

- Find three consecutive numbers which add up to 171.

As outcomes, Year 6 pupils should, for example:

Use, read and write, spelling correctly:
calculator, display, key, enter, clear, constant... recurring

Know how to:

- use the [clear] and [clear entry] keys, all operation keys, the [=] key and decimal point, to calculate with realistic data;
- recognise a negative number output and use the [sign change] key where appropriate;
- key in and interpret the outcome of calculations involving sums of money;
- key in fractions, recognise the equivalent decimal form, and use this to compare and order fractions;
- read the display of, say, 0.3333333 as 'point three recurring', know that it represents one third, and that 0.6666666 represents two thirds;
- start to use the memory and select the correct key sequence to carry out calculations involving more than one operation including brackets:
  for example, (23 + 41) × (87 + 48);
- have a feel for the approximate size of an answer after a calculation, and check it appropriately.

Use a calculator to respond to questions such as:

- The area of a square is 256 cm^2.
  What is the length of each side?

- Every day a machine makes 100 000 paper clips which go into boxes.
  A full box has 120 paper clips. How many full boxes can be made from 100 000 paper clips?

  Each paper clip is made from 9.2 cm of wire.
  What is the greatest number of paper clips that can be made from 10 metres of wire?

- 2753 people go to a sports event.
  Each person pays £2.30 for a ticket.
  What is the total amount of ticket money collected?

- Programmes cost 65p each.
  The total money from programme sales is £612.95.
  How many programmes are sold?

- Calculate 24% of 525.

- Write the missing number: 568.1 ÷ □ = 24.7.

- Find two consecutive numbers with a product of 1332.

CALCULATIONS

Pupils should be taught to:	As outcomes, Year 4 pupils should, for example:
Check by doing the inverse operation	For example, check: • 625 – 87 = 538 with 538 + 87 = 625; • 160 ÷ 4 = 40 with 40 × 4 = 160. • half of 36 = 18 with double 18.
Check the sum of several numbers by adding them in reverse order	Check the total of several numbers by adding them in reverse order.
Do an equivalent calculation	For example, check: • 140 + 136 with 140 + 130 + 6, or double 140 minus 4; • 35 × 4 with 30 × 4 plus 5 × 4, or four 40s minus four 5s, or 35 + 35 + 35 + 35.
Approximate by rounding	Use rounding to approximate. For example: • 297 + 406 is about 300 + 400 (rounding to the nearest hundred).
Use knowledge of sums or products of odd or even numbers	Recognise that the sum of: • two or more even numbers is even: for example, 78 + 26 is even; • two odd numbers is even: for example, 73 + 57 is even; • three odd numbers is odd: for example, 23 + 13 + 59 is odd; • one odd and one even number is odd: for example, 47 + 36 is odd. Recognise that the difference between: • two even numbers is even: for example, 78 – 26 is even; • two odd numbers is even: for example, 73 – 57 is even; • one odd and one even number is odd: for example, 68 – 49 is odd.
Use tests of divisibility	

As outcomes, Year 5 pupils should, for example:

For example, use a calculator to check:
- 3685 – 987 = 2698 with 2698 + 987 = 3685;
- 1650 ÷ 50 = 33 with 33 × 50 = 1650;
- half of 920 = 460 with double 460;
- ⅕ of 300 = 60 with 60 × 5 = 300.

Check the total of several numbers by adding them in reverse order.

For example, check:
- 2400 + 1365 with 3000 + 765, or 1765 + 2000;
- 86 × 9 with (80 × 9) + (6 × 9), or (86 × 10) – 86.

Use rounding to approximate. For example:
- 523 + 228 is more than 500 + 200;
- 605 – 197 is about 600 – 200;
- 24 × 19 is approximately 25 × 20;
- 520 ÷ 11 is about 500 ÷ 10.

Recognise that the sum of:
- two or more even numbers is even: for example, 132 + 512 is even;
- two odd numbers is even: for example, 423 + 617 is even;
- three odd numbers is odd: for example, 523 + 13 + 259 is odd;
- one odd and one even number is odd: for example, 917 + 226 is odd.

Recognise that the difference between:
- two even numbers is even: for example, 178 – 426 is even;
- two odd numbers is even: for example, 673 – 257 is even;
- one odd and one even number is odd: for example, 568 – 349 is odd.

As outcomes, Year 6 pupils should, for example:

For example, use a calculator to check:
- 6.5 – 9.8 = –3.3 with –3.3 + 9.8 = 6.5;
- 4.8 ÷ 5 = 0.96 with 0.96 × 5 = 4.8;
- half of 8.1 = 4.05 with double 4.05;
- ⅛ of 320 = 40 with 40 × 8 = 320.

Check the total of several numbers by adding them in reverse order.

For example, check:
- 24.5 – 3.35 with 21 + 0.5 – 0.35, or 24.5 – 3.5 + 0.15;
- 486 × 8 with (486 × 10) – 972, or (500 × 8) – (14 × 8).

Use rounding to approximate. For example:
- 2593 + 6278 is more than 2500 + 6200;
- 2605 – 1997 is about 2600 – 2000;
- 245 × 19 is approximately 250 × 20;
- 786 ÷ 38 is about 800 ÷ 40.

Recognise that the sum of:
- two or more even numbers is even: for example, 4132 + 512 is even;
- an even number of odd numbers is even: for example, 8423 + 5617 is even;
- an odd number of odd numbers is odd: for example, 1523 + 9013 + 2259 is odd.

Recognise that the difference between:
- two even numbers is even: for example, 7982 – 268 is even;
- two odd numbers is even: for example, 4735 – 1579 is even;
- one odd and one even number is odd: for example, 3687 – 49 is odd.

Recognise that the product of:
- two or more even numbers is even: for example, 74 × 36 is even;
- two odd numbers is odd: for example, 93 × 27 is odd;
- one odd and one even number is even: for example, 59 × 42 is even.

Use knowledge that in exact multiples of:

100	the last two digits are 00;
25	the last two digits are 00, 25, 50 or 75;
10	the last digit is 0;
2	the last digit is 0, 2, 4, 6 or 8;
3	the sum of the digits is divisible by 3;
4	the last two digits are divisible by 4;
5	the last digit is 0 or 5;
6	the number is even **and** divisible by 3;
8	the last 3 digits are divisible by 8;
9	the sum of the digits is divisible by 9.