Lesson - Place value to 10 000 and Roman numerals

Year: Year 4

Hello, I am Otto! Big numbers are all around us. A football stadium can hold thousands of fans, and a school library can hold thousands of books. In this chapter you learn how numbers up to 10 000 are built, how to order and round them, and how the Romans wrote numbers without any zero.

Starter activity

Imagine a charity counts the money it has collected in a jar. There are 4 bundles of £1000 notes pretend-money, 2 bundles of £100, 7 bundles of £10 and 3 single pounds. Write the total in digits. Then say it aloud: "four thousand, two hundred and seventy-three". You have just used place value!

Place value in 4-digit numbers

Definition: place value

The **place value** of a digit is how much the digit is worth because of where it stands in the number. In 6 285 the digit 6 is in the thousands place, so it is worth 6000. The digit 2 is in the hundreds place, so it is worth 200.

Thousands	Hundreds	Tens	Ones
6	2	8	5

Each column is worth **ten times** the column on its right. Ten ones make one ten, ten tens make one hundred, and ten hundreds make one thousand. A number such as 6 285 can be partitioned (split up) like this: 6000 + 200 + 80 + 5.

Key fact: the zero as a place holder

A zero in a number does not add any value, but it keeps the other digits in their correct columns. In 4 050 there are 4 thousands, 0 hundreds, 5 tens and 0 ones. If we left out the zeros we would write 45, which is a very different number! We say 4 050 as "four thousand and fifty".

Example 1

Write the value of the digit 7 in 3 712 and in 7 031.

In 3 712 the 7 is in the hundreds column, so it is worth **700**. In 7 031 the 7 is in the thousands column, so it is worth **7000**. The same digit can have a very different value depending on its place.

Example 2

Partition 5 408 and write it in words.

5 408 = 5000 + 400 + 0 + 8 = 5000 + 400 + 8. The words are **five thousand, four hundred and eight**. There are no tens, so we do not say any tens.

Ordering and comparing numbers

Method: comparing two numbers

1. Line the numbers up so that the ones are under the ones.
2. Start at the left. Compare the thousands digits. The bigger digit means the bigger number.
3. If the thousands are the same, compare the hundreds, then the tens, then the ones.
4. Use the signs: > means "is greater than", < means "is less than" and = means "is equal to".

Example 3

Put 4 396, 4 936, 4 369 and 3 946 in order, smallest first.

3 946 has only 3 thousands, so it is the smallest. The others all have 4 thousands. Compare the hundreds: 4 396 and 4 369 have 3 hundreds, and 4 936 has 9 hundreds, so 4 936 is the largest. Between 4 396 and 4 369, compare the tens: 9 tens is more than 6 tens. Smallest first: **3 946, 4 369, 4 396, 4 936**.

Watch out

A number with more digits is bigger, but only when it does not start with zeros. Do not be fooled by the digits themselves: 9 876 is smaller than 10 000 because 10 000 has five digits. Always line up the columns before you compare.

Counting in steps

You can count forwards and backwards in steps of 1000, 100, 10 and 1. When you count in 1000s only the thousands digit changes. Counting in 6s, 7s, 9s and 25s uses your times tables. For example, counting in 25s gives 25, 50, 75, 100, 125, 150 and so on. Every four steps make 100.

Example 4

Count on in 1000s from 2 450. What are the next four numbers?

Add 1000 each time. Only the thousands digit changes: **3 450, 4 450, 5 450, 6 450**.

Rounding

Definition: rounding

Rounding means replacing a number by a nearby number that is easier to use. We round to the **nearest 10, 100 or 1000**. The rounded number is only an estimate, so we use the sign ≈ (is approximately equal to).

Method: rounding to the nearest 10, 100 or 1000

1. Underline the digit in the place you are rounding to (tens, hundreds or thousands).
2. Look at the digit just to its right.
3. If that digit is 5, 6, 7, 8 or 9, round up: add 1 to the underlined digit.
4. If that digit is 0, 1, 2, 3 or 4, round down: keep the underlined digit.
5. Replace all the digits to the right with zeros.

Example 5

Round 3 674 to the nearest 10, 100 and 1000.

Nearest 10: the tens digit is 7 and the ones digit is 4, so we round down to **3 670**.
Nearest 100: the hundreds digit is 6 and the tens digit is 7, so we round up to **3 700**.
Nearest 1000: the thousands digit is 3 and the hundreds digit is 6, so we round up to **4 000**.

Did you know?

The number 10 000 is the smallest 5-digit number, and it is called ten thousand. In Britain a football club such as Wembley Stadium holds about 90 000 fans. Most local football grounds hold between 2 000 and 10 000 people, so these numbers are very common in sport.

Roman numerals

Definition: Roman numerals

Roman numerals are the way the ancient Romans wrote numbers using letters. The letters you need are **I = 1, V = 5, X = 10, L = 50 and C = 100**. There is no zero and there are no place value columns.

Letter	I	V	X	L	C
Value	1	5	10	50	100

Rule: reading and writing Roman numerals

- Letters of the same kind are added: III = 3, XX = 20, XXX = 30. A letter is never written more than three times in a row.
- A smaller letter after a bigger letter is added: VI = 5 + 1 = 6, XV = 15, LX = 60.
- A smaller letter before a bigger letter is taken away: IV = 5 − 1 = 4, IX = 10 − 1 = 9, XL = 50 − 10 = 40, XC = 100 − 10 = 90.
- Only I, X and C can be written before a bigger letter (V, L and D are never subtracted).

Example 6

Write 64 and 49 in Roman numerals.

64 = 50 + 10 + 4 = L + X + IV = **LXIV**. For 49 we write 40 and 9 separately: 40 = XL and 9 = IX, so 49 = **XLIX**. We do not write IL for 49, because only I, X and C can be taken away, and only from the next two bigger letters.

Example 7

What number is XCIV?

XC = 100 − 10 = 90, and IV = 5 − 1 = 4. So XCIV = 90 + 4 = **94**.

Watch out: Roman numerals in real life

You still see Roman numerals on clock faces, on the front of old buildings, on film credits and for the names of kings and queens such as Elizabeth II. Take care with a number like IX. The I comes first, so it is taken away from X. It is 9, not 11.

Otto's tip

To read a big number, say each column in order from the left: "six thousand, two hundred and eighty-five". To round, always look only at the digit to the right of the place you are rounding to, and ignore the rest!