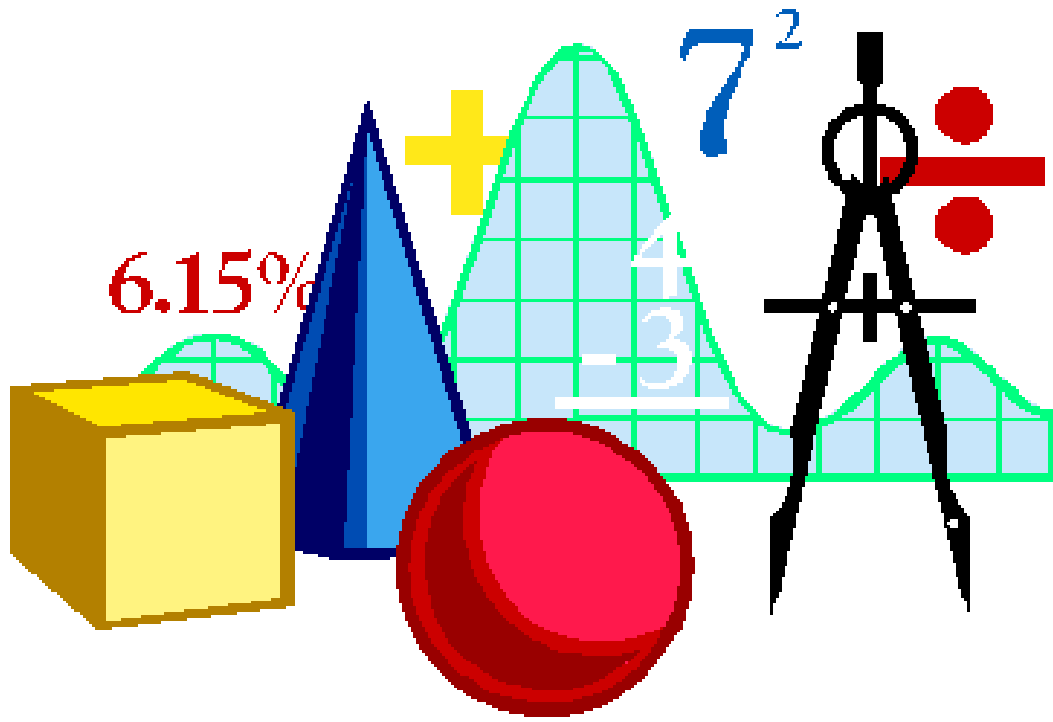


My Mental Arithmetic Skills Book 1



Name:

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Odd and even numbers

- All numbers are either even or odd
- Odd numbers end in one of these numbers: 1, 3, 5, 7, 9
- Even numbers end in one of these numbers: 2, 4, 6, 8, 0
- When you count every second number is odd: 1, 3, 5, 7, 9, 11, 13, 15 and so on
- When you count every second number is even: 2, 4, 6, 8, 10, 12, 14
- You can tell if a bigger number is odd or even by looking at the last digit: 289 This number is odd because it ends in a 9.
68,234 This number is even because it ends in a 4.

Check your understanding

Which of these numbers are odd and which are even?

16,782	165	290	324,867	1,894
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Partitioning numbers

The term partitioning means to split up.

All numbers above 9 can be partitioned:

- 13 can be split into 1 ten (10) and 3 ones (1+1+1)
- 234 can be split up into 2 hundreds (100 + 100), three tens (10 + 10 + 10) and 4 ones (1+1+1+1)

Being able to partition numbers quickly really helps when doing mental arithmetic.

Check your understanding

Can you partition these numbers?

357

495

687

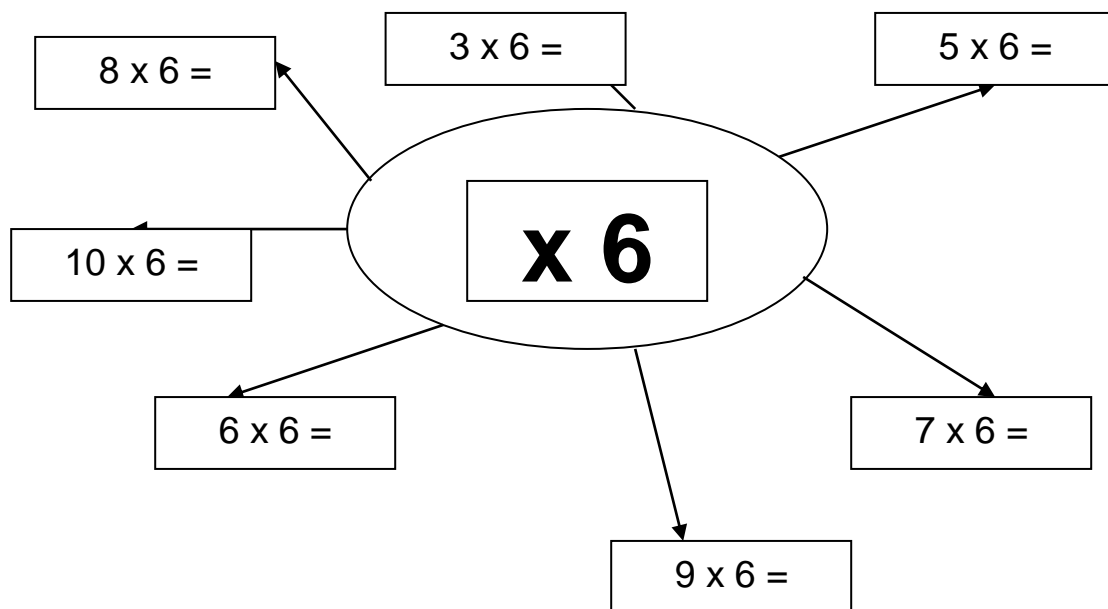
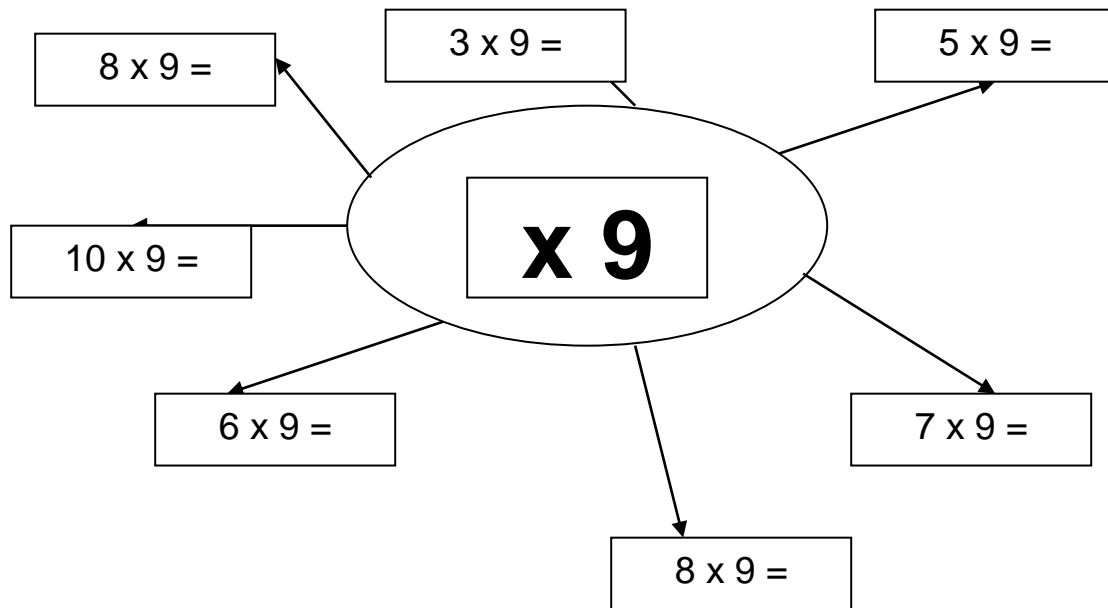
1,238

Multiplication tables

How to learn them:

- Learn them from 1x to 12x
- Say the whole sum: $1 \times 4 = 4$; $2 \times 4 = 8$; $3 \times 4 = 12$ and so on
- Learn them in sections: $1 \times 6 = 6$; $2 \times 6 = 12$; $3 \times 6 = 18$. Learn these first, then go up to 4×6 . When you know these add another one
- Remember easy ones 10x and 11x. It's good to get to know 6x quickly as this is halfway through
- Say them out loud – chant them
- Try to write them down in order, as fast as you can
- Practise using the multiplication dominoes
- When you really know them, try to say the table backwards: $12 \times 7 = 94$; $11 \times 7 = 77$; $10 \times 7 = 70$ and so on
- Say them in the bath; first thing in the morning; on the way to school; just before you go to sleep; to a friend at school; to one of your parents

- Try out this idea:



2 times table

$$1 \times 2 = 2$$

$$2 \times 2 = 4$$

$$3 \times 2 = 6$$

$$4 \times 2 = 8$$

$$5 \times 2 = 10$$

$$6 \times 2 = 12$$

$$7 \times 2 = 14$$

$$8 \times 2 = 16$$

$$9 \times 2 = 18$$

$$10 \times 2 = 20$$

$$11 \times 2 = 22$$

$$12 \times 2 = 24$$

3 times table

$$1 \times 3 = 3$$

$$2 \times 3 = 6$$

$$3 \times 3 = 9$$

$$4 \times 3 = 12$$

$$5 \times 3 = 15$$

$$6 \times 3 = 18$$

$$7 \times 3 = 21$$

$$8 \times 3 = 24$$

$$9 \times 3 = 27$$

$$10 \times 3 = 30$$

$$11 \times 3 = 33$$

$$12 \times 3 = 36$$

4 times table

$$1 \times 4 = 4$$

$$2 \times 4 = 8$$

$$3 \times 4 = 12$$

$$4 \times 4 = 16$$

$$5 \times 4 = 20$$

$$6 \times 4 = 24$$

$$7 \times 4 = 28$$

$$8 \times 4 = 32$$

$$9 \times 4 = 36$$

$$10 \times 4 = 40$$

$$11 \times 4 = 44$$

$$12 \times 4 = 48$$

5 times table

$$1 \times 5 = 5$$

$$2 \times 5 = 10$$

$$3 \times 5 = 15$$

$$4 \times 5 = 20$$

$$5 \times 5 = 25$$

$$6 \times 5 = 30$$

$$7 \times 5 = 35$$

$$8 \times 5 = 40$$

$$9 \times 5 = 45$$

$$10 \times 5 = 50$$

$$11 \times 5 = 55$$

$$12 \times 5 = 60$$

6 times table

$$1 \times 6 = 6$$

$$2 \times 6 = 12$$

$$3 \times 6 = 18$$

$$4 \times 6 = 24$$

$$5 \times 6 = 30$$

$$6 \times 6 = 36$$

$$7 \times 6 = 42$$

$$8 \times 6 = 48$$

$$9 \times 6 = 54$$

$$10 \times 6 = 60$$

$$11 \times 6 = 66$$

$$12 \times 6 = 72$$

7 times table

$$1 \times 7 = 7$$

$$2 \times 7 = 14$$

$$3 \times 7 = 21$$

$$4 \times 7 = 28$$

$$5 \times 7 = 35$$

$$6 \times 7 = 42$$

$$7 \times 7 = 49$$

$$8 \times 7 = 56$$

$$9 \times 7 = 63$$

$$10 \times 7 = 70$$

$$11 \times 7 = 77$$

$$12 \times 7 = 84$$

8 times table

$$1 \times 8 = 8$$

$$2 \times 8 = 16$$

$$3 \times 8 = 24$$

$$4 \times 8 = 32$$

$$5 \times 8 = 40$$

$$6 \times 8 = 48$$

$$7 \times 8 = 56$$

$$8 \times 8 = 64$$

$$9 \times 8 = 72$$

$$10 \times 8 = 80$$

$$11 \times 8 = 88$$

$$12 \times 8 = 96$$

9 times table

$$1 \times 9 = 9$$

$$2 \times 9 = 18$$

$$3 \times 9 = 27$$

$$4 \times 9 = 36$$

$$5 \times 9 = 45$$

$$6 \times 9 = 54$$

$$7 \times 9 = 63$$

$$8 \times 9 = 72$$

$$9 \times 9 = 81$$

$$10 \times 9 = 90$$

$$11 \times 9 = 99$$

$$12 \times 9 = 108$$

10 times table

$$1 \times 10 = 10$$

$$2 \times 10 = 20$$

$$3 \times 10 = 30$$

$$4 \times 10 = 40$$

$$5 \times 10 = 50$$

$$6 \times 10 = 60$$

$$7 \times 10 = 70$$

$$8 \times 10 = 80$$

$$9 \times 10 = 90$$

$$10 \times 10 = 100$$

$$11 \times 10 = 110$$

$$12 \times 10 = 120$$

11 times table

$$1 \times 11 = 11$$

$$2 \times 11 = 22$$

$$3 \times 11 = 33$$

$$4 \times 11 = 44$$

$$5 \times 11 = 55$$

$$6 \times 11 = 66$$

$$7 \times 11 = 77$$

$$8 \times 11 = 88$$

$$9 \times 11 = 99$$

$$10 \times 11 = 110$$

$$11 \times 11 = 121$$

$$12 \times 11 = 132$$

12 times table

$$1 \times 12 = 12$$

$$2 \times 12 = 24$$

$$3 \times 12 = 36$$

$$4 \times 12 = 48$$

$$5 \times 12 = 60$$

$$6 \times 12 = 72$$

$$7 \times 12 = 84$$

$$8 \times 12 = 96$$

$$9 \times 12 = 108$$

$$10 \times 12 = 120$$

$$11 \times 12 = 132$$

$$12 \times 12 = 144$$

Counting on

To get from a smaller number to a bigger number you can count on.

For example:

How many more is it from 26 to 82?

- **Step 1: count from 26 to the next multiple of 10**
- **The next multiple of 10 is 30**
- **26 to 30 is 4**
- **Step 2: count on from 30 to 80 in 10s: 40, 50, 60, 70, 80 5 tens or 50**
- **Step 3: count on from 80**
- **80 to 82 is 2**
- **Step 5: now add together those numbers: $4 + 50 + 2 = 56$**

A different way of doing this is to add a multiple of 10:

$$26 + 60 = 86$$

86 is 4 too many – we want 82

$$60 - 4 = 56$$

Check your understanding

How many more is it from 34 to:

84	96	61	58	71	112	133
----	----	----	----	----	-----	-----

Counting back

To get from a bigger number to a smaller number you can count back.

For example:

What is the difference (the gap) between 76 and 47?

- **Step 1: count back 76 to the next lowest multiple of 10**
- **The next lowest multiple of 10 is 70**
- **76 to 70 is 6**
- **Step 2: count back from 70 to the next multiple of 10 that is more than 47 in 10s: that number is 50**
- **60, 50, 2 tens or 20**
- **Step 3: count back from 50 to 47 The answer is 3**
- **Step 5: now add together those numbers: $6 + 20 + 3 = 29$**

A different way of doing this is to take away a multiple of 10:

$$76 - 30 = 46$$

46 is 1 too small – we want 47

$$30 - 1 = 29$$

Check your understanding

Count back to find what is the difference between 94 and:

64	36	21	48	51	12	33
----	----	----	----	----	----	----

Number Bonds

Number bonds are pairs of numbers that, when they are added together, make a significant number (like 10, 20, 50, 100, 200, 500, 1,000). It is really important to:

- know some number bond facts
- be able to quickly use strategies to work out other number bond facts

The following number bonds need to be learnt:

Set 1: Bonds of numbers smaller than 10

Number	Bonds
3	1+2 2+1
4	1+3 3+1 2+2
5	2+3 3+2 4+1 1+4

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

Set 2:

$$1 + 9 = 10$$

$$9 + 1 = 10$$

$$2 + 8 = 10$$

$$8 + 2 = 10$$

$$3 + 7 = 10$$

$$7 + 3 = 10$$

$$4 + 6 = 10$$

$$6 + 4 = 10$$

$$5 + 5 = 10$$

Set 3:

$$1 + 19 = 20$$

$$19 + 1 = 20$$

$$2 + 18 = 20$$

$$18 + 2 = 20$$

$$3 + 17 = 20$$

$$17 + 3 = 20$$

$$4 + 16 = 20$$

$$16 + 4 = 20$$

$$5 + 15 = 20$$

$$15 + 5 = 20$$

$$6 + 14 = 20$$

$$14 + 6 = 20$$

$$7 + 13 = 20$$

$$13 + 7 = 20$$

$8 + 12 = 20$

$12 + 8 = 20$

$9 + 11 = 20$

$11 + 9 = 20$

$10 + 10 = 20$

Set 4:

Efficient strategy for working out number bonds to 50:

- find out how many more to the next multiple of 10
- count on in 10s to 50

Example: 23

- The next multiple of 10 is 30
- How many more to 30?
- $3 + 7 = 10$ 7 more to 30
- Count in 10s from 30 to 50: 20 more
- 20 add the 7 is 27 27 more

Check your understanding

How many more to 50?

14	26	31	28	11	42	33
----	----	----	----	----	----	----

Set 5:

Efficient strategy for working out number bonds to 100:

- find out how many more to the next multiple of 10
- count on in 10s to 100

Example: 34

- The next multiple of 10 is 40
- How many more to 40?
- $4 + 6 = 10$ 6 more to 40
- Count on in 10s from 40 to 100
- 50, 60, 70, 80, 90, 100
- 6 more 10s 60
- Add the 6 to 66 66 more

Check your understanding

How many more to 100?

18	22	37	24	15	42	38
----	----	----	----	----	----	----

Set 6:

Efficient strategy for working out number bonds to 500:

- **find out how many more to the next multiple of 10**
- **count on in 10s to 100**
- **count on in 100s to 500**

Example: 167

- **Step 1: how many from 67 to 100?**
- **Use the same strategy**
- **The next 10 after 60 is 70**
- **How many more to 70**
- **$7 + 3 = 10$ 3 more to 70**
- **Step 2: How many from 70 to 100?**
- **Count in 10s: 80, 90, 100**
- **30 more**
- **$30 + 3 = 33$ 33 more from 167 to 200**
- **Step 3: From 200 to 500 - count in 100s**

- 300, 400, 500 300 more
- $300 + 33 = 333$ 333 more to 500

Check your understanding

How many more to 500?

92	141	278	27	315	263	334
----	-----	-----	----	-----	-----	-----

Set 7:

Efficient strategy for working out number bonds to 1,000:

- find out how many more to the next multiple of 10
- count on in 10s to 100
- count on in 100s to 1,000

Example: 329

- **Step 1:** how many from 29 to 100?
- Use the same strategy
- The next 10 after 29 is 30
- How many more to 30
- $9 + 1 = 10$ 1 more to 30

- **Step 2: How many from 30 to 100?**
- **Count in 10s: 40, 50, 60, 70, 80, 90, 100**
- **70 more**
- **$70 + 1 = 71$ 71 more from 329 to 400**
- **Step 3: From 400 to 1,000 count in 100s**
- **500, 600, 700, 800, 900, 1,000**
- **600 more**
- **$600 + 71 = 671$ 671 more to 1,000**

Check your understanding

How many more to 1,000?

93	147	375	228	319	266	334
----	-----	-----	-----	-----	-----	-----

Doubling numbers

You must learn, off by heart, doubles of all numbers up to 30:

Number	Double
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	16
9	18
10	20
11	22
12	24
13	26
14	28
15	30

Number	Double
16	32
17	34

18	36
19	38
20	40
21	42
22	44
23	46
24	48
25	50
26	52
27	54
28	56
29	58
30	60

Doubling multiples of 10

If you know $4 + 4$, you also know $40 + 40$ and $400 + 400$. There is a pattern here:

Simple double	Derived fact 1	Derived fact 2
$1 + 1 = 2$	$10 + 10 = 20$	$100 + 100 = 200$
$2 + 2 = 4$	$20 + 20 = 40$	$200 + 200 = 400$
$3 + 3 = 6$	$30 + 30 = 60$	$300 + 300 = 600$
$4 + 4 = 8$	$40 + 40 = 80$	$400 + 400 = 800$
$5 + 5 = 10$	$50 + 50 = 100$	$500 + 500 = 1,000$

$6 + 6 = 12$	$60 + 60 = 120$	$600 + 600 = 1,200$
$7 + 7 = 14$	$70 + 70 = 140$	$700 + 700 = 1,400$
$8 + 8 = 16$	$80 + 80 = 160$	$800 + 800 = 1,600$
$9 + 9 = 18$	$90 + 90 = 180$	$900 + 900 = 1,800$
$10 + 10 = 20$	$100 + 100 = 200$	$1,000 + 1,000 = 2,000$
$11 + 11 = 22$	$110 + 110 = 220$	$1,100 + 1,100 = 2,200$
$12 + 12 = 24$	$120 + 120 = 240$	$1,200 + 1,200 = 2,400$
$13 + 13 = 26$	$130 + 130 = 260$	$1,300 + 1,300 = 2,600$
$14 + 14 = 28$	$140 + 140 = 280$	$1,400 + 1,400 = 2,800$
$15 + 15 = 30$	$150 + 150 = 300$	$1,500 + 1,500 = 3,000$

Doubling numbers (up to 99) – what to do

- **Step 1 – Partition the number into tens and units**
- **Step 2 - Double the tens**
- **Step 3 – Double the units**
- **Step 4 – add these two amounts together**

Example 1: 46

- **Step 1 – Partition the number into tens and units 40 and 6**
- **Step 2 - Double the tens 40 \implies 80**
- **Step 3 – Double the units 6 \implies 12**

- **Step 4 – add these two amounts together** $80 + 12 = 92$

Example 2: 79

- **Step 1 – Partition the number into tens and units** 70 and 9
- **Step 2 - Double the tens**
 $70 \implies 140$
- **Step 3 – Double the units**
 $9 \implies 18$
- **Step 4 – add these two amounts together** $140 + 18 = 158$

Check your understanding

Double these numbers

63	47	75	28	19	66	34
----	----	----	----	----	----	----

Doubling numbers over 100 – what to do

- **Step 1 – Partition the number into hundreds, tens and units**
- **Step 2 - Double the hundreds**
- **Step 3 – Double the tens**

- **Step 4 – Double the units**
- **Step 4 – add these three amounts together**

Example 1: 375

- **Step 1 – Partition the number into hundreds, tens and units 100 and 70 and 5**
- **Step 2 - Double the hundreds**
300 \implies 600
- **Step 3 – Double the tens**
70 \implies 140
- **Step 4 – Double the units 5 \implies 10**
- **Step 4 – add these three amounts together $600 + 140 + 10 = 750$**

Example 2: 674

- **Step 1 – Partition the number into hundreds, tens and units 600 and 70 and 4**
- **Step 2 - Double the hundreds**
600 \implies 1,200
- **Step 3 – Double the tens**
70 \implies 140
- **Step 4 – Double the units**

4 \longrightarrow **8**

- **Step 4 – add these three amounts together: $1,200 + 140 + 8 = 1,348$**

Check your understanding

Double these numbers

134	270	315	346	268	534
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Halving numbers

Two rules:

- **If you halve an even number you will always get a whole number**
- **If you halve an odd number you will not get a whole number: you will get something and a half**

26 is even Halve it: 13 – a whole number

37 is odd Halve it: 18 ½ or 18.5 – not a whole number

You must learn, off by heart, halves of all numbers up to 30:

Number	Half
1	½ or 0.5
2	1
3	1 ½ or 1.5
4	2
5	2 ½ or 2.5
6	3

7	3 ½ or 3.5
8	4
9	4 ½ or 4.5
10	5
11	5 ½ or 5.5
12	6
13	6 ½ or 6.5
14	7
15	7 ½ or 7.5

Number	Half
16	8
17	8 ½ or 8.5
18	9
19	9 ½ or 9.5
20	10
21	10 ½ or 10.5
22	11
23	11 ½ or 11.5
24	12
25	12 ½ or 12.5
26	13
27	13 ½ or 13.5
28	14
29	14 ½ or 14.5

30	15
----	----

Halving numbers (up to 99) – what to do

- **Step 1 – Partition the number into tens and units**
- **Step 2 - Halve the tens**
- **Step 3 – Halve the units**
- **Step 4 – add these two amounts together**

Example 1: 76

- **Step 1 – Partition the number into tens and units 70 and 6**
- **Step 2 - Halve the tens $70 \implies 35$**
- **Step 3 – Halve the units $6 \implies 3$**
- **Step 4 – add these two amounts together $35 + 3 = 38$**

Example 2: 89

- **Step 1 – Partition the number into tens and units 80 and 9**
- **Step 2 - Halve the tens $80 \implies 40$**
- **Step 3 – Halve the units $9 \implies 4.5$**

- **Step 4 – add these two amounts together** $40 + 4.5 = 44.5$

Check your understanding

Halve these numbers

63	47	75	28	19	66	34
----	----	----	----	----	----	----

Halving numbers over 100 – what to do

- **Step 1 – Partition the number into hundreds, tens and units**
- **Step 2 - Halve the hundreds**
- **Step 3 – Halve the tens**
- **Step 4 – Halve the units**
- **Step 4 – add these three amounts together**

Example 1: 164

- **Step 1 – Partition the number into hundreds, tens and units** 100 and 60 and 4
- **Step 2 - Halve the hundreds** 100 \implies 50

- Step 3 – Halve the tens $60 \implies 30$
- Step 4 – Halve the units $4 \implies 2$
- Step 4 – add these three amounts together $50 + 30 + 2 = 82$

Example 2: 479

- Step 1 – Partition the number into hundreds, tens and units 400 and 70 and 9
- Step 2 - Halve the hundreds $400 \implies 200$
- Step 3 – Halve the tens $70 \implies 35$
- Step 4 – Halve the units $9 \implies 4.5$
- Step 4 – add these three amounts together: $200 + 35 + 4.5 = 239.5$

Check your understanding

Halve these numbers

93	147	375	228	319	266	334
----	-----	-----	-----	-----	-----	-----

Near Doubles

Once you have learnt, off by heart, the doubles of numbers up to 30 you can use this knowledge to work out near doubles.

An example of a near double is $7 + 8$

- Double 7 is 14
- So $7 + 8$ is 14 plus 1 = 15

Another example is $13 + 14$

- Double 13 is 26
- So $13 + 14$ is 26 plus one more = 27

More near doubles

Near double	Related double fact	Calculation
$6 + 7$	$6 + 6 = 12$	$12 + 1 = 13$
$8 + 9$	$8 + 8 = 16$	$16 + 1 = 17$
$11 + 12$	$11 + 11 = 22$	$22 + 1 = 23$
$15 + 16$	$15 + 15 = 30$	$30 + 1 = 31$
$18 + 19$	$18 + 18 = 36$	$36 + 1 = 37$
$24 + 25$	$24 + 24 = 48$	$48 + 1 = 49$

Adding and subtracting multiples of 10 and 100

It's very easy to add or take away multiples of 10 from a number

Number	Addition
<u>36</u>	Add 10 makes 46: simply add 1 onto the 3 to make 4.
<u>36</u>	Add 60 makes 96: simply add 6 onto the 3. It was 3 tens, now it's 9 tens
<u>36</u>	Add 120 (that's 12 tens): Simply add 12 to the 3. It was three tens, now it's 15 tens Answer: 156
<u>547</u>	Add 100 more Simply add 1 to the 5 It was 5 hundreds, now it's 6 hundreds Answer: 647
<u>547</u>	Add 400 more Simply add 4 to the 5

	<p>It was 5 hundreds, now it's 9 hundreds</p> <p>Answer: 947</p>
<u>547</u>	<p>Add 1,500</p> <p>Simply add 15 to the 5</p> <p>It was 5 hundreds, now it's 20 hundreds</p> <p>Answer: 2,047</p>
Number	Subtraction
<u>86</u>	<p>Take 10 makes 76: simply take 1 away from the 8 to make 7.</p> <p>$86 - 10 = 76$</p>
<u>86</u>	<p>Take away 60 makes 26: simply take away 6 from the 8. It was 8 tens, now it's 2 tens</p> <p>$86 - 60 = 26$</p>
<u>386</u>	<p>Subtract 120 (that's 12 tens):</p> <p>Simply take away 12 from the 38. It was thirty-eight tens, now it's 26 tens</p> <p>$386 - 120 = 266$</p> <p>Answer: 266</p>
<u>547</u>	<p>Subtract 100</p> <p>Simply take 1 from the 5</p>

	<p>It was 5 hundreds, now it's 4 hundreds</p> <p>$547 - 100 = 447$</p> <p>Answer: 447</p>
<u>5</u>47	<p>Subtract 400</p> <p>Simply subtract 4 from the 5</p> <p>It was 5 hundreds, now it's 1 hundred</p> <p>$547 - 400 = 147$</p> <p>Answer: 147</p>

Using known facts

Knowing one fact can really help you to work out another calculation

Known fact	Using the fact
$8 \times 4 = 32$	So $80 \times 4 = \underline{320}$ $80 \times 40 = \underline{3,200}$ $800 \times 40 = \underline{32,000}$ $800 \times 400 = \underline{320,000}$
$8 \times 4 = 32$	So $9 \times 4 = (32 - 4)$ It's going to be 4 less $9 \times 4 = 36$
$8 \times 4 = 32$	So $32 \div 8 = 4$ $32 \div 4 = 8$
$8 \times 4 = 32$	So 16×4 must be double 8×4 $16 \times 4 = (32 \times 2)$ $16 \times 4 = 64$
If you were told that: $24 \times 5 = 120$	$5 \times 24 = 120$ $120 \div 24 = 5$ $120 \div 5 = 24$

Compensating strategies

- To add 9 to a number you add 10 and take away 1
- To add 11 to a number you add 10, then add another one
- To subtract 9 from a number take 10 away then add 1
- To subtract 11 from a number take 10 away then take away an extra 1

- To multiply a number by 5, multiply by 10 then half the answer
- To multiply a number by 20, multiply it by 10 and then double your answer

Multiplying by 10

It is very easy to multiply any whole number by 10.

All you do is move each digit one column to the left.

	Th.	Hundreds	Tens	Ones
			4	7
		4	7	

Example 1: 47×10

- The 4 moves from tens to hundreds
- The 7 moves from the ones column to the tens column
- There is nothing in the ones column so we put a 0 there as a place holder.
- $47 \times 10 = 470$ (in effect a 0 has been added)

Example 2: 169×10

	Th.	Hundreds	Tens	Ones
		1	6	9
	1	6	9	

- The 1 moves from hundreds to the thousands
- The 6 moves from the tens column to the hundreds column
- The 9 moves from the ones column to the tens column
- There is nothing left now in the ones column so we put a 0 there as a place holder.
- $169 \times 10 = 1,690$ (in effect a 0 has been added to 169)

Dividing by 10

When you divide a number by 10 each digit in the number moves one column to the right.

Th.	Hundreds	Tens	Ones	1/10ths
		4	7	
			4	7

Example 1: $47 \div 10$

- The 4 moves from tens to the ones column
- The 7 moves from the ones column to the tenths (1/10) column
- $47 \div 10 = 4.7$

Example 2: $169 \div 10$

Th.	Hundreds	Tens	Ones	1/10ths
	1	6	9	
		1	6	9

- The 1 moves from hundreds to the tens column
- The 6 moves from the tens column

to the ones column

- **The 9 moves from the ones column to the tenths (1/10ths) column**
- **$169 \div 10 = 16.9$**

Multiplying by 100

The rules for multiplying numbers by 100 are very similar to the rules for multiplying numbers by 10.

This time you move each digit 2 columns (or places) to the left.

	Th.	Hundreds	Tens	Ones
			4	7
	4	7		

Example 1: 47×100

- The 4 moves from tens to thousands
- The 7 moves from the ones column to the hundreds column
- There is nothing in the tens column so we put a 0 there as a place holder.
- There is nothing in the ones column so we put a 0 there as a place holder as well.
- $47 \times 100 = 47\underline{00}$ (in effect two 00s)

has been added)

Example 2: 169 x 100

10TH	TH.	Hundreds	Tens	Ones
		1	6	9
1	6	9		

- The 1 moves from hundreds to the ten thousands column
- The 6 moves from the tens column to the thousands column
- The 9 moves from the ones column to the hundreds column
- There is nothing left now in the tens column so we put a 0 there as a place holder.
- There is nothing left now in the ones column so we put a 0 there as a place holder as well.
- $169 \times 100 = 16,900$ (in effect two 00s has been added to 169)

Place value

In our counting system the position of a digit signals its value, or how big it is.

Our counting system is based upon the number ten

10 ones or units	One ten 10
10 tens	One hundred 100
10 hundreds	One thousand 1,000
10 thousands	One ten thousand 10,000
10 ten thousands	One hundred thousand 100,000
10 one hundred thousands	The big M A million 1,000,000

1	100	10	TH	H	T	U
M	TH	TH				

1	100	10	TH	H	T	U
M	TH	TH				
		5	1	7	6	4

This number is 51,764
Fifty-one thousand, seven hundred
and sixty-four

What does each digit represent?

Digit	Value
5	5 ten thousands 10,000 + 10,000 + 10,000 + 10,000 + 10,000
1	1 thousand 1,000
7	7 hundreds 100 + 100 + 100 + 100 + 100 + 100 + 100
6	6 tens 10 + 10 + 10 + 10 + 10 + 10
4	4 units 1 + 1 + 1 + 1

Check your understanding

What does each digit represent in each of these numbers? Can you show the numbers in columns?

23,875	3,401	165,940	1,200,000
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Measurements

These measurements must be learnt off by heart:

Time	
• Seconds in a minute	60
• Minutes in an hour	60
• Hours in a day	24
• Days in a week	7
• Days in a year	365
• Days in a leap year (every 4 th year)	366
• Weeks in a year	52
• Months in a year	12
• Years in a decade	10
• Years in a century	100
Length/distance	
• Millimetres in a centimetre	10
• Centimetres in a metre	100
• Millimetres in a metre	1,000
• Metres in a kilometre	1,000

Weight	
• Grammes in a kilogram	1,000
Capacity	
• Millilitres in a litre	1,000

How many days are there in each of the 12 months? Learn this rhyme:

30 days has September, April, June and November. All the rest have 31, except February alone, which has 28 days and 29 days in a leap year.

Mathematical terms

Term	Meaning	Example
consecutive number	A next door neighbour – every number has two consecutive numbers: the one before it and the one after it	6 has two consecutive numbers: the number before it: 5 and the number after it: 7
digit	A figure in a number	The number 47 has 2 digits: 4 and 7. The number 3,259 has 4 digits: 3,2,5 and 9.

divisible by	Can be divided exactly, without a remainder	12 is divisible by 4. There are exactly three 4s in 12.
factor	A number that will divide into another number without a remainder	The number 10 has four factors: 10 divides into it once 5 divides into it twice 2 divides into it five times 1 divides into it 10 times
greater than	More than or bigger than	13 is eight greater than 5
less than	Smaller than or lower than	6 less than 20 is 14.
multiple	A number that can be made by multiplying a given number	20 is a multiple of 5. It can be made by multiplying 5 four times. All these numbers are multiples of 5: 25, 40, 55, 100
partition	Split a number up	The number 157 can be partitioned into 100 and 50 and 7
product	Multiply together	The product of 6 and 3 is 18 $6 \times 3 = 18$
sum of	Add together	The sum of 6 and 3 is 9 $6 + 3 = 9$
the difference	How much bigger is one number than another. What is the size of the gap between them	The difference between 12 and 7 is 5. There are 5 numbers between 12 and 7 $12 - 7 = 5$

Key number facts

There are some number facts you just need to learn

There are 10 tens in 100	$10 \times 10 = 100$
There are 5 twenties in 100	$5 \times 20 = 100$
There are 4 twenty-fives in 100	$4 \times 25 = 100$
There are 8 lots of 12.5 in 100	$8 \times 12.5 = 100$
There are ten 100s in a thousand	$10 \times 100 = 1,000$
There are twenty 50s in a thousand	$20 \times 50 = 1,000$
To find half of a number you divide the number by 2	Half of 14 is the same as $14 \div 2$
To find a quarter of a number you	A quarter of 60

halve it, then halve it again	Halve it: 30 Halve it again: 15
1 million is written 1, followed by six 0s	1,000,000

Inverse operations

The word inverse means opposite.

- Adding (+) is the inverse of subtracting (-)
- Subtracting (-) is the opposite of adding (+)

$$5 + 2 = 7 \quad 7 - 2 = 5$$

$$234 - 139 = 95 \quad 95 + 139 = 234$$

- Multiplying (x) is the opposite of dividing (\div)
- Dividing (\div) is the opposite of multiplying (x)

$$12 \div 6 = 2 \quad 6 \times 2 = 12$$

$$384 \div 6 = 64 \quad 64 \times 6 = 384$$

- Doubling is the opposite of halving.
 - Halving is the opposite of doubling
- Double 189 = 378 Halve 378 = 189