Section 2: Shaping up!

In this section, you can learn topics which are mapped to QQI Shape and Space at Levels 1 and 2.

By the end of this section, you will be able to:

- recognise and talk about shapes and forms in everyday life,

- recognise the main features of shapes and forms, and

- use words to do with comparing shapes & forms.
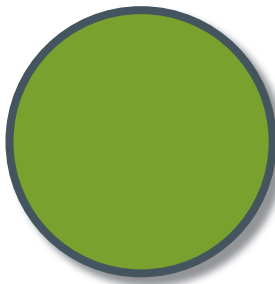
Introducing shapes
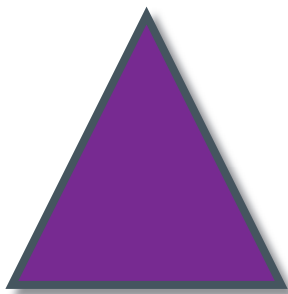
Here are some shapes with their names.

square

rectangle

circle

triangle

Shapes can be different colours, different sizes and can even be turned on their sides.

On the next few pages, you will learn some facts about each of these shapes!
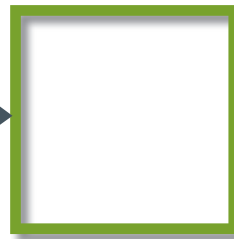
The square

Here are some facts about squares. You might know some of them already, but it is good to make sure you remember.

Fact 1: squares have 4 (four) sides.
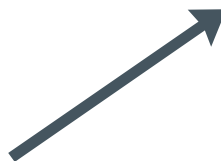
Can you count them to check?

This is a side!
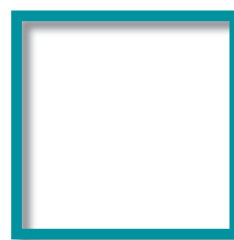
Fact 2: squares have 4 (four) corners.

Check if this is right by counting the corners.

This is a corner!

Fact 3: each side is as long as all the others.

Have a look. Do you think the 4 (four) sides are all as long as each other?

Hmmmmm ...

Bonus fact: when we talk about how long something is, we call it the "length".

The rectangle

Here are some facts about rectangles. See how many you already know.

Fact 1: like squares, rectangles have 4 (four) sides.

Can you count them to check?
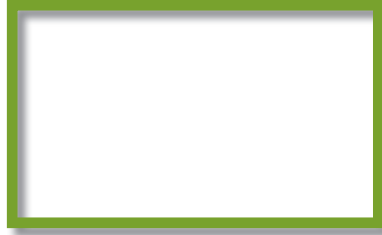
Fact 2: like squares, rectangles have 4 (four) corners.

Check if this is right by counting the corners.

Fact 3: rectangles have 2 (two) short sides and 2 (two) longer sides.

Can you see 2 (two) short sides and 2 (two) longer sides?
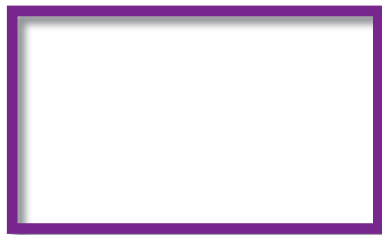
Bonus fact: a rectangle is quite like a square, but one that has been stretched out!

The circle

Here are some facts about circles. Did you know them already?

Fact 1: a circle is curved and has no sides.

Fact 2: a circle looks the same whichever way you turn it.
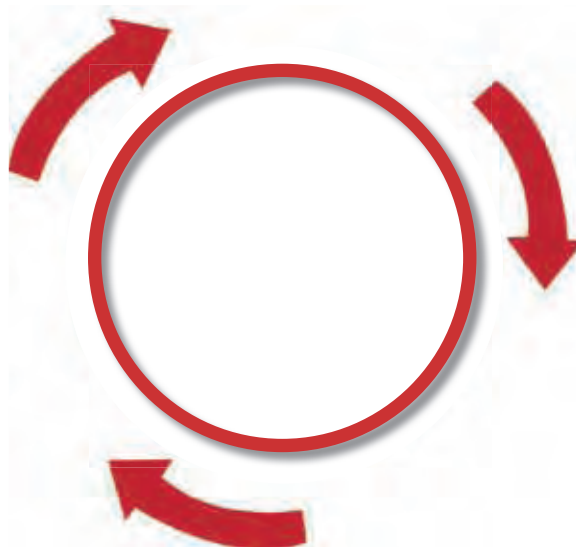
The triangle

Here are some facts about triangles. See how many you already know.

Fact 1: a triangle has 3 (three) sides.

Count them to check.
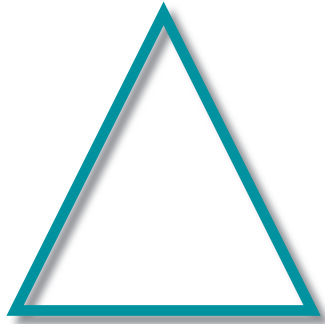
Fact 2: a triangle has 3 (three) corners.

Count them to check.
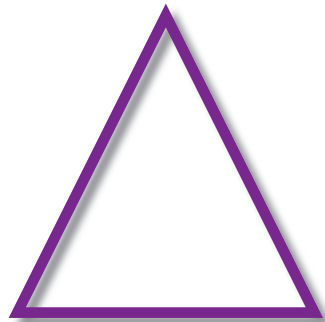
Fact 3: a triangle can have sides the same length, or different lengths.

These are all triangles.

16
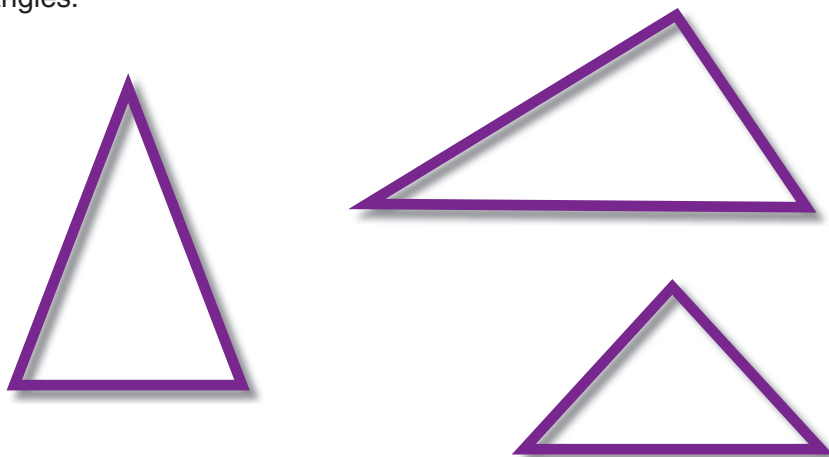
Draw an arrow from the shape on the left to its name on the right. There are two of everything.
The first one is done for you.
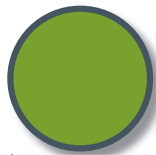
circle
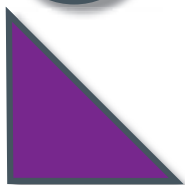
rectangle

triangle

square

41
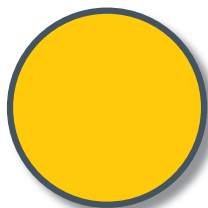
Can you name the shape?

Have you remembered the names of the shapes?

Write the name of the shape on the line below it.

_____   _____

_____   _____
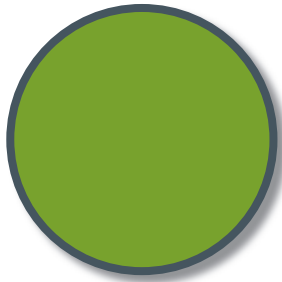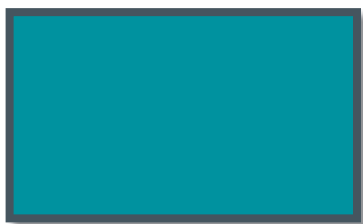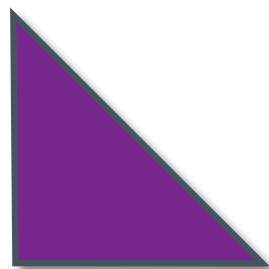
We need words to help us talk about shapes.

Some of these words are:

bigger	**smaller**
longer	**shorter**
wider	**narrower**

Here are some examples:

The circle on the left is **bigger** than the one on the right.

The circle on the right is **smaller** than the one on the left.

The rectangle on the left is **longer** than the one on the right.

The rectangle on the right is **shorter** than the one on the left.

Comparing shapes

The red triangle is **wider** than the blue triangle.

The blue triangle is **narrower** than the red one.
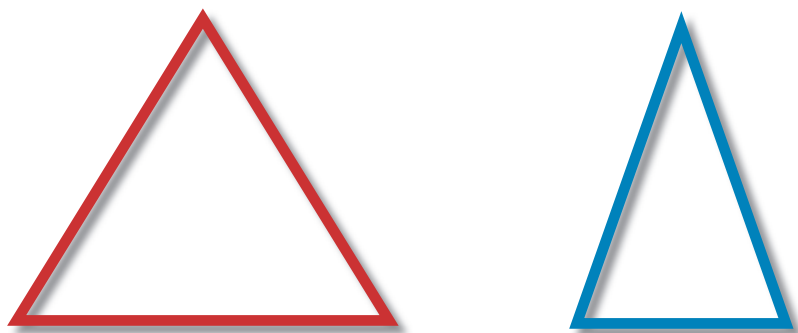
How would you talk about these pairs of shapes? (There might be more than one right answer!)

(1)
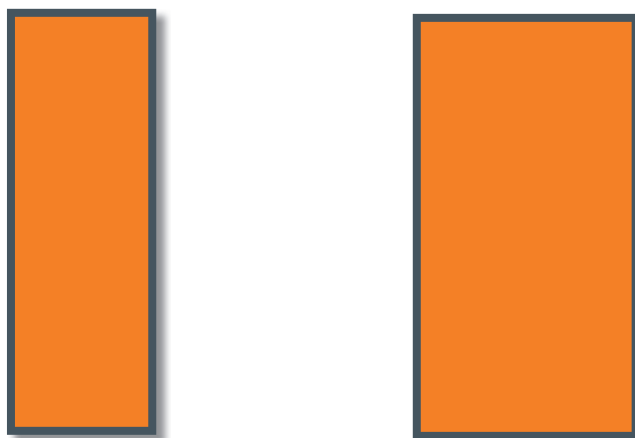
(2

Shapes in everyday life

Here are some things you might see at home, at the shops or on TV.

Write what shape each item is on the line below it.

_____

_____

_____

_____

_____

_____

The answers are on page 83

Shapes in everyday life

How many shapes can you see in these pictures?

More shapes!

The shapes you have looked at so far are called 2-dimensional or 2D shapes.   These shapes are **flat**.

Other shapes are **solid**. You can pick them up and turn them around. We say these are 3-dimensional or 3D shapes.

Here are some examples of 3D shapes you might have in your home.

These are sugar **cubes**. A **cube** has six square faces that are the same size.

Other **cubes** include: dice and children's building blocks.

This box is one you might get delivered to your door. It is not a cube because its faces are not all square. Its faces are different sized rectangles. So we do not call it a cube. We call it a **cuboid**.

You will find lots of **cuboids** in your food cupboards or at the supermarket. Cereal boxes are cuboids as are lots of boxes of washing powder.

More shapes!

This picture of a football looks like a circle. But the real thing is not circular. It is a **sphere**.

Balls are **spheres**.

The earth is a **sphere**. If you set sail across the sea, you would come back round to where you started.

Task for 3D shapes

16

With a friend or your tutor, find some boxes. These might be cereal boxes, a box of teabags or another type of box.

Choose one of the boxes.

What was in it? _____

How many corners does it have? _____

How many faces does it have? _____

How many edges does it have? _____

Use this image to help you with the questions above.
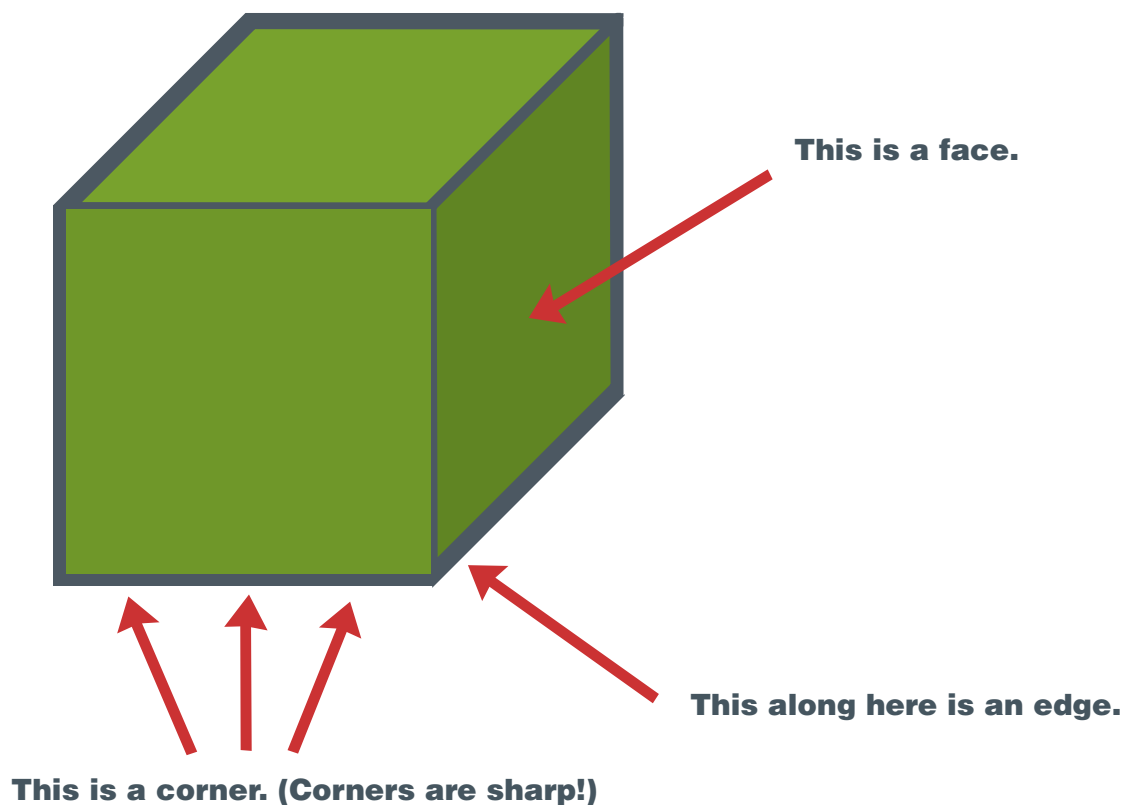
This is a face.

This along here is an edge.

This is a corner. (Corners are sharp!)

End of Section 2 – Shaping up!

Did you learn it?

At the start of this section, we said you would learn certain skills.

Give yourself a score in the box next to each skill that shows how confident you feel about it now. You can score yourself with a number from 0 to 10. 0 is low and 10 is high.

Skill 1: Recognise and talk about shapes and forms in everyday life.

Skill 2: Recognise the main features of shapes and forms.

Skill 3: Use words to do with comparing shapes & forms.

Section 3: Moving on!

IIn this section, you can learn skills that are mapped to some parts of the QQI award: Quantity and Number at Level 2.

By the end of this section, you will be able to:

- use numbers up to 100 in everyday life,

- recognise how large numbers, such as 1,000, are 'built',

- know place value in numbers,

- add up numbers that total less than 100,

- use the + and = signs, and

- estimate to the nearest number or quantity.

How do numbers work?

Our system of numbers is based on the number **10 (ten)**. It is called **decimal**.

'Dec' means 10, as in '**dec**ade' and '**Dec**ember', which was once the 10th month of the year.

We use a system called **place value** to build numbers. You might have heard people talk about 'hundreds, tens and units'. They are talking about **place value**.
Here a 'unit' means one.

Tens (T) and Units (U)

Look at this number:

62 (sixty-two)

This number is made up of 2 (two) parts:
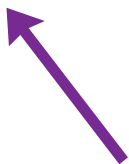
60 and 2

If we write them in a place value table, you can see how the number is formed:

Tens (T)	Units (U)
6	2

This means 60 (6 tens). This means 2 (2 ones).

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

Look at this bigger number:

235 (two hundred and thirty-five)

This number is made up of 3 (three) parts:

200 and 30 and 5

If we write them in a **place value table**, you can see how the number is formed:

Hundreds (H)	Tens (T)	Units (U)
2	3	5

This means 200 (2 hundreds).   This means 30 (3 tens).   This means 5 (5 ones).
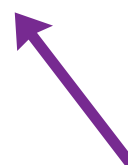
Hundreds (H), Tens (T) and Units (U)

Now you try it. Fill in the orange boxes below.

Look back at the previous page to help you

Hundreds (H)	Tens (T)	Units (U)
3	6	4
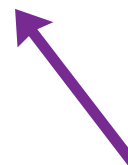
This means

_____

This means

_____

This means

_____

Fill in the table – place value

Put these numbers into the place value table. Write in how many hundreds, tens and units there are.

The first one is done for you.

~~20~~   26   34   59   100   376

Hundreds (H)	Tens (T)	Units (U)
	2 *(2 tens)*	*0* *(no units)*

The answers are on page 84

More practice at place value

Put these numbers into the place value table. Write in how many hundreds, tens and units there are.

The first one is done for you.

372   44   19   80   199   456

Hundreds (H)	Tens (T)	Units (U)
3 (3 hundreds)	7 (7 tens)	2 (2 units)

The answers are on page 85

The 100 square

This square contains 100 smaller squares showing the numbers from 0 to 99.

Read down each column from the top to the bottom. Can you see that the number increases by 10 each time?

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Talk to a friend or your tutor and think of different ways you could use this square to help you in your maths.

➡ Could you use it for **counting forwards and backwards**?

➡ Could you use it for **adding**?

➡ Could you use it for **anything else**?

Have a go at the next task, where we will ask you to fill in the gaps in a number square.

100 square with gaps

This number square has not been finished. Can you fill in the missing numbers to complete it?

0	1	2		4	5		7	8	
10	11		13	14	15	16		18	19
	21		23	24		26	27		29
30		32		34	35			38	
40	41		43		45	46	47	48	49
	51			54		56			59
60		62	63	64	65		67		
	71	72			75	76		78	79
80	81		83	84			87	88	
90			93	94		96			99

Do you want some more practice filling in the missing numbers on a 100 square?

You can try to solve the number square jigsaw on this website:
https://nrich.maths.org/5572

Ask a friend or your tutor if you need help.

The answers are on page 85

Using the 100 square to add 10

You can use the 100 square to add numbers together.

If you want to add 10, you just go down to the next row, like this:

I have 34 (the yellow square).

I want to add 10 ... so I drop down 1 row.

So the answer is ... 44 (the blue square).

We can write this as: 34 + 10 = 44

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	**34**	35	36	37	38	39
40	41	42	43	**44**	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

+ means add

= means equals or totals (the answer)

Using the 100 square to add 10

If you want to add 30 using the number square, you just go down three rows, like this:

I have 27 (the yellow square).

I want to add 30 ... so I drop down 3 rows.

So the answer is ... 57 (the blue square).

We can write this as: 27 + 30 = 57

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	**27**	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	**57**	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

+ means add

= means equals or totals (the answer)

Using the 100 square to add more than one ten

Use the 100 square to add the following numbers:

(a)   2 + 20 = _____

(b)   17 + 50 = _____

(c)   49 + 40 = _____

(d)   76 + 20 = _____

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

The answers are on page 86

Using the 100 square to add other numbers

What if I want to add a different number? Say, 14 + 17.

I would need to break the 17 into tens (T) and units (U), to give me: 10 + 7

I start at 14 (the yellow square).

I then add 10 ... by dropping down 1 row, to 24 (the green square).

I then add 7 ... by counting along the next 7 squares.

This brings me to 31 (the blue square).

We can write this as: 14 + 17 = 31

0	1	2	3	4	5	6	7	8	9
10	11	12	13	**14**	15	16	17	18	19
20	21	22	23	**24**	25	26	27	28	29
30	**31**	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Using the 100 square to add

Use the 100 square to add the following numbers:

(a)　23 + 19 = _____

(b)　37 + 35 = _____

(c)　42 + 41 = _____

(d)　67 + 15 = _____

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

The answers are on page 86

Adding without using the 100 square

You can add numbers without using the 100 square.

Example 1:

Say we are adding **43 + 32.**

We need to split each number into tens (T) and units (U):

		T		U
43	=	40	and	3
32	=	30	and	2
		70		5

We then add up how many we have in the tens (T) column: (40 + 30 = **70**)

And then add up how many we have in the units (U) column: (3 + 2 = **5**)

So in total we have **75**.

Example 2:

For our next sum, we need to add **25 and 64**. We need to split the number up:

		T		U
25	=	20	and	5
64	=	60	and	4
		80		9

We then add up how many we have in the tens (T) column: (20 + 60 = **80**)

And then add up how many we have in the units (U) column: (5 + 4 = **9**).

So in total we have **89**.

Have a go at adding 2-digit numbers

A digit is any number from 0 to 9 so an example of a 2-digit number is 19.

Have a go at adding these 2-digit numbers.

(a) **41 + 37 =**

		T	U
41	=		and
37	=		and
			_____

(b) **33 + 56 =**

	T	U
=		and
=		and
		_____

(c) **73 + 25 =**

	T	U
=		and
=		and
		_____

The answers are on page 86

Adding more 2-digit numbers

What happens if the number of units (U) adds up to more than 10? Have a look at these examples.

Example 1:

Say we are adding **27 + 35**.

We need to split each number into tens (T) and units (U):

		T		U
27	=	20	and	7
35	=	30	and	5
		50		12

We then add up how many we have in the tens (T) column: (20 + 30 = **50**)

And then add up how many we have in the units (U) column: (7 + 5 = **12**)

We then need to do one more task, and add **50 + 12**, which is **62**.

Example 2:

For our next sum, we need to add 59 and 24. We need to split the number up:

		T		U
59	=	50	and	9
24	=	20	and	4
		70		13

We then add up how many we have in the tens (T) column: (50 + 20 = **70**)

And then add up how many we have in the units (U) column: (9 + 4 = **13**)

We then need to do one more task, and add **70 + 13**, which is **83**.

Adding more 2-digit numbers

See if you can work out the answers to these sums yourself. Use the examples on the 3 previous pages to help you.

(a)   64 + 27   =   _____

(b)   38 + 47   =   _____

(c)   29 + 13   =   _____

(d)   47 + 37   =   _____

The answers are on page 86

Estimating – What is it?

When working with numbers or quantities, an important skill that you need is being able to **estimate**. This means being able to guess a number or quantity sensibly, based on the information you have.

If you estimate before working out an answer, you can tell roughly what the answer will be. It helps you spot if you have made a mistake and need to check again.

Here is an example of how estimating can help.

Example:

I need to add €12 and €34.

€12 is quite near to €10

and

€34 is quite near to €30.

A good estimate of the answer will be €10 + €30, which is €40.

So my answer should be around €40.

If I then make a mistake when I work out €12 + €34, and get the answer €460, I know I have gone wrong and need to check again!

Ooooops!

Of course, the **exact** answer is:

€12 + €34 = **€46.**
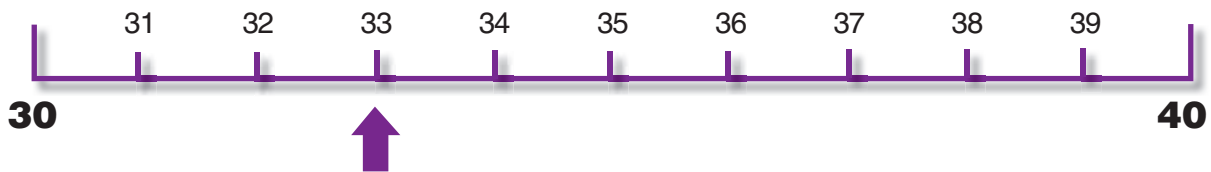
How do you estimate?

You estimate by **rounding off** the number to a number that is easier to deal with.

If you are dealing with 2-digit numbers, like 33 or 68, you can round off to the nearest **10**.

Example 1:

Imagine the number 33 on a number line:

Question: Is 33 nearer to 30 or 40?

Answer: It is nearer to 30. So if we round 33 to the nearest 10, we say it is **30**.

Example 2:

What about 68?

Question: Is it nearer to 60 or 70? (Draw a number line if you like.)

Answer: It is nearer to **70**.

Example 3:

What about 45?

Question: Is 45 nearer to 40, or to 50?

Answer: Well, it is right in the middle – 5 bigger than 40, and 5 less than 50.

So … what do we do?

The answer is, when it is a 5, we go up. So 45 would be rounded to **50**.

Bonus fact: We round down for 0, 1, 2, 3, 4 and round up for 5, 6, 7, 8, 9

Estimating

Have a go at rounding off these numbers. Draw a number line if you like.

(a)   What is 27 to the nearest 10?   _____

(b)   What is 51 to the nearest 10?   _____

(c)   What is 44 to the nearest 10?   _____

(d)   What is 75 to the nearest 10?   _____

The answers are on page 86

Bonus learning!

If you want to work towards the award QQI Quantity and Number at Level 2, you will need to know some big numbers. Use this fact sheet to see how many you can recognise!

Fact sheet

Big numbers

➡ **10** has **1 zero**.

➡ **10**0 has **2 zeros**.

Remembering the number of zeros can help you spot big numbers.

1,000 = **one thousand** **(3 zeros)**

100,000 = **one hundred thousand** **(5 zeros)**

1,000,000 = **one million** **(6 zeros)**

➡ A **million** is 1,000 lots of 1,000!

1,000,000,000 = **one billion** **(9 zeros)**

➡ A **billion** is 1,000 lots of 1,000,000!

Using numbers up to 100 in everyday life

Using everything you have learned in this section, have a go at working out answers to the following questions about money. Use the scribble pad for working out your answers.

Question 1:

A dress in the sale costs €34. I also want a jacket that costs €18.

What is the total cost?

Scribble pad

Question 2:

I need to get my bike repaired. It costs €65.

I also need to get a filling at the dentist's. This will cost €27.

I only have €90. Can I afford both?

Scribble pad

Question 3:

I can take 23 kilograms (kg) onto the plane.

My big case weighs 15kg. My computer bag weighs 7kg. Can I take both on board?

Scribble pad

End of Section 2 – Shaping up!

Did you learn it?

At the start of this section, we said you would learn certain skills.

Give yourself a score in the box next to each skill that shows how confident you feel about it now. You can score yourself with a number from 0 to 10. 0 is low and 10 is high.

Skill 1:   Use numbers up to 100 in everyday life.

Skill 2:   Recognise how large numbers, such as 1,000, are "built".

Skill 3:   Know place value in numbers.

Skill 4:   Add up numbers that total less than 100.

Skill 5:   Use the + and = signs.

Skill 6:   Estimate to the nearest number or quantity.