

## Place Value

Work through these tasks at your own pace and level:



If you find this part of maths tricky, start here. You can always move up to something spicier!



Most people will want to start here. Fluency at this stage is really important before moving up. If you struggle, work on the lower level first, and come back to this.



This is an extension. If you are happy at the level below, try this out and push yourself to reason with your maths.

Answers can be found at the end of the booklet. If your answers don't match – try the problem again and see if you can work out how to get to the correct answer.

## 1. Negative numbers

When counting down below 0, the usual rules for numbers are reversed.

When you add to a negative number, the number gets smaller up to 0, then bigger again.

e.g.  $-6 + 10 = 4$



When you subtract from a negative number the number gets bigger.


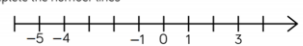
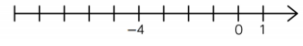
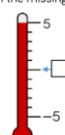
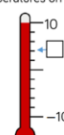



e.g.  $-3 - 4 = -7$



Finding the difference between a negative and positive number can be done easily – add the negative amount to the positive amount. This will give you the distance from the negative number to 0 and the distance from 0 to positive number.

e.g. Find the different between -2 and 2. Answer: 4



 <p>Complete the number lines</p>   <p>Fill in the missing temperatures on the thermometers.</p>   <p>Dexter is counting backwards out loud. He says, "Two, one, negative one, negative two, negative three ...". What mistake has Dexter made?</p> <p>Teddy counted down in 3s until he reached -18. He started at 21, what was the tenth number he said?</p>	 <p>Estimate and label where 0, -12 and -20 will be on the number line.</p>  <p>Whitney visits a zoo. The rainforest room has a temperature of 32°C. The Arctic room has a temperature of -24°C. Show the difference in room temperatures on a number line.</p> <p><math>-3 + 7 =</math></p> <p><math>-2 - 8 =</math></p> <p><math>-17 + 5 =</math></p> <p><math>23 - 33 =</math></p> <p><math>5 - 13 =</math></p> <p><math>-2 + 7 - 2 =</math></p>	 <p><b>True or False?</b></p> <ul style="list-style-type: none"> <li>The temperature outside is -5 degrees, the temperature inside is 25 degrees. The difference is 20 degrees.</li> <li>Four less than negative six is negative two.</li> <li>15 more than -2 is 13</li> </ul> <p>Explain how you know each statement is true or false.</p> <p>Put these statements in order so that the answers are from smallest to greatest.</p> <ul style="list-style-type: none"> <li>The difference between -24 and -76</li> <li>The even number that is less than -18 but greater than -22</li> <li>The number that is half way between 40 and -50</li> <li>The difference between -6 and 7</li> </ul>
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## 2. Numbers up to one million

M	HTh	TTh	Th	H	T	
million	hundred thousand	ten thousand  twenty thousand  ...	thousand	hundred	ten twenty thirty forty fifty sixty seventy eighty ninety	one two three four five six seven eight nine

e.g. 582,534

five hundred and eighty two thousand, five hundred and thirty four

902,612

nine hundred and two thousand, six hundred and twelve

eleven  
twelve  
thirteen  
fourteen  
fifteen  
sixteen  
seventeen  
eighteen  
nineteen



Write these numbers in words:

5,967

3,780

6,532

Write these words as numbers:

six thousand, four hundred and twenty two

two thousand and eighty nine

What is the value of the underlined digit in each number?

6,983    9,021    789    6,570

Represent each of the numbers on a place value grid.

Create four 4-digit numbers to fit the following rules:

- The tens digit is 3
- The hundreds digit is two more than the ones digit
- The four digits have a total of 12



Write these numbers in words:

673,701

592,166

Write these words as numbers:

four hundred and twenty three thousand, three hundred and ninety seven

Complete the missing numbers.

59,000 = 50,000 + \_\_\_\_\_

\_\_\_\_\_ = 30,000 + 1,700 + 230

75,480 = \_\_\_\_\_ + 300 + \_\_\_\_\_

Describe the value of the digit 7 in each of the following numbers. How do you know?

407,338

700,491

25,571



Rosie counts forwards and backwards in 10s from 317

Circle the numbers Rosie will count.

427    997    -7  
1,666    3,210    5,627  
-23    7    -3

Explain why Rosie will not say the other numbers.

Dora has made five numbers, using the digits 1, 2, 3 and 4

She has changed each number into a letter.

Her numbers are

aabdc  
acdbc  
dcaba  
cdadc  
bdaab

Here are three clues to work out her numbers:

- The first number in her list is the greatest number.
- The digits in the fourth number total 12
- The third number in the list is the smallest number.

### 3. Comparing and ordering

Step 1: Look at the highest value digit in each number – do they all have the same place value?

Step 2: If the first digit is the same, move on to the next biggest digit, and so on down the number until you find a digit that differs

3,457      32,467      3,492

Smallest to biggest:

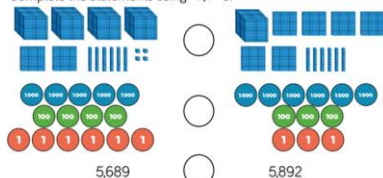
3,457      3,492      32,467

These two have the same number of thousands and hundreds but the tens are different which allows us to order them

This has ten thousands which the others don't so it's bigger



Complete the statements using  $<$ ,  $>$  or  $=$



Circle the smallest amount in each pair.

Two thousand, three hundred and ninety seven      3,792

$6,000 + 400 + 50 + 6$       6,455

9 thousands, 2 hundreds and 6 ones      9,602

Complete the statements.

$1,985 > \underline{\hspace{1cm}}$

$4,203 < 4,000 + \underline{\hspace{1cm}} + 4$

I am thinking of a number. It is greater than 3,000, but smaller than 5,000

The digits add up to 15  
What could the number be?

Write down as many possibilities as you can.

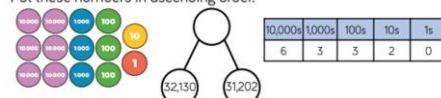
The difference between the largest and smallest digit is 6. How many numbers do you now have?



Put these numbers in order, biggest to smallest:

322,325    335,462    32,754    32,216  
32,522    352,321

Put these numbers in ascending order.



Add the symbol  $<$ ,  $>$  or  $=$  to make the statement correct.

MMXVII     

(look below for roman numeral support)

Use digit cards 1 to 5 to complete the comparisons:

$564 \square < \square 73 \square$

$2 \square 38 > 23 \square 5$

You can only use each digit once.



Here is a table showing the population in areas of Yorkshire.

Halifax	88,134
Brighouse	32,360
Leeds	720,492
Huddersfield	146,234
Wakefield	76,886
Bradford	531,200

Use  $<$ ,  $>$  or  $=$  to make the statements correct.

The population of Halifax  $\bigcirc$  the population of Wakefield.

Double the population of Brighouse  $\bigcirc$  the population of Halifax.

Place the digits cards 0 to 9 face down and select five of them.

Make the greatest number possible and the smallest number possible.

How do you know which is the greatest or smallest?


Using the digit cards 0 to 9, create three different 5-digit numbers that fit the following clues:

- The digit in the hundreds column and the ones column have a difference of 2
- The digit in the hundreds column and the ten thousands column has a difference of 2
- The sum of all the digits totals 19

#### 4. Rounding

Rounding involves taking a complex number and making it simpler by finding a number that is close to it. (for example, we would never talk about the Earth's population in exact numbers, but would round it to a simpler number: 7 million)

<p>e.g. Round 345,327 to the nearest hundred thousand</p> <p>Hundred thousands either side: 300,000 or 400,000</p> <p>345,327</p> <p>4 or lower so we round down to 300,000</p>	<p>Step 1: Check what you are rounding to – find the nearest options either side of your number</p> <p>Step 2: Look one digit <i>lower</i> than the digit you are trying to round to – if it's 4 or lower round down to the lower option, if it's 5 or higher round up</p> <p>Step 3: All digits lower than that become zero – rounding is about removing smaller, less important digits</p>	<p>e.g. Round 56,757 to the nearest hundred</p> <p>Hundreds either side: 56,700 or 56,800</p> <p>56,757</p> <p>5 or higher so we round up to 56,800</p>
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Round these numbers to the nearest 1,000




- Eight thousand and fifty-six
- 5 thousands, 5 hundreds, 5 tens and 5 ones


Complete the table.

Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1,000
4,999			

David's mum and dad are buying a car.

They look at the following cars:

Car A	Car B	Car C
 9,869 Approximately 10,000 miles	 8,501 Approximately 8,000 miles	 7,869 Approximately 8,000 miles



Round these populations to the nearest 100,000

City	Population	Rounded to the nearest 100,000
Leeds	720,492	
Durham	87,559	
Sheffield	512,827	
Birmingham	992,000	

My number rounded to the nearest 10 is 1,150  
 Rounded to the nearest 100 it is 1,200  
 Rounded to the nearest 1,000 it is 1,000

Jack


What could Jack's number be?

Can you find all of the possibilities?

Teddy

4,725 to the nearest 1,000 is 5,025

Explain the mistake Teddy has made.



Round 59,996 to the nearest 1,000  
 Round 59,996 to the nearest 10,000

What do you notice about the answers?

Can you think of three more numbers where the same thing could happen?

Here are four number cards.

42,350	43,385
56,995	56,963

Four children take one each and say a clue.

My number is 57,000 when rounded to the nearest 100

Mo

My number has exactly three hundreds in it

Rosie

My number is 43,000 when rounded to the nearest thousand

Jack

My number is exactly 100 less than 57,063

Dora

Which card did each child have?

## 5. Roman Numerals

Roman numbers were made of letters in different combinations.

e.g. XXV means ten and ten and five, so XXV = 25

There were never more than 3 of the same letter in a row. In order to show 4 or 9 they used a system of putting letters in a different order. By putting the letter of a lower place value in front of a letter, it showed that it meant less:

e.g. IV means one less than five, so IV = 4

XC means ten less than one hundred, so XC = 90

I = 1

V = 5

X = 10

L = 50

C = 100

D = 500

M = 1000



Each diagram shows a number in numerals, words and Roman Numerals.



Complete the diagrams.

Complete the function machines.



Mo says:

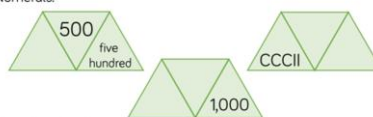
In the 10 times table, all the numbers have a zero. Therefore, in Roman Numerals all multiples of 10 have an X



Research and give examples to prove whether or not Mo is correct.

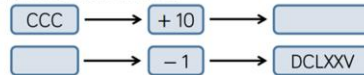


Each diagram shows a number in digits, words and Roman Numerals.



Complete the diagrams.

Complete the function machines.



Solve the following calculation:

$$XIV + XXXVI = \underline{\quad}$$

How many other calculations, using Roman Numerals, can you write to get the same total?



Here is part of a Roman Numerals hundred square.

Complete the missing values.

XLIV	XLV		XLVII
		LVI	LVII
LXIV		LXVI	LXVII

What patterns do you notice?


Solve

$$CCCL + CL =$$

How many calculations, using Roman Numerals, can you write to get the same total?

## Answers

### 1. Negative Numbers




Complete the number lines

Fill in the missing temperatures on the thermometers.

Dexter is counting backwards out loud. He says, "Two, one, negative one, negative two, negative three ...". What mistake has Dexter made?

Teddy counted down in 3s until he reached -18. He started at 21, what was the tenth number he said?



Estimate and label where 0, -12 and -20 will be on the number line.

Whitney visits a zoo. The rainforest room has a temperature of 32°C. The Arctic room has a temperature of -24°C. Show the difference in room temperatures on a number line.

56°C

$-3 + 7 = 4$


$-2 - 8 = -10$

$-17 + 5 = -12$

$23 - 33 = -10$

$5 - 13 = -8$

$-2 + 7 - 2 = 3$



True or False?

False it is -10

False it is 30 degrees

True

Put these statements in order so that the answers are from smallest to greatest.


The difference between -24 and -76: 4.

The even number that is less than -18 but greater than -22: 1.

The number that is half way between 40 and -50: 2.

The difference between -6 and 7: 3.

### 2. Numbers up to one million



Write these numbers in words:

5,967: Five thousand, nine hundred and sixty seven

3,780: Three thousand, seven hundred and eighty

6,532: Six thousand, five hundred and thirty two

Write these words as numbers:

six thousand, four hundred and twenty two: 6,422

two thousand and eight: 2,089

What is the value of the underlined digit in each number?

6,983: 900


9,021: 20

789: 80

6,570: 700

Create four 4-digit numbers to fit the following rules:

- The tens digit is 3
- The hundreds digit is two more than the ones digit
- The four digits have a total of 12



Write these numbers in words:

673,701: Six hundred and seventy three thousand, seven hundred and one

592,166: Five hundred and ninety two thousand, one hundred and sixty six

Write the

four hundred and twenty three thousand, three hundred and ninety seven: 423,397

Complete the missing numbers

50,000 = 30,000 + 17,000 + 230


75,480 = 75,000 + 300 + 180

Describe the value of the digit 7 in each of the following numbers. How do you know?

407,338: 7,000

700,491: 700,000

25,571: 70



Rosie counts forwards and backwards in 10s from 317

Circle the numbers Rosie will count.

427, 997, -7, 1,666, 3,210, 5,627, -23, 7, -3

Explain why Rosie will not say the other numbers.

Dora has made five numbers, using the digits 1, 2, 3 and 4. She has changed each number into a letter.

Her numbers are

aabdc, acdbc, dcaba, cdadc, bdaab


Here are three clues:

- The first number in her list is the greatest number.
- The digits in the fourth number total 12
- The third number in the list is the smallest number.

44,213, 43,123, 13,424, 31,413, 21,442



### 3. Comparing and ordering numbers



Complete the statements using  $<$ ,  $>$  or  $=$

$1,985 > 1,885$

$4,203 < 4,000 + 200 + 3$

Circle the smallest amount in each pair.

Two thousand, three hundred and ninety seven  $3,792$

$6,000 + 400 + 50 + 6$   $6,455$

9 thousands, 2 hundreds and 6 ones  $9,602$

Complete the statements.

$1,985 > 1,885$


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I am thinking of a number. It is greater than 3,000, but smaller than 5,000

The digits add up to 15  
What could the number be?

Write down as many possibilities as you can.

The difference between the largest and smallest digit is 6. How many numbers do you now have?  $13$



Put these numbers in order, biggest to smallest:

$322,325$   $335,462$   $32,754$   $32,216$

$32,522$   $352,321$

Put these numbers in ascending order.

$32,130$   $51,202$

Add the symbol  $<$ ,  $>$  or  $=$  to make the statement

$MMXVII < 2,017$


Use digit cards 1 to 5 to complete the comparisons:

$564 \boxed{1} < 573 \boxed{2}$

$2 \boxed{4} 38 > 23 \boxed{3} 5$

You can only use each digit once

There are other solutions, but 5 must be in that location



Here is a table showing the population in areas of Yorkshire.

Area	Population
Halifax	88,134
Brighouse	32,360
Leeds	720,492
Huddersfield	146,234
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Use  $<$ ,  $>$  or  $=$  to make the statements correct.

The population of Halifax  $>$  the population of Wakefield.

Double the population of Brighouse  $<$  the population of Halifax.

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### 4. Rounding



Round these numbers to the nearest 1,000

- Eight thousand and fifty-six
- 5 thousands, 5 hundreds, 5 tens and 5 ones

Complete the table.


Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1,000
4,999	5,000	5,000	5,000

David's mum and dad are buying a car.

They look at the following cars:

Car A	Car B	Car C
9,869	8,501	7,869
Approximately 10,000 miles	Approximately 8,000 miles	Approximately 8,000 miles

Car B should say approx. 9,000



Round these populations to the nearest 100,000

City	Population	Rounded to the nearest 100,000
Leeds	720,492	700,000
Durham	87,559	100,000
Sheffield	512,827	500,000
Birmingham	992,000	1,000,000

My number rounded to the nearest 10 is 1,150  
Rounded to the nearest 100 it is 1,200  
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What could Jack's number be?

Can you find all of the possibilities?

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He forgot to round the whole number



Round 59,996 to the nearest 1,000  
Round 59,996 to the nearest 10,000

What do you notice about the answers?

Can you think of three more numbers where the same thing could happen?

They are the same

Here are four number cards.

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Four children take one each and say a clue.

Mo: My number is 57,000 when rounded to the nearest 100

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Which card did each child have?



## 5. Roman Numerals

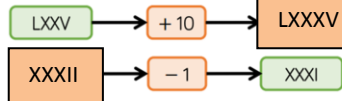


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Complete the diagrams.

Complete the function machines.



Mo says:

In the 10 times table, all the numbers have a zero. Therefore, in Roman Numerals all multiples of 10 have an X

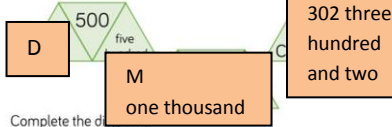


Research and give examples to prove whether or not Mo is correct.

No, because 50 is an L and 100 is D

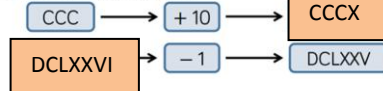


Each diagram shows a number in digits, words and Roman Numerals.



Complete the diagrams.

Complete the function machines.



Solve the following calculation:

$$XIV + XXXVI = \begin{matrix} 50 \\ L \end{matrix}$$

How many other calculations, using Roman Numerals, can you write to get the same total?



Here is part of a Roman Numerals hundred square.

Complete the missing values.

XLIV	XLV	XLVI	XLVII
LIV	LV	LVI	LVII
LXIV	LXV	LXVI	LXVII

What patterns do you notice?

Solve

$$CCCL + CL = \begin{matrix} 500 \\ D \end{matrix}$$

How many calculations, using Roman Numerals, can you write to get the same total?