

Year 3  
(Entry into Year 4)  
25 Hour Revision Course  
Mathematics



NORD  
ANGLIA  
EDUCATION

# Section 1 – Counting

1 hours

# Counting on

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Sometimes it is very useful to count on in numbers other than one. This is called Skip Counting, and it can help you to count things quickly.

For example – counting on in 10s

43            53            63            73

Now try to count on in Tens on your own

23            ?            ?            ?

32            ?            ?            ?

74            ?            ?            ?

91            ?            ?            ?

117            ?            ?            ?

Now try to count on in Fives on your own

18            ?                    ?                    ?

42            ?                    ?                    ?

60            ?                    ?                    ?

91            ?                    ?                    ?

526            ?                    ?                    ?

Now try to count on in Hundreds on your own

18            ?            ?            ?

42            ?            ?            ?

60            ?            ?            ?

91            ?            ?            ?

526           ?           ?           ?

Now try to count on in Thousands on your own

1000                    ?                    ?                    ?

1023                    ?                    ?                    ?

6000                    ?                    ?                    ?

5481                    ?                    ?                    ?

11754                    ?                    ?                    ?

## Section 2 – Addition

3 hours

# Addition using the Column Method

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As well as using our fingers or simply adding up in our heads, we also use the Column Method. The Column Method involves lining both sums above each other all the numbers in the right place. An addition sum using the Column Method looks like this;

$$\begin{array}{r} \text{H T U} \\ 26 \\ + 13 \\ \hline \\ \hline \end{array}$$

(H stands for Hundreds, T stands for Tens, and U stands for Units)

In this sum we have 26 (2 Ten and 6 Units) plus 13 (1 Ten and 3 Units).

With Column sums, we always start on the right-hand side.

$$\begin{array}{r} \text{H T U} \\ 26 \\ + 13 \\ \hline 9 \\ \hline \end{array}$$

Six plus Three is 9. This is put underneath, between the answer lines. Next we look at the Tens Column, and add Two and One.



$$\begin{array}{r}
 \text{H T U} \\
 26 \\
 + 13 \\
 \hline
 39 \\
 \hline
 \end{array}$$

The answer is 39.

Often we have a Column where the answer is greater than 10. When this happens, we need to leave a mark to remember to add it to the next Column later.

For example,

$$\begin{array}{r}
 \text{H T U} \\
 37 \\
 + 25 \\
 \hline
 \\
 \hline
 \end{array}$$

Here, Seven add Five is Twelve. We fill in the numbers like this;

$$\begin{array}{r}
 \text{H T U} \\
 37 \\
 + 25 \\
 \hline
 2 \\
 \hline
 1
 \end{array}$$

For the next Column, we add the two numbers at the top (3 and 2) and the new number below the answer box. This gives us this answer.

$$\begin{array}{r}
 \text{H T U} \\
 37 \\
 + 25 \\
 \hline
 62 \\
 \hline
 1
 \end{array}$$

Using the information shown above, please work out the following questions;

$$\begin{array}{r} \text{H T U} \\ 21 \\ + \quad 4 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 17 \\ + \quad 8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 32 \\ + \quad 8 \\ \hline \\ \hline \\ \hline \end{array}$$

H T U

2 7

+ 8

---

---

H T U

4 5

+ 9

---

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$$\begin{array}{r} \text{H T U} \\ 12 \\ + 11 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 25 \\ + 14 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 28 \\ + 12 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 37 \\ + 25 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 66 \\ + 32 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 75 \\ + 28 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 84 \\ + 39 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 77 \\ + 77 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 92 \\ + 66 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 84 \\ + 79 \\ \hline \\ \hline \end{array}$$



$$\begin{array}{r} \text{H T U} \\ 132 \\ + 17 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 706 \\ + 36 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 762 \\ + 38 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 517 \\ + 28 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 192 \\ + 43 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 805 \\ + 77 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 355 \\ + 61 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 554 \\ + 78 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 638 \\ + 96 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 762 \\ + 79 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r}
 \text{Th H T U} \\
 296 \\
 + 118 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{Th H T U} \\
 540 \\
 + 250 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{Th H T U} \\
 535 \\
 + 263 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 314 \\ + 240 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 491 \\ + 319 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 936 \\ + 532 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 965 \\ + 625 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 858 \\ + 677 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r}
 \text{Th H T U} \\
 907 \\
 + 434 \\
 \hline
 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{Th H T U} \\
 892 \\
 + 379 \\
 \hline
 \\
 \hline
 \end{array}$$



# Mental Addition

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Please work out the following sums without using the Column Method, preferably in your head.

1.  $27 + 9 =$

2.  $64 + 4 =$

3.  $57 + 7 =$

4.  $52 + 5 =$

5.  $26 + 6 =$

6.  $37 + 8 =$

7.  $111 + 5 =$

8.  $114 + 7 =$

9.  $351 + 5 =$

10.  $465 + 8 =$

11.  $17 + 11 =$

12.  $27 + 20 =$

13.  $35 + 18 =$

14.  $46 + 12 =$

15.  $61 + 26 =$

16.  $85 + 47 =$

17.  $68 + 54 =$

18.  $71 + 39 =$

19.  $55 + 37 =$

20.  $72 + 47 =$

## Section 3 – Subtraction

3 hours

# Column Subtraction

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Column Subtraction is very similar to Column Addition, although here we introduce a new trick – Borrowing. We borrow in examples where the top number in the column is smaller than the bottom, like this;

$$\begin{array}{r} \text{H T U} \\ 35 \\ - 26 \\ \hline \\ \hline \end{array}$$

As two is less than seven, we have to borrow. To do this, we cross out the number in the next column along on the left, and write the number one less than it above it. Finally we take the one we've 'borrowed' and put it next to the top unit that was too small originally. It should look something like this;

$$\begin{array}{r} \text{H T U} \\ 23 15 \\ - 26 \\ \hline \\ \hline \end{array}$$

We then subtract as normal.

$$\begin{array}{r}
 \text{H T U} \\
 23 \ 15 \\
 - \quad 2 \ 6 \\
 \hline
 \phantom{23} \ 9 \\
 \hline
 \end{array}$$

The answer here is 9.

Now try some subtractions of your own

.

$$\begin{array}{r}
 \text{H T U} \\
 3 \ 9 \\
 - \quad 6 \\
 \hline
 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{H T U} \\
 6 \ 8 \\
 - \quad 4 \\
 \hline
 \\
 \hline
 \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 96 \\ - \quad 5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 48 \\ - \quad 6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 66 \\ - \quad 3 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 27 \\ - 13 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 34 \\ - 11 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 93 \\ - 50 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 78 \\ - 25 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 75 \\ - 21 \\ \hline \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 22 \\ - 7 \\ \hline \hline \end{array}$$



$$\begin{array}{r} \text{H T U} \\ 62 \\ - \quad 8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 34 \\ - \quad 9 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 42 \\ - \quad 5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 31 \\ - \quad 7 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 94 \\ - \quad 7 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 46 \\ - \quad 8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 30 \\ - 13 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 90 \\ - 61 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 41 \\ - 17 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 96 \\ - 39 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 93 \\ - 27 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 338 \\ - 23 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 619 \\ - 74 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 709 \\ - 15 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 842 \\ - 74 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 269 \\ - \quad 83 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 703 \\ - 411 \\ \hline \end{array}$$

# Mental Subtraction

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Please work out the following sums without using the Column Method, preferably in your head.

1.  $17 - 4$

2.  $18 - 7$

3.  $23 - 2$

4.  $36 - 4$

5.  $54 - 2$

6.  $30 - 30$

7.  $57 - 27$

8.  $25 - 10$

9.  $63 - 40$

10.  $100 - 35$

11.  $57 - 22$

12.  $68 - 51$

13.  $84 - 53$

14.  $97 - 46$

15.  $88 - 42$

16.  $31 - 8$

17.  $42 - 4$

18.  $21 - 9$

19.  $40 - 24$

20.  $77 - 48$



## Section 3 – Multiplication

3 hours

# Multiplication using Columns

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Another way that we can show the working out for multiplication is by putting the sum into columns, much like we have done for column addition or subtraction. It looks like this.

$$\begin{array}{r} \text{H T U} \\ 12 \\ \times \quad 3 \\ \hline \\ \hline \end{array}$$

Just like column addition and subtraction, we start on the right hand side, with the Units column. Firstly, we multiply  $2 \times 3$ , and put the answer in the Unit column underneath.

$$\begin{array}{r} \text{H T U} \\ 12 \\ \times \quad 3 \\ \hline 6 \\ \hline \end{array}$$

We then move into the next column along, working out the answer to  $1 \times 3$ . This answer gets put in the Tens column.

$$\begin{array}{r} \text{H T U} \\ 12 \\ \times \quad 3 \\ \hline 36 \\ \hline \end{array}$$

In the next example, we will show what to do when working with a multiple that is larger than 10.

For example;

$$\begin{array}{r} \text{H T U} \\ 35 \\ \times \quad 6 \\ \hline \\ \hline \end{array}$$

Start as before, in the Units column.  $6 \times 5$  is 30. Show it like this;

$$\begin{array}{r} \text{H T U} \\ 35 \\ \times \quad 6 \\ \hline 0 \\ \hline 3 \end{array}$$

Next, work out the Tens column. This is  $3 \times 6$ , which is 18. However, we have placed the 3 from 30 underneath the Tens column, and we must add this in.  $18 + 3 = 21$ , so we write 1 in the Tens Column, and place the 2 under the Hundreds column, like this.

$$\begin{array}{r}
 \text{H T U} \\
 35 \\
 \times \quad 6 \\
 \hline
 10 \\
 \hline
 23
 \end{array}$$

Finally, we add up the last remaining column. Here, we simply bring the 2 up into the Hundreds box, as there are no other numbers to add to it. This makes the answer 210.

$$\begin{array}{r}
 \text{H T U} \\
 35 \\
 \times \quad 6 \\
 \hline
 210 \\
 \hline
 \hline
 \end{array}$$

Using Column Multiplication, please work out the answer to the following questions;

$$\begin{array}{r} \text{H T U} \\ 12 \\ \times \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 17 \\ \times \quad 4 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 23 \\ \times \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 27 \\ \times \quad 6 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 24 \\ \times \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 32 \\ \times \quad 7 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 40 \\ \times \quad 8 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 45 \\ \times \quad 9 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 53 \\ \times \quad 7 \\ \hline \\ \hline \end{array}$$



H T U

6 2

x 9

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# Long Multiplication

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Once you've learnt all of your times tables properly, you can begin to look at Long Multiplication. Long multiplication is a way to multiply numbers larger than 10. It is useful because to do it, we only need to know the 10x table, and the times tables which are less than ten. You should have learnt these by now...

For this example, let's multiply **52 x 31**. In Long Multiplication, we set the sum up like this;

$$\begin{array}{r} \text{H T U} \\ 52 \\ \times 31 \\ \hline \\ \hline \\ \hline \end{array}$$

Firstly, we multiply  $52 \times 1$ . This is 52, and is put on the top line under the sum, like this.

	H	T	U
		5	2
x		3	1
<hr/>			
		5	2
 <hr/>			
 <hr/>			

Then we multiply  $52 \times 30$ . Start by putting a zero in the far right (Units) column, and then work out  $52 \times 3$ . In stages, it looks like this.

$$\begin{array}{r}
 \text{H T U} \\
 52 \\
 \times 31 \\
 \hline
 52 \\
 0 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{H T U} \\
 52 \\
 \times 31 \\
 \hline
 52 \\
 1560 \\
 \hline
 \hline
 \end{array}$$

Once we have worked out by  $52 \times 1$  and  $52 \times 30$ , we need to add the two answers together.

$$\begin{array}{r} \text{H T U} \\ 52 \\ \times 31 \\ \hline 52 \\ + 1560 \\ \hline 1612 \\ \hline 1 \end{array}$$

The answer is 1612.

Using Long Multiplication, please work out the answer to the following questions;

$$\begin{array}{r} \text{Th H T U} \\ 72 \\ \times 14 \\ \hline \\ + \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{Th H T U} \\ 50 \\ \times 17 \\ \hline \\ + \\ \hline \\ \hline \end{array}$$

Th H T U

8 3

x 1 8

---

+

---

---

Th H T U

7 1

x 2 3

---

+

---

---

Th H T U

6 7

x 2 4

---

+

---

---

Th H T U

8 5

x 4 4

---

+

---

---



Th H T U

7 8

x 4 7

---

+

---

---

Th H T U

6 5

x 5 8

---

+

---

---

Th H T U

7 6

x 4 6

---

+

---

---

Th H T U

9 3

x 8 9

---

+

---

---

Th H T U

4 3

x 4 1

---

+

---

---

Th H T U

5 5

x 5 5

---

+

---

---

Th H T U

6 2

x 2 9

---

+

---

---

Th H T U

7 0

x 3 5

---

+

---

---

Th H T U

8 1

x 2 2

---

+

---

---

Th H T U

1 0 7

x 2 5

---

+

---

---

Th H T U

2 2 3

x 4 1

---

+

---

---

Th H T U

5 0 4

x 4 5

---

+

---

---

Th H T U

6 7 3

x 5 0

---

+

---

---

Th H T U

4 1 8

x 6 2

---

+

---

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## Section 4 – Division

3 hours



# Division

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Division is the splitting up of a number into equal parts or groups. To do it, we have to work out how many times the divisor goes into the dividend (Usually the larger of the two numbers)

For example:

$$2 \quad \overline{) 16}$$

In this question, we are being asked how many 2s there are in 16. 2 is the divisor, while 16 is the dividend. In this question, the answer is 8, as there are 8 2s in 16. The answer is written like this.

$$8 \\ 2 \quad \overline{) 16}$$

In some questions, there will not be a neat answer and we will often be left with a remainder. This is shown like this;

$$6 \text{ R}1 \\ 3 \quad \overline{) 19}$$

In this question we are being asked how many 3s go into 19. The answer is 6, as 6 3s is equal to 18, and we can't fit another in. As the dividend is 19, we subtract 18 from 19 to get the remainder. The remainder in this instance is 1.

Using Division, please work out the answer to the following questions;

$$5 \overline{)40}$$

$$8 \overline{)80}$$

$$6 \overline{)30}$$

$$6 \overline{) 54}$$

$$5 \overline{) 45}$$

$$5 \overline{) 42}$$

$$3 \overline{) 20}$$

$$4 \overline{) 26}$$

$$6 \overline{) 68}$$

$$5 \overline{) 77}$$

# Long Division

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Long Division is an extension of the Bus Stop method for division which is used whenever the dividend or the divisor become particularly large. This is how it is done.

$$25 \overline{) 375}$$

Firstly, we divide the first digit of the dividend (3) by the divisor (25). There are zero (0) 25s in 3, so we put this on top. We then multiply the answer we receive by the divisor.

$$25 \times 0 = 0$$

This result is put under the first digit of the dividend, and we subtract the 0 from 3, putting the answer underneath. It should look like this.

$$\begin{array}{r} 25 \overline{) 375} \\ 0 \\ \hline 3 \end{array}$$

We then bring the 7 down, to make 37. Then we repeat the process, this time taking 37 as the dividend. There is one 25 in 37, with 12 left as the remainder.

$$\begin{array}{r}
 01 \\
 25 \overline{) 375} \\
 \underline{0} \\
 37 \\
 \underline{25} \\
 125
 \end{array}$$

Then finally we bring the 5 down, and make 125 the new dividend. There are 5 25s in 125, which makes our answer to this question 15.

$$\begin{array}{r}
 015 \\
 25 \overline{) 375} \\
 \underline{0} \\
 37 \\
 \underline{25} \\
 125 \\
 \underline{125} \\
 0
 \end{array}$$

Using Long Division, please work out the answer to the following questions;

$$7 \overline{) 651}$$

$$8 \overline{) 120}$$

$$6 \overline{) 252}$$

$$7 \overline{) 595}$$

$$5 \overline{) 185}$$



$$20 \overline{)360}$$

$$24 \overline{)384}$$

$$31 \overline{)372}$$

$$35 \overline{)490}$$

$$42 \overline{)714}$$

# Section 5 – Algebra

3 hours

# Explaining Algebra

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Algebra is a part of Maths which uses abstract, or unknown quantities in its equations. In the examples that we will use, this most often means putting a letter into the equation.

The word algebra comes from the Arabic *Al-Jabr*, meaning 'reunion of broken parts' and we can see why in the equation below.

For example;

$$x + 2 = 4$$

$$x = 4 - 2$$

$$x = 2$$

Here x has been put together with another 'broken part', the number 2, to make 4. We can rearrange this equation to get x on its own, and to provide a sum with which we can find the value of x.

Here is another example;

$$x - 5 = 6$$

$$x = 6 + 5$$

$$x = 11$$

Please look at the equations below and try to find the value of x.

$$x - 2 = 4$$

$$x =$$

$$x =$$

$$x - 5 = 7$$

$$x =$$

$$x =$$

$$x - 3 = 4$$

$$x =$$

$$x =$$

$$x - 1 = 5$$

$$x =$$

$$x =$$

$$x - 4 = 8$$

$$x =$$

$$x =$$

$$x + 4 = 8$$

$$x =$$

$$x =$$

$$x + 3 = 5$$

$$x =$$

$$x =$$

$$x + 1 = 9$$

$$x =$$

$$x =$$

$$x + 10 = 20$$

$$x =$$

$$x =$$

$$x + 9 = 14$$

$$x =$$

$$x =$$

You will also see examples where we have  $x$  being either multiplied or divided. Here are two examples showing both of these.

$$2x = 4$$

$$x = \frac{4}{2}$$

$$x = 2$$

$$\frac{x}{2} = 6$$

$$x = 6 \times 2$$

$$x = 12$$

Now try these questions below and find the value of x.

$$3x = 6$$

$$x = \text{---}$$

$$x =$$



$$3x = 9$$

$$x = \text{—}$$

$$x =$$

$$2x = 12$$

$$x = \text{—}$$

$$x =$$

$$4x = 16$$

$$x = \text{—}$$

$$x =$$

$$3x = 15$$

$$x = \text{—}$$

$$x =$$

$$\frac{X}{4} = 2$$

$$x =$$

$$x =$$

$$\frac{X}{3} = 6$$

$$x =$$

$$x =$$

$$\frac{X}{2} = 2$$

$$x =$$

$$x =$$

$$\frac{X}{4} = 3$$

$$x =$$

$$x =$$

$$\frac{X}{5} = 4$$

$$x =$$

$$x =$$

# Section 6 – Fractions, Decimals, and Percentages

8 hours

# Fractions

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A Fraction is a numerical value that is not a whole number. In practice, this means part or piece of a whole number. Well known fractions include a half ( $1/2$ ), or a quarter ( $1/4$ ).

Fractions are made up of two parts;

$$\frac{\textit{Numerator}}{\textit{Denominator}}$$

The Denominator is the total number of parts that a whole number has been split into. The Numerator is the number of parts that are present.

Please add each of the following Simple Fractions

$$\frac{1}{3} + \frac{1}{3} =$$

$$\frac{3}{5} + \frac{1}{5} =$$

$$\frac{4}{8} + \frac{2}{8} =$$

$$\frac{6}{10} + \frac{3}{10} =$$

$$\frac{5}{12} + \frac{6}{12} =$$

Please subtract each of the following Simple Fractions

$$\frac{3}{4} - \frac{1}{4} =$$

$$\frac{4}{5} - \frac{1}{5} =$$

$$\frac{6}{7} - \frac{2}{7} =$$

$$\frac{2}{6} - \frac{2}{6} =$$

$$\frac{5}{10} - \frac{3}{10} =$$

# Fractions of Different denominators

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The questions in the previous exercise involved adding and subtracting fractions where the Denominators were the same. Fractions of this type are known as Simple Fractions. However, we can also add and subtract fractions where the Denominators are different.

For example;

$$\frac{1}{3} + \frac{1}{2}$$

To solve this equation, first we must make each of the denominators the same. To do this, we first need to work out the Lowest Common Denominator (LCM) of the denominators (in this case, 3 and 2). The LCM of 3 and 2 is 6, so we need to make equivalent fractions using 6 as our new denominator.

$$\frac{1}{3} + \frac{1}{2} = \frac{\quad}{6} + \frac{\quad}{6}$$

Once we have put our new denominator in, we need to transform each fraction individually. To change  $\frac{1}{3}$  into an equivalent fraction with denominator of 6, we need to look at 3 and work out how to make it into 6. To make 3 into 6, we have to multiply by 2 (2x). Once we work that out, we multiply the numerator by the same factor (2x). This is what we get.

$$\frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{\quad}{6}$$



We then repeat the process for the second fraction ( $\frac{1}{2}$ ). To get from 2 to 6, we have to multiply by 3 (3x). By multiplying both top and bottom of the fraction by 3x, we get the following equation.

$$\frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6}$$

Once this is done, we are left with a Simple Equation, as both sides of the sum now have the same denominator. We can work out the sum.

$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

Using the method explained above, please evaluate the following sums.

$$\frac{1}{4} + \frac{1}{2} =$$

$$\frac{3}{5} + \frac{1}{4} =$$

$$\frac{1}{4} + \frac{1}{3} =$$

$$\frac{7}{10} + \frac{1}{5} =$$

$$\frac{3}{8} + \frac{1}{2} =$$

$$\frac{2}{3} - \frac{1}{5} =$$

$$\frac{5}{6} - \frac{1}{3} =$$

$$\frac{1}{2} - \frac{1}{3} =$$

$$\frac{5}{9} - \frac{1}{3} =$$

$$\frac{7}{12} - \frac{1}{4} =$$

# Multiplying Fractions

---

Unlike for addition and subtraction of fractions, with multiplication of fractions, you do not need to worry about whether the denominators are the same. To multiply fractions, you simply multiply the top line (numerators) together to get the numerator answer, and you multiply the two bottom numbers (denominators) to get the denominator answer.

For example;

$$\frac{2}{5} \times \frac{3}{4} = \frac{2 \times 3}{5 \times 4} = \frac{6}{20}$$

If the numbers you are working with are quite large, you may be able to do something called cross-cancelling. Cross-cancelling helps you to get smaller numbers to multiply with by first dividing by the Highest Common Factor (HCF).

For example;

$$\frac{6}{8} \times \frac{4}{5}$$

To cross-cancel, look at the numbers in the corners. 4 and 8 are a pair here, and so are 5 and 6. 5 and 6 have no factors in common, so we cannot cancel those two numbers. However, the HCF of 4 and 8 is 4, so if we divide each number (4 and 8) by 4, we will get the numbers cancelled as best we can. Once you've done that, multiply as normal.

$$\frac{6}{8} \times \frac{4}{5} = \frac{6}{\cancel{8}2} \times \frac{\cancel{4}1}{5} = \frac{6}{10}$$

For each of the questions below, please multiply the fractions. If possible, cross cancel first.

$$\frac{1}{2} \times \frac{4}{5} =$$

$$\frac{2}{4} \times \frac{1}{5} =$$

$$\frac{1}{2} \times \frac{2}{3} =$$

$$\frac{1}{3} \times \frac{2}{9} =$$

$$\frac{3}{10} \times \frac{2}{3} =$$

$$\frac{4}{10} \times \frac{5}{8} =$$

$$\frac{1}{5} \times \frac{3}{4} =$$

$$\frac{1}{5} \times \frac{4}{6} =$$

$$\frac{1}{3} \times \frac{2}{5} =$$

$$\frac{1}{2} \times \frac{4}{10} =$$

# Dividing Fractions

---

To divide fractions, you simply flip the divisor (the fraction you are dividing by), and multiply.

For example;

$$\frac{1}{2} \div \frac{3}{7} = \frac{1}{2} \times \frac{7}{3} = \frac{(1 \times 7)}{(2 \times 3)} = \frac{7}{6}$$

For each of the questions below, please multiply the fractions. If possible, cross cancel after you have flipped the divisor.

$$\frac{4}{5} \div \frac{3}{9} =$$

$$\frac{6}{8} \div \frac{4}{6} =$$

$$\frac{1}{8} \div \frac{2}{3} =$$

$$\frac{2}{8} \div \frac{6}{7} =$$

$$\frac{3}{8} \div \frac{4}{5} =$$

$$\frac{3}{5} \div \frac{2}{10} =$$

$$\frac{2}{5} \div \frac{1}{2} =$$

$$\frac{1}{3} \div \frac{1}{5} =$$

$$\frac{7}{9} \div \frac{3}{5} =$$



$$\frac{3}{7} \div \frac{2}{3} =$$

# Decimals

---

A decimal number is a number which contains a decimal point. Decimals are used to denote parts of a whole number, and for that reason, are very similar to fractions or percentages. A typical decimal number looks something like this;

2.5

As you can see in the number above, there is a decimal place in the sum. Here we have 2 units, and 5 tenths, better known as Two point Five, or Two and a Half.

Decimals are organised in reverse order from the decimal place. See below for another example;

2.367

Here we have;

2 Units

3 Tenths

6 Hundredths

7 Thousandths

Decimals can be rounded, added, subtracted, multiplied or divided, just like whole numbers.

# Rounding Decimals

---

Decimals are usually rounded to a number of decimal places. This is usually 1 decimal place (written 1 d.p.) or 2 decimal places (2d.p.), but can be 3 or more.

To round decimals, you need to look at the numbers next to them. To round to one decimal place, you need to look at the second number after the decimal point. To round to two decimal places, you look at the third, and so on... If the number you are looking at is 5 or greater, we round up. If the number is 4 or lower, we round down. Here are two examples;

## Round 2.47 to 1 decimal place

**2.47** Look at the second number after the decimal place (7). This is higher than 5, so we round up. The first number goes up to the next number (5), making our answer **2.5**

Answer = 2.5

## Round 2.472 to 2 decimal place

**2.472** Look at the third number after the decimal place (2). This is less than 5, so we round down. The second number therefore remains unchanged, making our answer **2.47**

Answer = 2.47

Please look at the numbers below and round to 1 decimal place (1 d.p.).

1. 2.63

2. 3.52

3. 1.79

4. 5.30

5. 1.85

6. 6.38

7. 4.44

8. 9.65

9. 3.00

10. 7.46

Please look at the numbers below and round to 2 decimal places (2 d.p.).

1. 3.461
2. 7.115
3. 4.168
4. 8.713
5. 4.248
6. 6.105
7. 3.259
8. 4.376
9. 1.234
10. 12.103

# Adding and Subtracting Decimals

---

We can add and subtract decimals in the same ways that we can add and subtract whole numbers. However, given the extra detail and often small numbers, it is best to use the column method.

Please work out the answers to the questions involving decimals below.

$$\begin{array}{r} \text{U} \quad \text{Ts} \quad \text{Hs} \\ 3 \quad . \quad 1 \quad 3 \\ + 2 \quad . \quad 1 \quad 9 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{U} \quad \text{Ts} \quad \text{Hs} \\ 5 \quad . \quad 4 \quad 4 \\ + 3 \quad . \quad 7 \quad 2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{Ts} \quad \text{Hs} \\
 6 \quad . \quad 4 \quad 2 \\
 + 3 \quad . \quad 5 \quad 1 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{Ts} \quad \text{Hs} \\
 5 \quad . \quad 8 \quad 1 \\
 + 1 \quad . \quad 9 \quad 1 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{Ts} \quad \text{Hs} \\
 6 \quad . \quad 6 \quad 8 \\
 + 5 \quad . \quad 5 \quad 2 \\
 \hline
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{T}_s \quad \text{H}_s \\
 7 \quad . \quad 2 \quad 7 \\
 - 4 \quad . \quad 8 \quad 9 \\
 \hline \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{T}_s \quad \text{H}_s \\
 2 \quad . \quad 7 \quad 7 \\
 - 2 \quad . \quad 2 \quad 7 \\
 \hline \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{T}_s \quad \text{H}_s \\
 5 \quad . \quad 1 \quad 7 \\
 - 3 \quad . \quad 6 \quad 3 \\
 \hline \\
 \hline
 \end{array}$$



$$\begin{array}{r}
 \text{U} \quad \text{T}_s \quad \text{H}_s \\
 8 \quad . \quad 6 \quad 1 \\
 - \quad 2 \quad . \quad 4 \quad 6 \\
 \hline
 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \text{U} \quad \text{T}_s \quad \text{H}_s \\
 7 \quad . \quad 4 \quad 7 \\
 - \quad 3 \quad . \quad 6 \quad 5 \\
 \hline
 \\
 \hline
 \end{array}$$

# Percentages

---

Percentages, much like fractions and decimals, are used to express parts of a whole number. Due to their similarities with fractions and decimals, people often change between them quite regularly. Percentages are also used to express probability.

Percentages look like this;

50%

This is said as 'Fifty Per Cent', which has Latin roots and means Fifty for Each Hundred, or Fifty out of a Hundred.

For each of the decimals below, please convert it into a percentage

1. 0.6

2. 0.1

3. 0.25

4. 0.9

5. 0.7

6. 0.4

7. 0.25

8. 0.3

9. 0.2

10. 1.0

For each of the percentages below, please convert it into a decimal

1. 10%
2. 85%
3. 25%
4. 0%
5. 64%
6. 130%
7. 70%
8. 30%
9. 65%
10. 18.5%

## Section 6 – General Maths Test

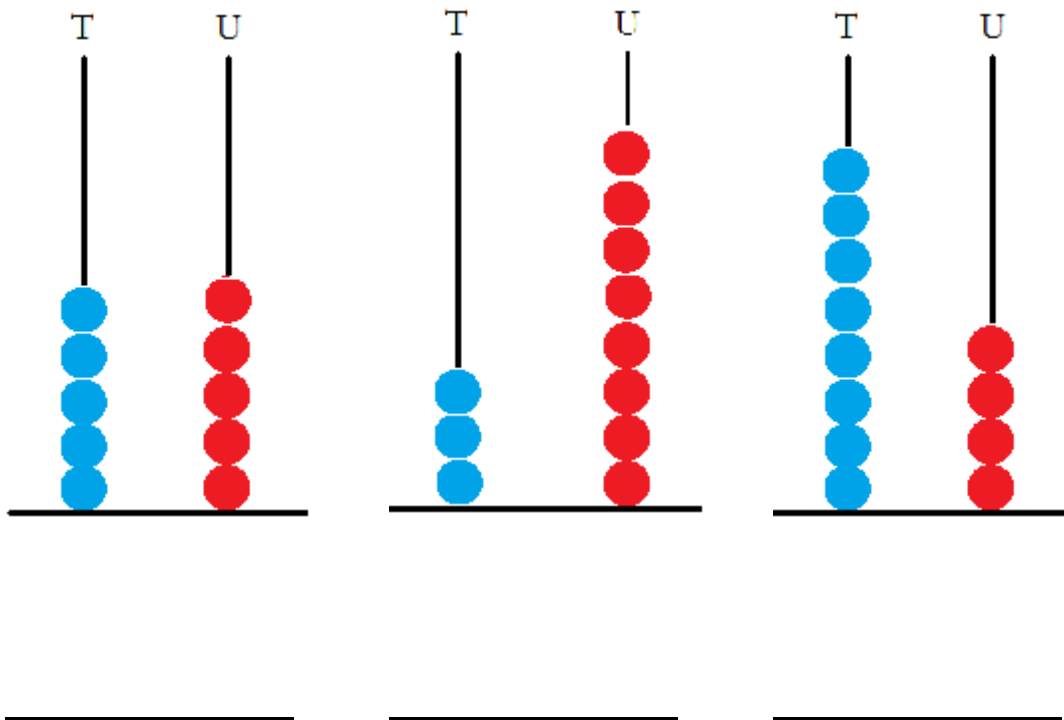
1 hour

# General Test

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Answers these questions as accurately and quickly as you can. If you finish in under one hour, please check your answers carefully.

1. Here are three abacuses. Please write the number shown on each.



2. Write the numbers in order, starting with the smallest.

---

3. Work out the following sums

$$\begin{array}{r} \text{H T U} \\ 75 \\ + 37 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 75 \\ - 37 \\ \hline \\ \hline \end{array}$$

Th H T U

1 8 3

x      2 4

---

+

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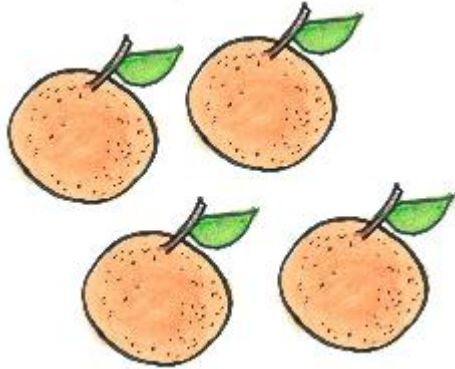
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2 0  $\overline{480}$

4. A book costs £2.50. How much do 5 books cost?



5. Four Oranges cost £1.20. How much does One Orange cost?





6. How much money is shown in each line?



7. What is half of

a. 8?

b. 36?

c. 100?

8. What is double

a. 15?

b. 24?

c. 60?

9. I double a number and add 5.

The answer is 19

What is the number?

10. I subtract four from a number and then half it.

The answer is 4

What is the number?

11. Round these numbers to the nearest

a. 10

b. 7

c. 23

d. 68

e. 105

f. 5412

12. What time is it?



# References

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(n.d.). Retrieved from [http://www.etymonline.com/index.php?term=algebra&allowed\\_in\\_frame=0](http://www.etymonline.com/index.php?term=algebra&allowed_in_frame=0)