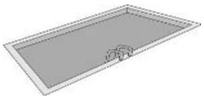
Unit 10 Week 1

1. Match each image with the appropriate measurement (*images not to scale or in proportion to each other)

68 metres	4 metres	346 kilometres	330 millilitres	19 grams	150 kilograms

					
The height of a double decker bus	The capacity of a can of drink	The weight of a mouse	The length of the River Thames	The perimeter of a swimming pool	The weight of a motorcycle

4 metres | 330 millilitres | 19 grams | 346 kilometres | 68 metres | 150 kilograms

2.

A) 1kg is equal to 1000 g. Use this information to complete the below table.

Kilograms	Grams
1.7	1700
8.4	8400
250	250 000

B) A garden lawn is rectangular in shape. The length of the lawn is 12 m. The width of the lawn is 87 cm shorter. Find the width of the lawn in metres.

12 metres = 1200 cm

1200 – 87 = 1113 cm *or* 11.13 m

3. Caleb leaves his home to travel to the Olympic stadium to watch the athletics. He leaves the house at 7.45 am and is on the train exactly 30 minutes later. His train journey takes 1 hour and 33 minutes. He then has a 42 minute bus journey to reach the stadium. How long is his journey in total? What time does he arrive at the stadium?

7:45 am $\xrightarrow{+\ 30\ \text{mins}}$ 8:15 am $\xrightarrow{+\ 1\ \text{hour}}$ 9:15 am $\xrightarrow{+\ 30\ \text{mins}}$ 9:45 am $\xrightarrow{+\ 3\ \text{mins}}$ 9:48 am

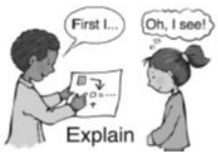
9:48 am $\xrightarrow{+\ 2\ \text{mins}}$ 9:50am $\xrightarrow{+\ 40\ \text{mins}}$ 10:30 am

Caleb arrives at the stadium at 10:30 am.

7:45 am $\xrightarrow{+\ 2\ \text{hours}}$ 9:45am $\xrightarrow{+\ 45\ \text{mins}}$ 10:30 am

His journey lasts 2 hours and 45 minutes.

Idea for Depth



Explain the meaning of ‘kilo’, ‘centi’ and ‘milli’.

How do these definitions support your understanding of how to convert kilometres to centimetres and centimetres to millimetres?

Unit 10 Week 2

1) Are imperial units of measure still used? Explore your surroundings to see and hear examples of these units. Ask your family and friends if they can think of examples where these units are used. Record your findings in the table below or in the notes pages at the back of the book.

Length inches, feet, miles	Popular examples include use of a tape measure (inches), height of people (feet) and distance between places (miles).
Mass ounce, pound (lb), stone	Popular examples include baking measures (ounces and lb) and mass of people (stone).
Volume fluid ounce (fl oz), pint, gallon	Popular examples include drinks (fl oz), drinks (pints) and measure of large water bottles and milk (gallons).
Other	

2) Measure the length of different items in centimetres and then again in inches. If you do not have a ruler at home, there is a small one printed at the back of the book.

Item measured	Inches	Centimetres
E.g. pencil	7 inches	17.8 cm

3) Some liquids are sold in pints, have a look at milk containers. A pint is a bit more than half a litre.

1 pint $\approx$ 570 ml Which symbol will make the statements below correct. $<$ or $\approx$ or $>$

1 litre ◯ 3 pints 2 litres ◯ 2 pints

10 pints ◯ 5.7 litres 6 pints ◯ 3 litres

Idea for Depth If these are the measurements, what could have been measured?

? ← Answer

14 inches	3 feet	5 miles
1 pint	2 lbs	12 fl oz

Unit 11 Week 1

1a) Complete the table to represent the answer to each calculation:

	Tens	Ones	tenths	hundredths	thousandths	
Make 1.6 ten times greater		1	0.1 0.1 0.1 0.1 0.1 0.1			1.6
Make 1.6 ten times smaller	10	1 1 1 1 1 1				1.6 × 10 = 16
Make 1.6 one hundred times smaller			0.1	0.01 0.01 0.01 0.01 0.01 0.01		1.6 ÷ 10 = 0.16
				0.01		1.6 ÷ 100 = 0.016

1b) Complete the table to represent the answer to each calculation:

	Tens	Ones	tenths	hundredths	thousandths	
Make 0.34 ten times smaller			0.1 0.1 0.1	0.01 0.01 0.01 0.01		0.34
Make 0.34 ten times greater				0.01 0.01 0.01		0.34 ÷ 10 = 0.34
Make 0.34 one hundred times greater		1 1 1	0.1 0.1 0.1 0.1			0.34 × 10 = 3.4
	10 10 10	1 1 1 1				0.34 × 100 = 34

2) Write down each distance in kilometres then in metres. Which athletes ran the greatest distance?

I ran 1070 m 1.07 km

I ran 1 km and 700 m 1.7 km

I ran 1.625 km

This person ran the greatest distance.

How many centimetres did each athlete run?

3) 

Across a day, Mike drank 2.4 litres of water.

How many millilitres did Mike drink? Mike drank 2400 ml

Dom drank 3.8 litres of water. How many millilitres did Dom drink? Dom drank 3800 ml

How many millilitres did they drink altogether? In total they drank 6200 ml

How many litres did they drink altogether? In total they drank 6.2 litres

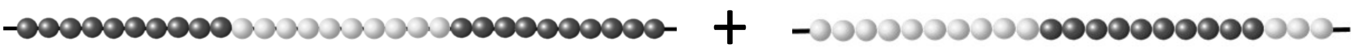
Next Step for Depth Spot the errors and use space at the back of the book to explain the mistakes.

10.5 ÷ 10 = 1.5   2.06 ÷ 10 = 0.26   407 ÷ 10 = 47

140 ÷ 100 = 0.14   2360 ÷ 1000 = 0.236

Unit 11 Week 2

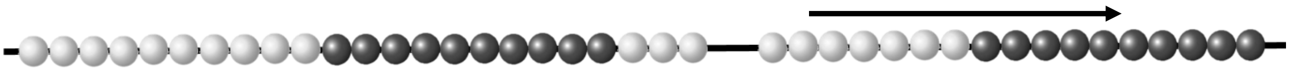
1) The beads below represent an addition calculation



Which of these calculation could it represent?

3 + 0.23	0.3 + 0.23
3000 + 2300	30 + 230
300 + 23	3 + 2.3

2) The beads below represent a subtraction calculation



Complete the table by recording the calculation represented if each bead had a different value.

For the last row, choose your own value for each bead.

If each bead represents ...	...the calculation is...	The difference is...
1	40 – 17	23
0.1	4 - 1.7	2.3
10	400 - 170	230
0.01	0.4 - 0.17	0.23

3) Complete the pyramids. Each block is the sum of the two blocks below.

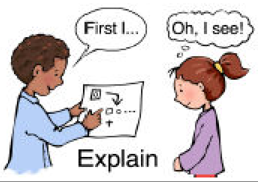
Pyramid 1:
7.8
4.7 | 3.1
3.9 | 0.8 | 2.3

Pyramid 2:
2.7
0.9 | 1.8
0.4 | 0.5 | 1.3

Pyramid 3:
8.2
 |
 | 1.7 |

There is more than one possibility. Use the spare pyramids at the back of the book to investigate.

Next Step for Depth



Look at question one:

Choose a calculation that the bead string **does not** represent and explain why.

Unit 11 Week 3

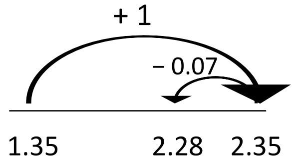
1) How high did the Olympic athlete jump?
Work it out using more than one strategy.

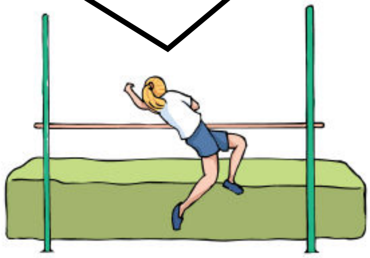
I can jump a height of 1.35 m. I watched an athlete at the Olympics jump 0.93 m higher.

Accept any suitable method. Two examples are detailed:

1.35 + 0.93 = 1.35 + 1 - 0.07
= 2.35 - 0.07

The athlete jumped 2.42 m





135 + 93 = 130 + 90 + 5 + 3
= 220 + 8

The athlete jumped 228 cm.

2) Marcus has made an error when he calculated

4.57 - 2.74 = 2.23

What did he do wrong? How can you correct it?

I partitioned the number into it place value parts and found the difference between the parts.
The difference between 4 ones and 2 ones is 2 ones. Between 5 tenths and 7 tenths is 2 tenths. Between 7 hundredths and 4 hundredths is 3 hundredths.
The answer is **2.23**

Accept any explanation that highlights that he has not understood that 4.57 is the whole and he is subtracting 2.74 from this.
By finding the difference between 0.5 and 0.7, he has made the error.
To correct he can partition 4.57 into 3, 1.5 and 0.07. Then his method will work and the answer will be 1.83

3) Use any of the digits 1 to 9 once to create each target. There are spare grids at the back of the book.

TARGET: a total less than 0.8

0 . 1 4
0 . 2 5
\+ 0 . 3 6

TARGET: the largest possible sum

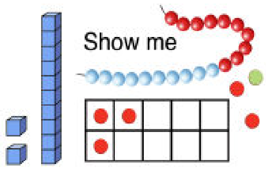
0 . 9 6
0 . 8 5
\+ 0 . 7 4

TARGET: a sum as close to 1 as possible

0 . 1 5
0 . 3 6
\+ 0 . 4 9

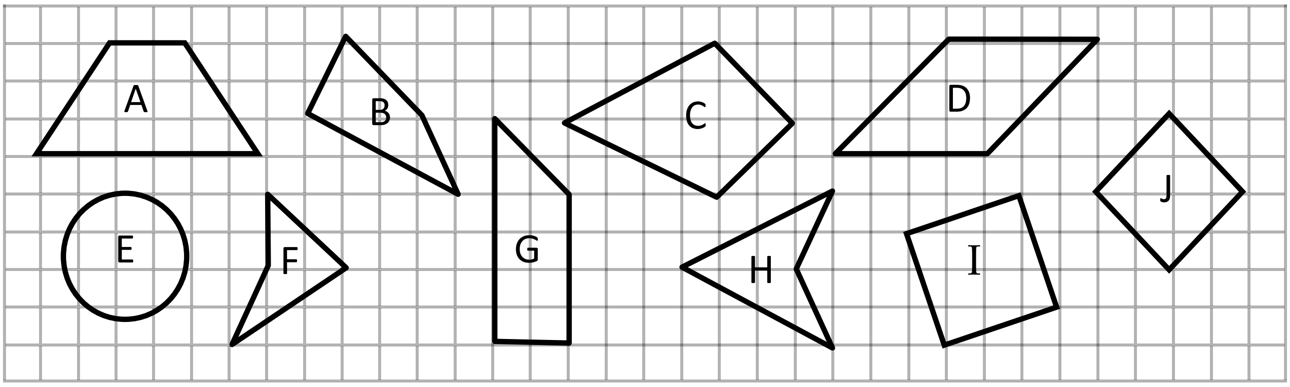
There is more than one possible answer for these.

Next Step for Depth



For the second calculation in question three, how do you know that you have the largest possible sum? Is there more than one calculation that gives the same total?
Clearly show that there cannot be a larger sum using the digit 1 to 9 once.

Unit 12 Week 1



1) List the letters of the shapes for which each statement is true:

i) It has at least two sides which are equal in length C, D, H, I, J

ii) It has **only** one pair of parallel lines A and G

iii) It is a regular shape I and J

iv) It is not a polygon E

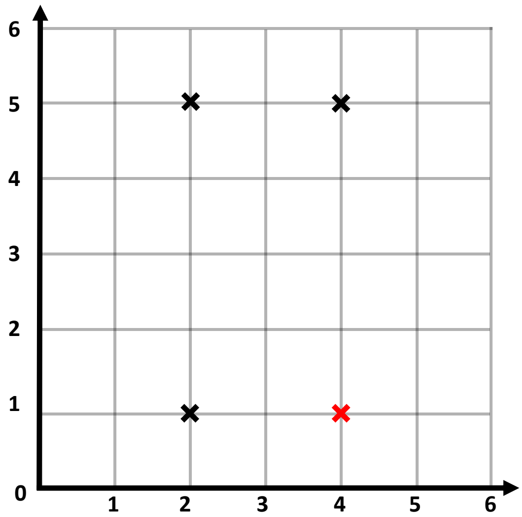
v) It has at least one acute angle A, B, C, D, F, G, H

vi) It has a pair of perpendicular lines G, I, J

vii) There is a right angle at every vertex I and J

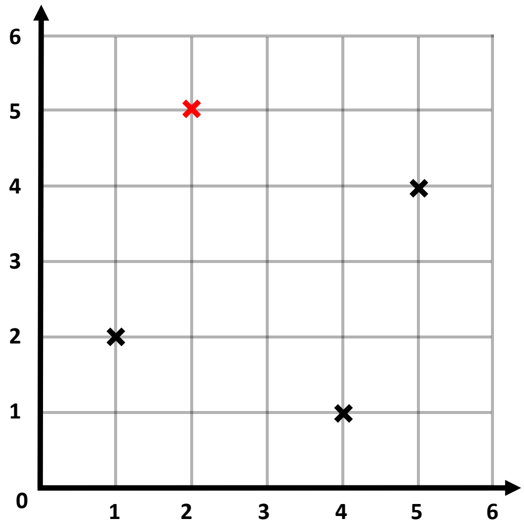
2a) Complete the missing coordinate to plot the vertices of a rectangle

(2, 6) (2, 2) (4, 6) (4 , 1)

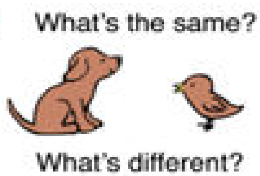


2a) Complete the missing coordinate to make a regular rectangle (a square)

(1, 2) (4, 1) (5, 4) (2 , 5)



Next Step for Depth

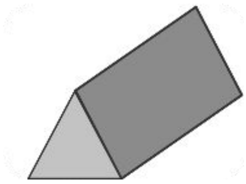


Look at the shapes in question one. Choose pairs of shape and describe as many similarities and differences as you can think of.

Unit 12 Week 2

1) I have two of these 3-D shapes. In total there are 11 faces, 14 vertices and 21 edges.

Fill out the information and put a tick to show the two shapes that I have.

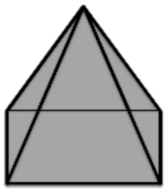


Triangular prism

5 faces

6 vertices

9 edges

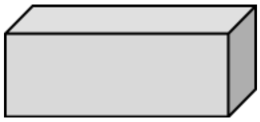


Square based pyramid

5 faces

5 vertices

8 edges



Cuboid

6 faces

8 vertices

12 edges

2) What shape is each person describing? Write the name of the shape, sketch a diagram of the shape and answer their questions.

I'm thinking of a shape. When I try to draw my shape I start with a triangle.

My shape has four vertices and four faces.

How many edges does it have?

The shapes is a tetrahedron (triangular based pyramid).

It has 6 edges.

When I draw my shape it looks like a triangle but with a curved side.

It has only one vertex.

What would you eat out of this shape?

The shape is a cone.

Ice cream, chips, ...

3) Can you explain why this person must be incorrect?

My shape has six flat faces.

It only has two edges.

It has only three vertices.

If a shapes has six faces, it will have more than 2 edges.

It has flat faces so it a polyhedron. It is not possible to have a polyhedron with only three vertices. A tetrahedron is the polyhedral with the least vertices and it has 4 vertices.

Next Step for Depth

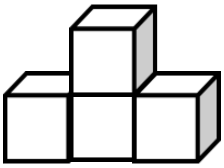
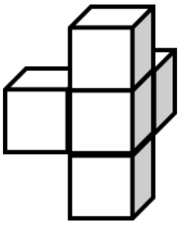
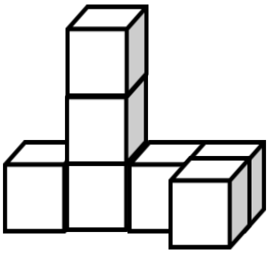
Odd one out

Look at the shapes in question one.

Which shape is the odd one out. How many different answers can you think of?

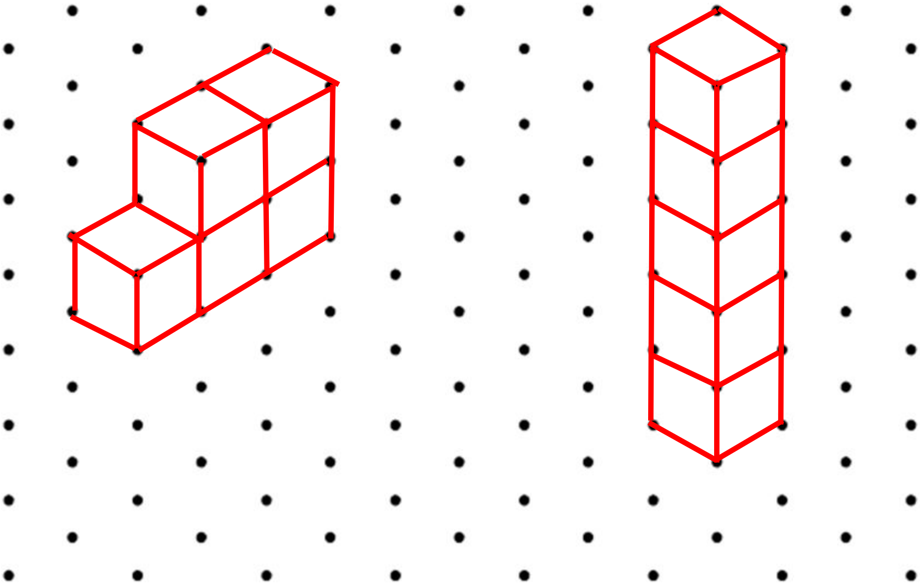
Unit 13 Week 1

1) Find the volume of the following solids if each block represents 1 cm^3.

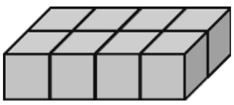
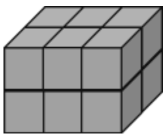
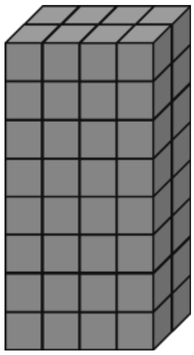




A) 4 cm^3 B) 5 cm^3 C) 7 cm^3

2) Sketch two different solids with a volume of 5cm^3 (e.g.)



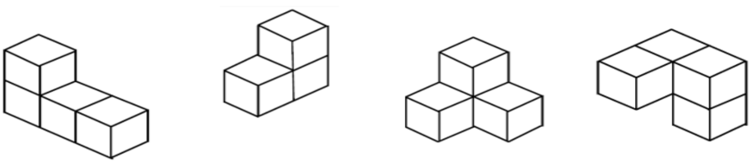
3) What is the volume of these cuboids? Each block represents 1cm^3

A) 8 cm^3 B) 12 cm^3 C) 64 cm^3

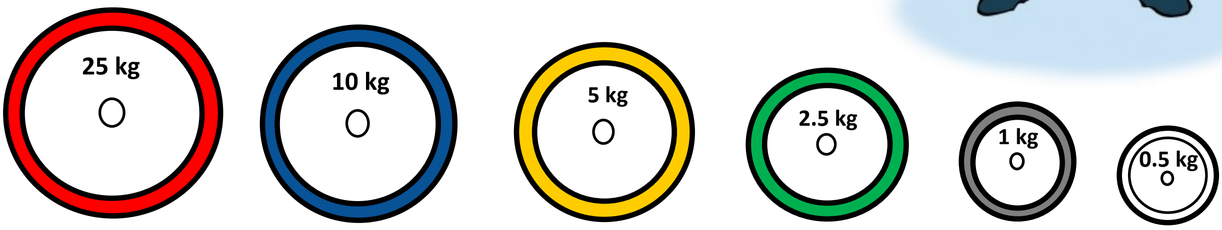
Idea for Depth

Which solid is the odd one out? Why?



Unit 14 Week 1

In Olympic weight lifting athletes attempt to lift a barbell loaded with weight plates.
The weight plates are large metal discs that slide onto each end of the metal pole. The mass of the plates available are shown below:



IMPORTANT INFORMATION:

- The barbell (the metal pole) has a mass of 20 kg
- A weight plate is added to each side of the pole to keep it balanced.

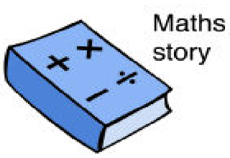
Complete the table and use the information to solve the problem below:

One weight plate	25 kg	10 kg	5 kg	2.5 kg	1 kg	0.5 kg
Two weight plates	50 kg	20 kg	10 kg	5 kg	2 kg	1 kg
Four weight plates	100 kg	40 kg	20 kg	10 kg	4 kg	2 kg
Six weight plates	150 kg	60 kg	30 kg	15 kg	6 kg	3 kg

Adrian lifts a total mass of 120 kg. How many different ways can you find of making this?

- four 25 kg plates and two 10 kg plates
- four 25 kg plates and four 5 kg plates
- two 25 kg plates, six 10 kg plates and two 5 kg plates

Next Step for Depth

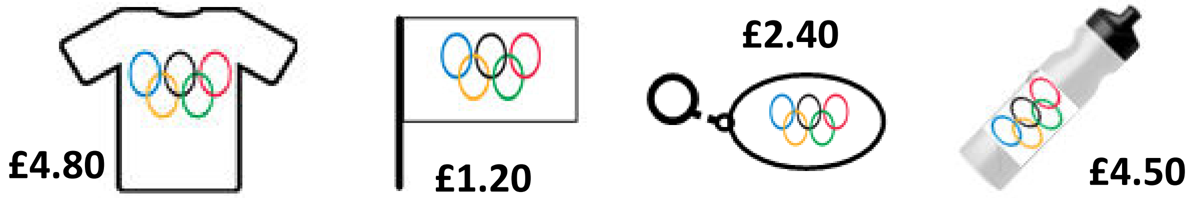


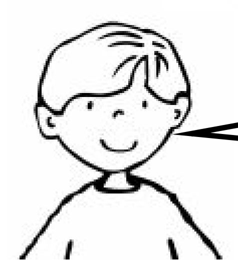
An athlete started at **round one** lifting a mass of **100 kg**. He wins by lifting a mass of **137 kg** in **round four**. A different weight plate was added each round.

Tell the story of the four round competition and the mass lifted each round.

Unit 14 Week 2

A market stall at the Olympic park sells these items:





I bought four souvenirs for my family. I bought the same thing for my mum and dad, but two different things for my sisters. I spent **more than £10** but **less than £15.** What did I buy?

How many solutions can you find? Use the table to record your investigation.

	£1.20	£2.40	£2.40	£2.40	£4.80	£4.50
	£1.20	£2.40	£2.40	£2.40	£4.80	£4.50
	£4.80	£4.50	£4.80	£4.80	£2.40	£2.40
	£4.50	£1.20	£4.50	£1.20	£1.20	£1.20
TOTAL COST:	£11.70	£10.50	£14.10	£10.80	£13.20	£12.60

What could he have bought for his family?

There are actually more than six possible answers because for each of the answers detailed above, you can swap which sister gets which present making six more possible answers.

Next Step for Depth

Have you found every possible solution? How can you organise your results to convince your teacher that you have found them all?

CLUE: There are six.

1 2 3
1 3 2
2 1 3
2 3 1
3 1 2
3 2 1

Bonus Task (suggested approach)

Parental Guidance

Pupils continue to use problem-solving skills and all four operations to solve problems involving measures using decimal notation.

Prior & future learning

See previous week

Worked example

Understanding the problem

Here are some questions that will make sure that the key information in the problem laid out on the next page has been understood:

? ***Which swimmer has the longest laps? What about the shortest?***

Person A has the longest lap of 25 metres and person D has the shortest lap of 12.5 metres.

? ***How much longer is the length of the small pool than the width of the big pool?***

The difference between 17.5 and 20 is 2.5. The small pool is 2.5 metres longer than the big pool is wide.

? ***If Person D swims two laps, how far has he gone?***

I know that half of 25 is 12.5 so double 12.5 must be 25.He swam 25 metres.

Gather information

The problem will be easier to tackle if you have the numbers available to play around with. A table is useful for organising the distance each person swam for between one and ten laps.

	Person A	Person B	Person C	Person D
Lap 1	25	17.5	20	12.5
Lap 2	50	35	40	25
Lap 3	75	52.5	60	32.5
Lap 4	100	70	80	50
Lap 5	125	87.5	100	62.5
Lap 6	150	105	120	75
Lap 7	175	122.5	140	87.5
Lap 8	200	140	160	100
Lap 9	225	157.5	180	112.5
Lap 10	250	175	200	125

Once the information has been gathered it can be used to find a different value for each swimmer that gives a total of 425. The numbers have been selected so that there is more than one solution for this problem.

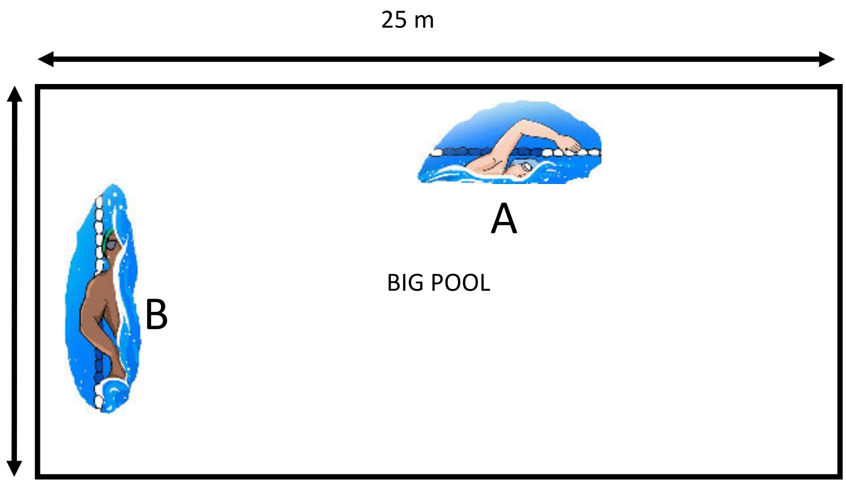
Bonus Task

Four people take part in a swimathon. They took it in turns to swim different length laps in two different pools, the big pool and the small pool.

Person A swam lengths of the big pool. Each length was 25 m long.

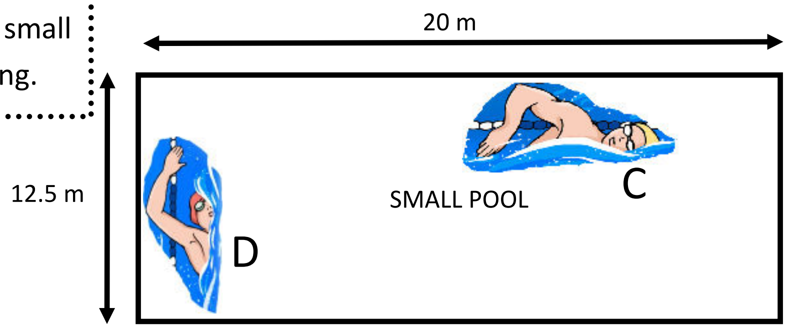
Person B swam the width of the big pool. Each width was 17.5 m long.

17.5 m

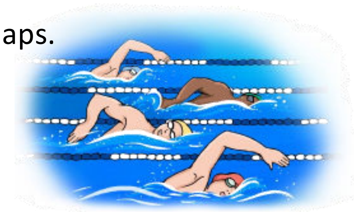


Person C swam lengths of the small pool. Each length was 20 m long.

Person D swam across the width of the big pool. Each width was 12.5 m long.



In total they swam a distance of 425 metres. No one swam more than ten laps. How many laps did each person swim? Is there more than one solution?

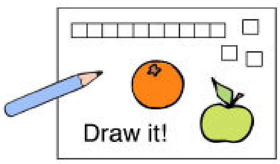


Two possible answers are detailed below:

A swam 5 lengths and a distance of 125 m
B swam 5 widths and a distance of 87.5 m
C swam 5 lengths and a distance of 100 m
D swam 9 widths and a distance of 112.5 m

A swam 6 lengths and a distance of 150 m
B swam 6 widths and a distance of 105 m
C swam 6 lengths and a distance of 120 m
D swam 4 widths and a distance of 50 m

Next Step for Depth



For your solution (or choose a solution if you have more than one) draw a line showing the total distance swum and the different number of laps each person did. It should look a lot like a number line.