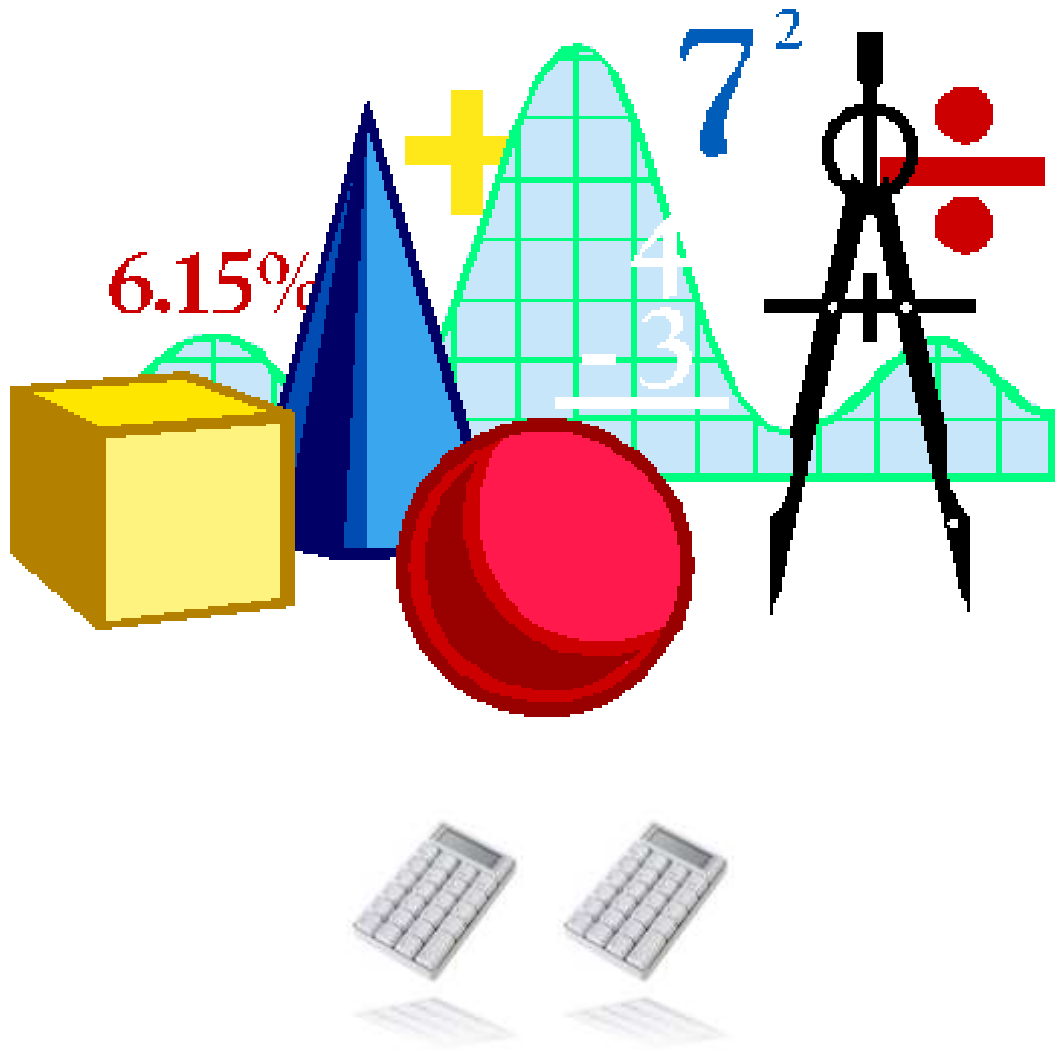


# My Mental Arithmetic Skills Book



Name:

# Contents

<b>Mathematical topic</b>	<b>Page</b>
• <b>Odd and even numbers</b>	<b>3</b>
• <b>Partitioning numbers</b>	<b>4</b>
• <b>Multiplication tables</b>	<b>5-17</b>
• <b>Counting on</b>	<b>18-19</b>
• <b>Counting back</b>	<b>20-21</b>
• <b>Number bonds</b>	<b>22-28</b>
• <b>Doubling numbers</b>	<b>29-34</b>
• <b>Halving numbers</b>	<b>35-39</b>
• <b>Near doubles</b>	<b>40</b>
• <b>Adding and subtracting multiples of 10</b>	<b>41-43</b>
• <b>Using known facts</b>	<b>44</b>
• <b>Compensating strategies</b>	<b>45</b>
• <b>Multiplying by 10</b>	<b>46-47</b>
• <b>Dividing by 10</b>	<b>48-49</b>
• <b>Multiplying by 100</b>	<b>50-51</b>
• <b>Place value</b>	<b>52-54</b>
• <b>Measurements</b>	<b>55-56</b>
• <b>Mathematical terms</b>	<b>56-57</b>
• <b>Key number facts</b>	<b>58-59</b>
• <b>Inverse operations</b>	<b>60</b>

# 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
--------	-----	-----	---------	-------

## 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

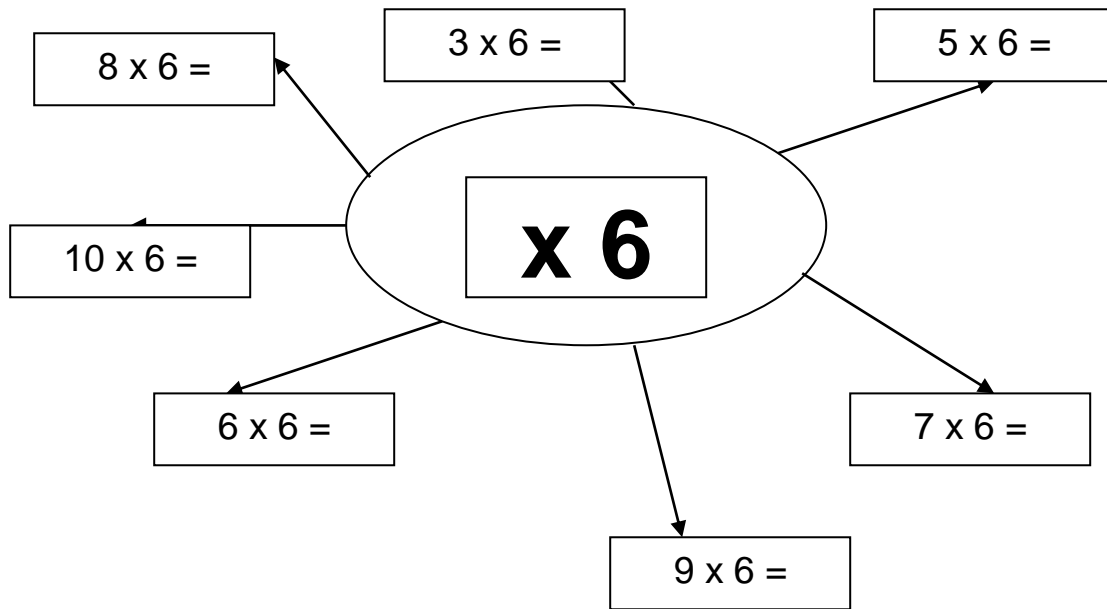
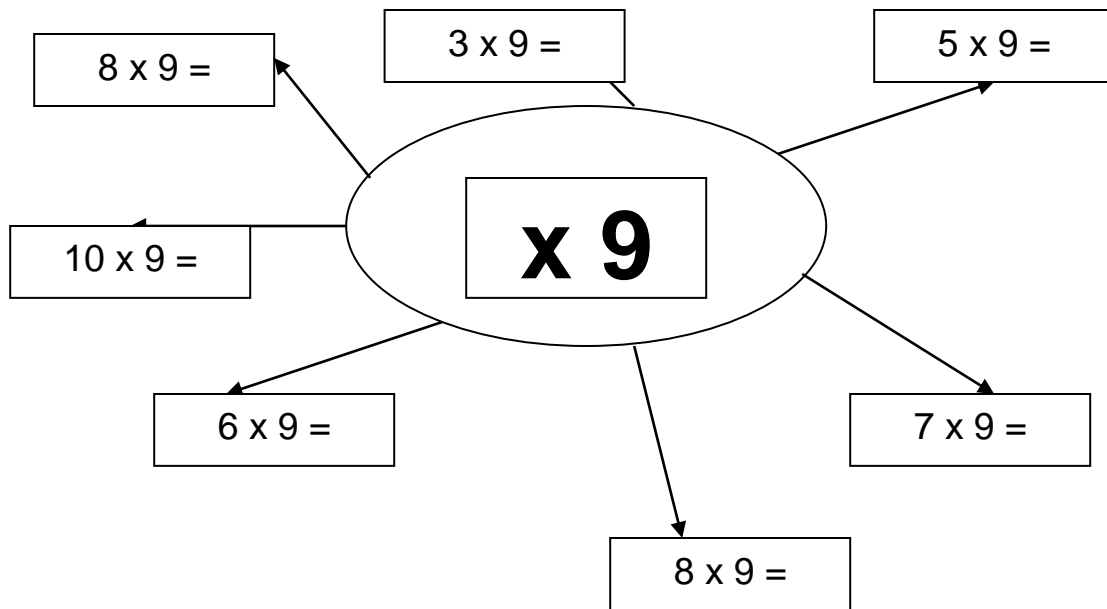
687

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  $4 \times 6$ . 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
- Use <https://www.studyzone.tv/topic-mentalmaths-timestables.php>
- 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

<b>6</b>	<b>1+5</b>	<b>5+1</b>	<b>2+4</b>	<b>4+2</b>	<b>3+3</b>
<b>7</b>	<b>1+6</b>	<b>6+1</b>	<b>2+5</b>	<b>5+2</b>	<b>3+4</b>
	<b>4+3</b>				
<b>8</b>	<b>1+7</b>	<b>7+1</b>	<b>2+6</b>	<b>6+2</b>	<b>3+5</b>
	<b>5+3</b>	<b>4+4</b>			
<b>9</b>	<b>1+8</b>	<b>8+1</b>	<b>2+7</b>	<b>7+2</b>	<b>3+6</b>
	<b>6+3</b>	<b>4+5</b>	<b>5+4</b>		

### 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:

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

<b>Number</b>	<b>Double</b>
<b>16</b>	<b>32</b>
<b>17</b>	<b>34</b>

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

### Doubling multiples of 10

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

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

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

## 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**  
 $300 \longrightarrow 600$
- **Step 3 – Double the tens**  
 $70 \longrightarrow 140$
- **Step 4 – Double the units  $5 \longrightarrow 10$**
- **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**  
 $600 \longrightarrow 1,200$
- **Step 3 – Double the tens**  
 $70 \longrightarrow 140$
- **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
-----	-----	-----	-----	-----	-----

## 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:**

<b>Number</b>	<b>Half</b>
<b>1</b>	<b>½ or 0.5</b>
<b>2</b>	<b>1</b>
<b>3</b>	<b>1 ½ or 1.5</b>
<b>4</b>	<b>2</b>
<b>5</b>	<b>2 ½ or 2.5</b>
<b>6</b>	<b>3</b>

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

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

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>5</u> 47	<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>
<b>Number</b>	<b>Subtraction</b>
<u>8</u> 6	<p>Take 10 makes 76: simply take 1 away from the 8 to make 7.</p> $86 - 10 = 76$
<u>8</u> 6	<p>Take away 60 makes 26: simply take away 6 from the 8. It was 8 tens, now it's 2 tens</p> $86 - 60 = 26$
<u>3</u> 86	<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> $386 - 120 = 266$ <p>Answer: 266</p>
<u>5</u> 47	<p>Subtract 100</p> <p>Simply take 1 from the 5</p>

	<p><b>It was 5 hundreds, now it's 4 hundreds</b></p> <p><b><math>547 - 100 = 447</math></b></p> <p><b>Answer: 447</b></p>
<b><u>5</u>47</b>	<p><b>Subtract 400</b></p> <p><b>Simply subtract 4 from the 5</b></p> <p><b>It was 5 hundreds, now it's 1 hundred</b></p> <p><b><math>547 - 400 = 147</math></b></p> <p><b>Answer: 147</b></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 $9 \times 4 = (36 - 4)$ 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 $16 \times 4$ must be double $8 \times 4$ $16 \times 4 = (32 \times 2)$ $16 \times 4 = 64$
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:  $47 \times 10$**

- 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:  $169 \times 10$**

	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:  $47 \times 100$**

- 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

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

<b>1</b>	<b>100</b>	<b>10</b>	<b>TH</b>	<b>H</b>	<b>T</b>	<b>U</b>
<b>M</b>	<b>TH</b>	<b>TH</b>				

<b>1</b>	<b>100</b>	<b>10</b>	<b>TH</b>	<b>H</b>	<b>T</b>	<b>U</b>
<b>M</b>	<b>TH</b>	<b>TH</b>				
		<b>5</b>	<b>1</b>	<b>7</b>	<b>6</b>	<b>4</b>

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

**What does each digit represent?**

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

## 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
--------	-------	---------	-----------

# Measurements

**These measurements must be learnt off by heart:**

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

<b>Weight</b>	
• Grammes in a kilogram	<b>1,000</b>
<b>Capacity</b>	
• Millilitres in a litre	<b>1,000</b>

**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**

<b>Term</b>	<b>Meaning</b>	<b>Example</b>
<b>consecutive number</b>	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
<b>digit</b>	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.



<b>divisible by</b>	Can be divided exactly, without a remainder	12 is divisible by 4. There are exactly three 4s in 12.
<b>factor</b>	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
<b>greater than</b>	More than or bigger than	13 is eight greater than 5
<b>less than</b>	Smaller than or lower than	6 less than 20 is 14.
<b>multiple</b>	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
<b>partition</b>	Split a number up	The number 157 can be partitioned into 100 and 50 and 7
<b>product</b>	Multiply together	The product of 6 and 3 is 18 $6 \times 3 = 18$
<b>sum of</b>	Add together	The sum of 6 and 3 is 9 $6 + 3 = 9$
<b>the difference</b>	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

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

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

# 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