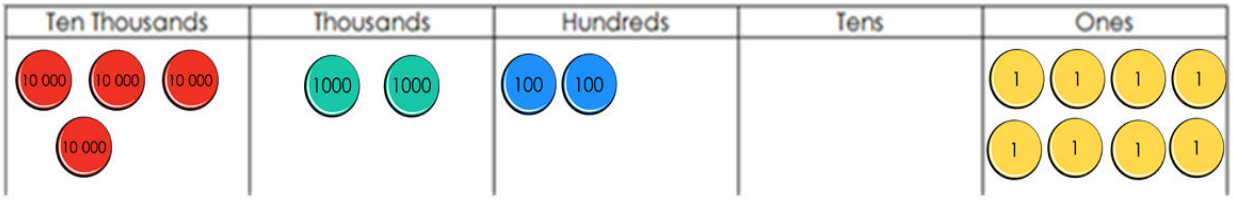
Pupil tasks

1. Look at the place value chart below.



A) What number is represented? Write your answer in digits. **42 208**

B) Circle True or False for the statements below. For any that are false, correct the statement.

There are two thousands in this number (TRUE) FALSE _____

This number is 40 000 + 2000 + 20 + 8 TRUE (FALSE) **There are 2 hundreds and not 2 tens**

This number is 40 000 + 2000 + 200 + 8 (TRUE) FALSE _____

2.

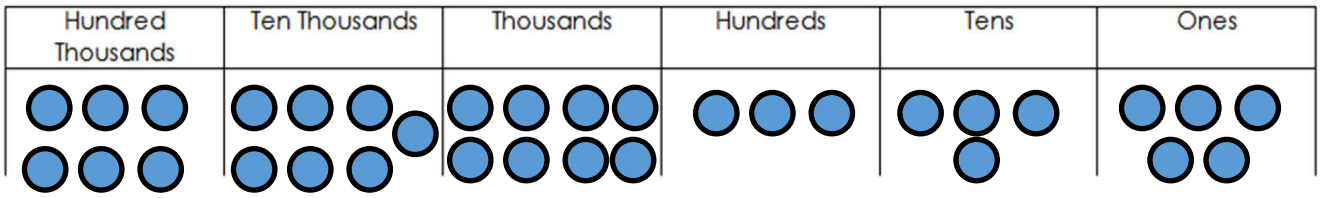
5	7	0	1	4

A) Write down the greatest 5-digit number that can be made with these digits. **75 410**

Write down the smallest 5-digit number that can be made with these digits. **10 457**

Write down a number using these digits where the 4 has a value ten times smaller than the value it has in the smallest number you have made. **Any 5-digit number using the above digits with a 4 in the tens place.**

B) Draw the number 678 345 in the place value chart below (using place value counter representations as above).



Write a number where the value of the 4 is one hundred times bigger. **A number with 4 in the thousands place**

Write a number where the value of the 7 is one thousand times smaller. **A number with 7 in the hundreds place**

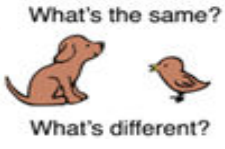
3. A number rounded to the nearest 1000 is 35 000.

A) Write down the smallest number it could have been. **34 500**

B) Write down the largest number it could have been. **35 499**

C) What is the rule for rounding to the nearest 1000? **If the digit in the hundreds place is 0, 1, 2, 3, 4 it rounds to the previous multiple of 1000 and if it is 5, 6, 7, 8, 9 it rounds to the next multiple**

Next Step for Depth



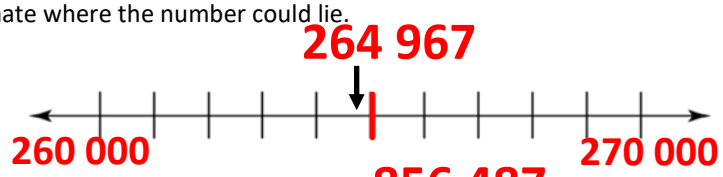
Look at the three numbers below. Write three facts that show how the numbers are different and three facts that show how the numbers are the same.

72 039 70 239 72 390

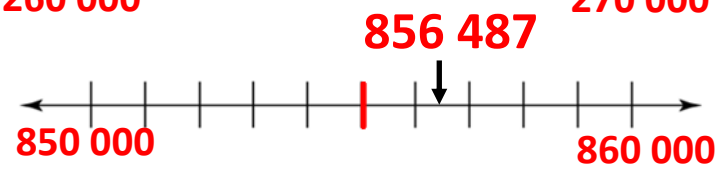
Pupil tasks

1. For the following numbers write the two closest multiples of 10 000 at each end of the number line and approximate where the number could lie.

A) 264 967



B) 856 487



2. Here are four 6-digit numbers:

623 084 326 408 620 843 308 624

A) Each of the four numbers has the same digits. Explain why the numbers have different values.

Answers to include knowledge that the position of the digit determines its value.

Exemplify with one digit.

B) Using the numbers above, complete the boxes below. Write a statement comparing each pair of numbers.

Multiple correct answers for example:

620 843 < 623 084 620 843 has a place holder in the thousands place and 623 084 has a 3 in the thousands place

[ ] > [ ] _____

3. Here is part of a number sequence: 23, 17, 11, 5, -1, -7, -13, -19

A) Fill in the missing terms of this sequence above.

What would the 10th term of this sequence be? The 10th term will be -31

Write three statements that describe this sequence.

Decreasing sequence

Difference between terms is 6

The rule is subtract 6

difference between terms | decreasing | increasing | rule

B) Circle the sequence(s) that will contain the number 1000. How do you know?

25, 35, 45, 55, 65, …. 100, 200, 300, 400, …… 850, 825, 800, 775, 750,….

I know because Each term is a multiple of 100 and the sequence increases by 100. This sequence will contain 1000 because it is a multiple of 100

Write the first 5 terms of an increasing sequence with the rule 'add 0.7'. The first term is 2.1.

2.1, 2.8, 3.5, 4.2, 4.9

Next Step for Depth

? ← Answer

I'm thinking of a whole number…

It has six digits and it is odd.

It is approximately equal to 358 000 when rounded to the nearest 1000.

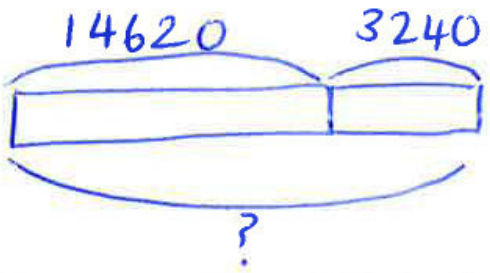
What is the greatest number it could be? Smallest? Suggest 2 numbers it could not be and explain why.

Pupil tasks

1. 14 620 + 3240 =

A) Construct a bar model to represent this calculation.

Bar model



B) Estimate the answer to this calculation.

14 620 ≈ **15 000** 3240 ≈ **3000**

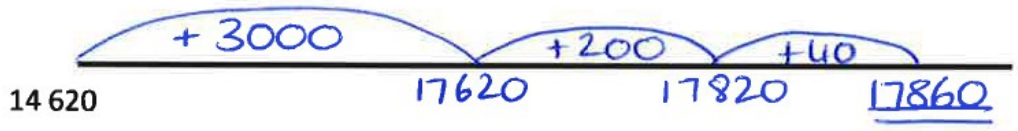
15 000 + **3000** = **18 000**

C) Complete the calculation by partitioning both numbers into place value amounts.

10 000 + 0 = 10 000
4000 + 3000 = 7000
600 + 200 = 800
20 + 40 = 60
0 + 0 = 0

10000 + 7000 + 800 + 60 + 0 =
17860 or column method.

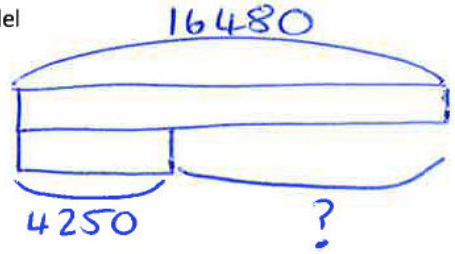
D) Complete the calculation by partitioning 3240 and counting on using a number line.



2. 16 480 - 4250 =

A) Construct a bar model for this calculation.

Bar model



B) Estimate the answer to this calculation.

16 480 ≈ **16 000** 4250 ≈ **4000**

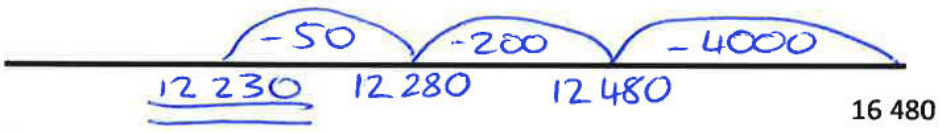
16 000 - **4000** = **12 000**

C) Complete the calculation by partitioning both numbers into place value amounts.

10 000 − 0 = 10 000
6000 − 4000 = 2000
400 − 200 = 200
80 − 50 = 30
0 − 0 = 0

10000 + 2000 + 200 + 30 + 0
= 12 230 or column method

D) Complete the calculation by partitioning 4250 and counting back using a number line.



3. Which of the two partitioning methods do you prefer? Why?

Justification of preferred method required

Next Step for Depth

Make up and solve a maths story for this calculation

87 500 + 4300 =

Think about an appropriate context for the given numbers e.g. do they represent people, money, distances etc?

Pupil tasks

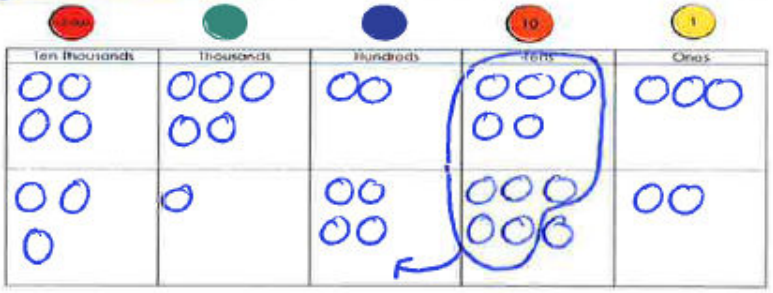
1. For each of the following calculations draw a bar model and complete the calculation by drawing place value counters in the chart alongside the formal column method.

A) 45 253 + 31 462 =

Bar model

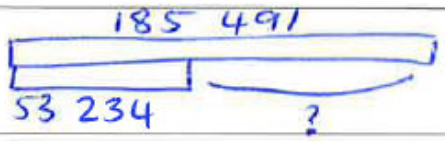
Column method

$$\begin{array}{r} 45\ 253 \\ +\ 31\ 462 \\ \hline 76\ 715 \\ \hline 1 \end{array}$$



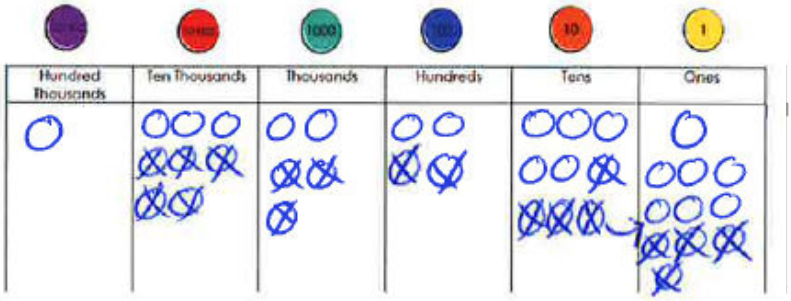
B) 185 491 − 53 234 =

Bar model

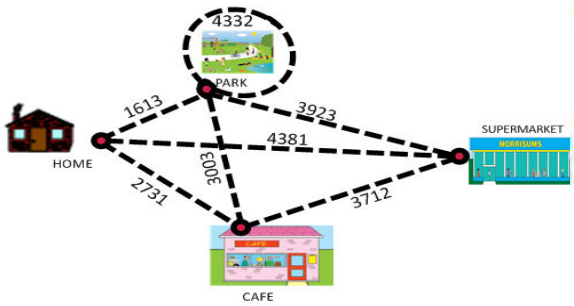


Column method

$$\begin{array}{r} 185\ \overset{8}{4}\overset{1}{9}\overset{1}{1} \\ -\ 53\ 234 \\ \hline 132\ 257 \\ \hline \end{array}$$



2. I walk from home to the supermarket, then to the café before going home again. However, I want to reach my target of taking 15 000 steps in a day. What could I do to make this happen? Show your working.



4381
3712
+ 2731
10824
1 1

Walk from cafe to park adds 3003 steps.
Wak around park adds 4332 steps

10 824 + 3003 + 4332 = 17 041

Other answers possible.

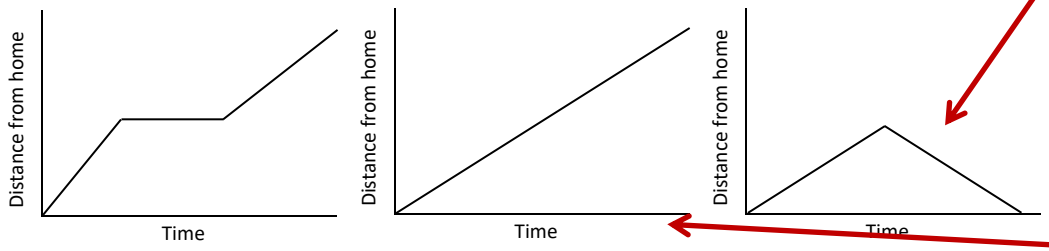
Next Step for Depth

What has gone wrong? What guidance should you give?

76 827	76 827	132 754	132 754
+12 412	+ 12 412	- 12 346	- 12 346
64 415	881 239	120 412	120 418

Pupil tasks

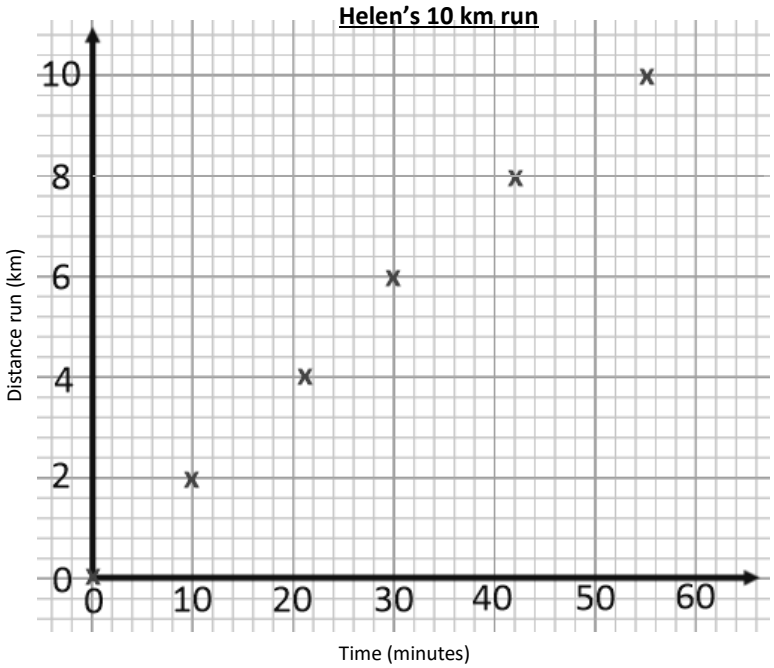
1) Which graph represents which "Maths story"?



Story A: I was on my way to school when I felt un-well, so I turned around and went home.

Story B: I travelled to school at the same speed and didn't stop until I got there.

2) Helen and Claire complete a 10 km run and record their time after each 2 km. Complete the table.

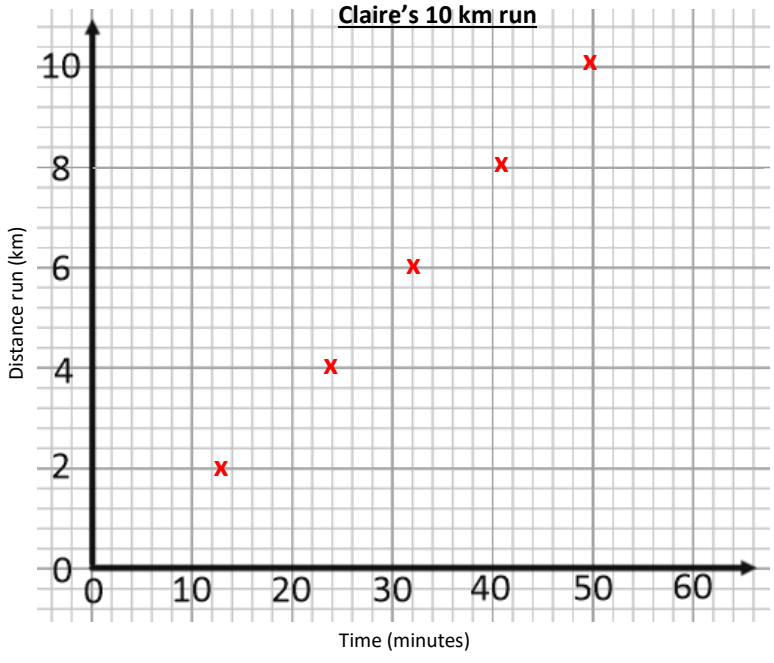


Distance (km)	Helen's run time	Claire's run time
0	0	0
2	10	13
4	**21**	24
6	30	32
8	**42**	41
10	55	50

a) How long did Helen take to run from the 4 km mark to the end of the race?

34

3) Use the table below to draw a graph representing Claire's run.



Write a questions that can be answered using this data.

Check that questions relate to the situation

Next Step for Depth

Write a third "Maths story" for the graph in question 1 that doesn't have one. Create three new stories that could be represented with the three graphs. Create your own graphs and "stories" for a range of different situations. For example, your journey to school.

Pupil tasks

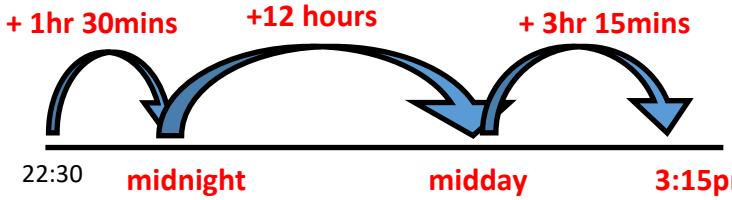
1a)

I have 8 hours and 20 minutes until my event. If the time is 9:45 am, what time is my event?

The event is at **18:05** / **6:05pm**

There are different ways of completing the calculations and number lines

We are performing at 3:15 pm tomorrow. If it 10:30 pm now, how long it is until the event?

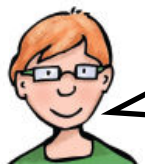


It is this long until the event: **16 hours 45 minutes**

2) This is the timetable for a train service that runs between London and Manchester via Birmingham.

London	08:37	08:58	09:22	09:45	10:08	**11:27**
Birmingham	09:59	10:23	-	11: 08	-	
Manchester	11:02	11:25	11:39	12:52	12:33	**13:42**

a)



I catch the 08:37 train from London to Manchester. How long is my journey?

2 hrs 25 mins

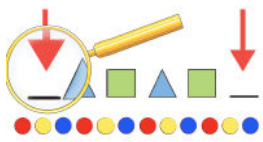
b)

I catch the train that takes the least amount of time to reach Manchester.

I catch the 09:22 train

I arrive in Manchester at 13:42 having been on the train for 2 hours and 15 minutes.

Next Step for Depth



A bus leaves the depot every 17 minutes starting at 06:15.

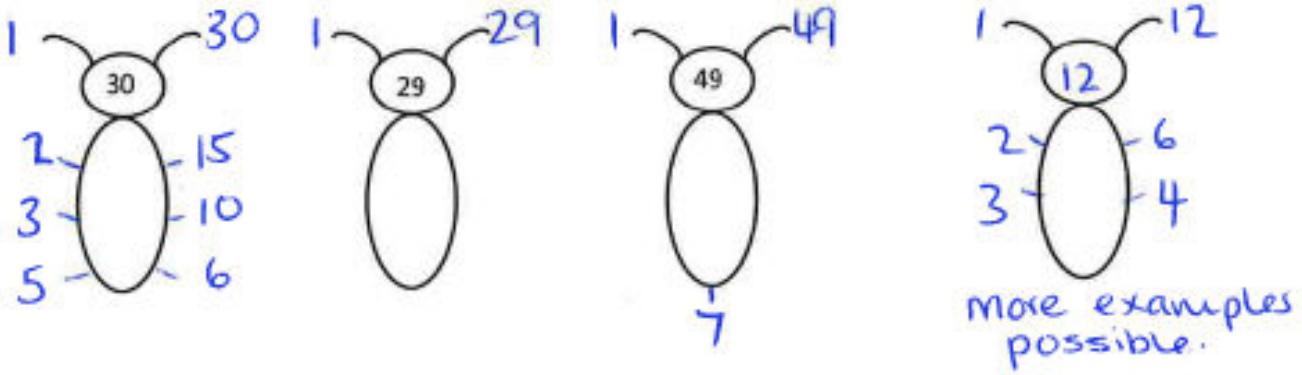
What time does the fourth bus leave?

What time does the tenth bus leave?

Pupil tasks

1. Create factor bugs for the following numbers:

A) 30 B) 29 C) 49 D) A number of your own choice



E) Choose two of the factor bugs you have created above and explain how they are **same** and how they are **different**.

Factor bug _____ and Factor bug _____ e.g.

All have 1 as a factor, 30 has 8 factors

29 is prime so only has 2 factors, 30 & 12 both have 2

49 is square so has an odd number of factors

2.

A) Sort these numbers into the Venn diagram below.

~~16~~ ~~18~~ ~~20~~ ~~24~~ ~~30~~ ~~32~~ ~~36~~ ~~48~~

B) What other numbers can you include? Write these in the Venn diagram. *

C) Write two facts for each set of numbers (including the ones not in the circles).

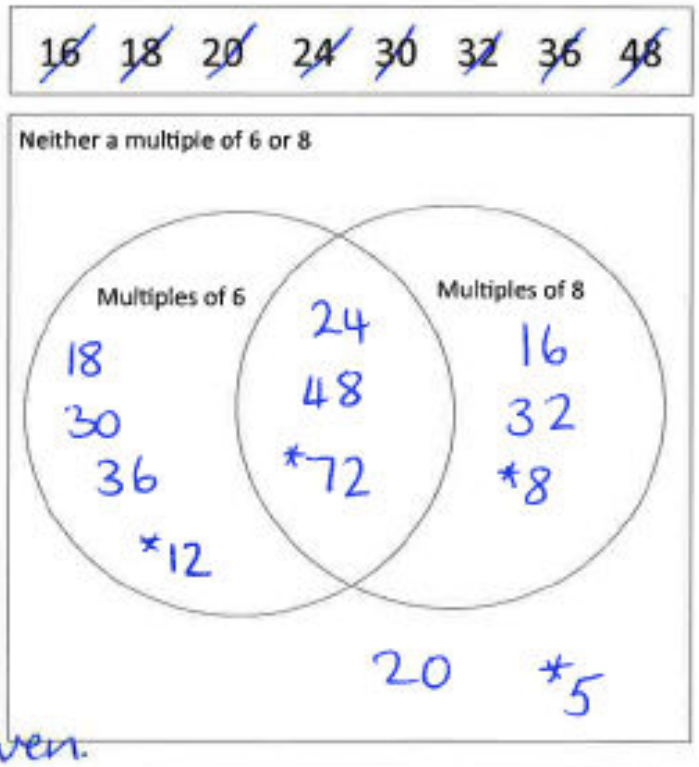
e.g. All multiples of 6 are also multiples of 3.

Multiples of 6: All even; all divisible by 3.

Multiples of 8: All even; all divisible by 4

Both: All multiples of 24, all even.

Neither: Multiples of 5; odd or even.



Next Step for Depth

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

Find all the common factors of

24 and 42

36 and 48

Pupil tasks

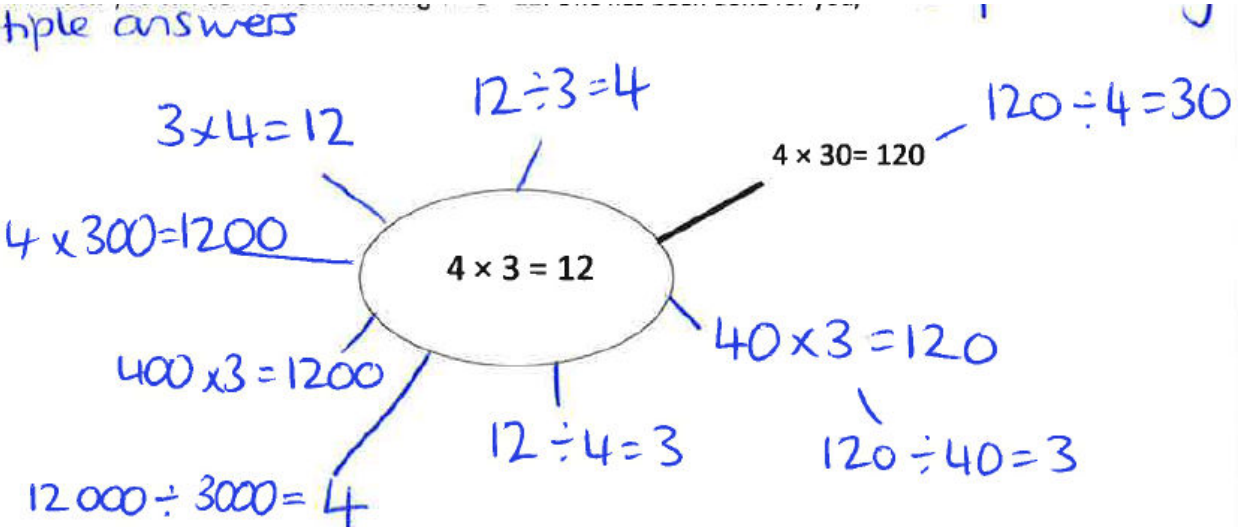
1. Complete the table

	× 2	× 20	× 200	× 2000
43	86	860	8600	86 000
26	52	520	5200	52 000
63	126	1260	12 600	126 000

B) What do you notice about the digits of a number when it is multiplied by 10, 100 and 1000?

The digits are in a place that has a value ten times greater e.g. 86 x 10 = 860, 80 is now 800, 6 is now 60 and 0 is used as a place holder. The digits are one, two or three places to the left respectively.

2. Write down facts you can derive from knowing 4 × 3 = 12. One has been done for you,



2. Use known facts, (e.g. factors, partitioning, distributive law etc.) to solve the following calculations.

multiple answers.

A) 15 × 4 = 10 x 4 = 40, 5 x 4 = 20 so 15 x 4 = 40 + 20 = 60

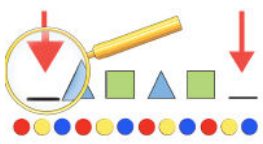
B) 6 × 13 = 6 x 10 = 60, 6 x 3 = 18 so 6 x 13 = 60 + 18 = 78

C) 23 × 20 = 23 x 10 = 230, 230 x 2 = 460

D) Which known fact will help you solve this calculation? Solve it.

270 ÷ 30 = 9. Because 3 x 9 = 27 or 27 ÷ 3 = 9.

Next Step for Depth



Write out all of the multiples of 11 from 1 × 11 up to 20 × 11.

What patterns do you notice in the numbers? Describe and explain the pattern.

Pupil tasks

1. Use the formal method of multiplication to solve these calculations.

A)

		4	6
×			3
	1	3	8
		1	

B)

		3	1	4
×				4
	1	2	5	6
			1	

C)

		2	1	4	3
×					5
	1	0	7	1	5
			2	1	

D)

		3	2
×	3	0	
	9	6	0

E)

		2	1	3
×			4	0
	8	5	2	0
		1		

F)

			1	6	4
	×	2	0	0	
	3	2	8	0	0
	1				

2. Use the formal short method of division to solve these calculations.

A)

			7	9
6	4	$^{4}7$	$^{5}4$	

B)

		1	4	6
5	7	$^{2}3$	$^{3}0$	

C)

			8	2
7	5	$^{5}7$	$^{1}4$	

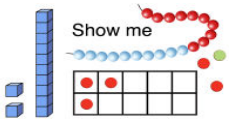
3. Medals for the winning athletes arrive in boxes of 149. There are 6 boxes. They need to be taken out and polished before being presented at the medal ceremony. After polishing, one gold, one silver and one bronze are arranged on trays. How many trays are needed in total?

1	4	9	
×		6	
8	9	4	medals
2	5		

	2	9	8
3	8	$^{2}9$	$^{2}4$

298 trays will be needed

Next Step for Depth



Using place value counters explain how to solve

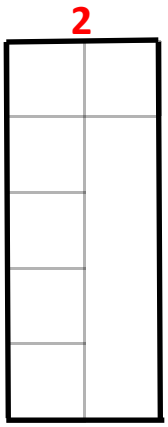
87 ÷ 4

Pupil tasks

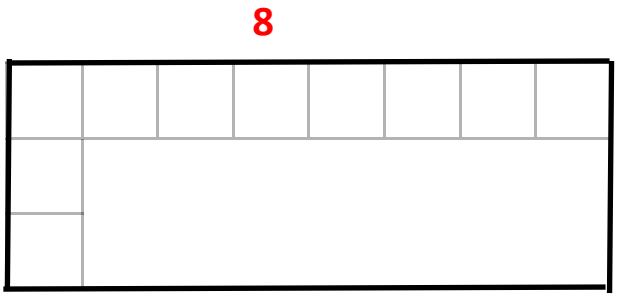
1. Calculate the area and perimeter of these shapes.

= 1 square cm (cm²)

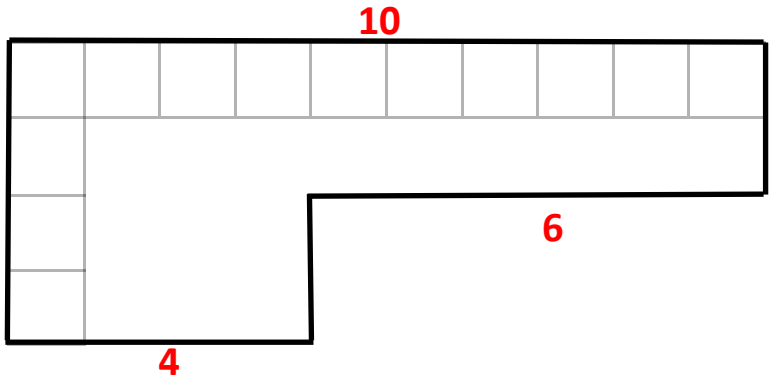
A)



B)



C)



Rectangle A

Area = 10 cm²

Perimeter = 14 cm

Rectangle B

Area = 24 cm²

Perimeter = 22 cm

Rectangle C

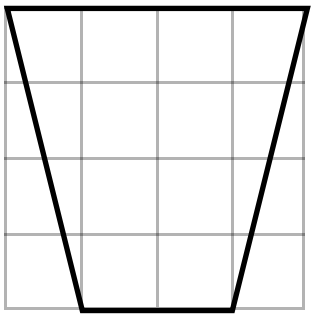
Area = 28 cm²

Perimeter = 28 cm

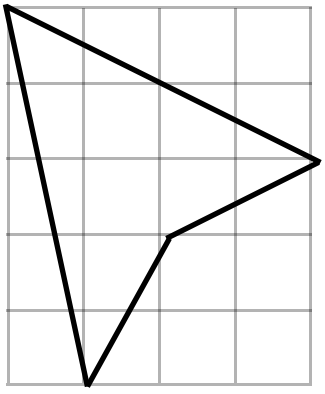
2. Find the approximate area of these shapes

= 1 square cm (cm²)

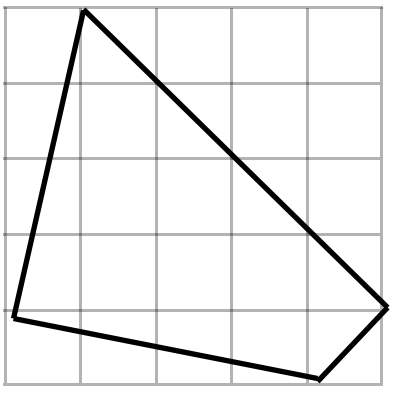
A)



B)



C)

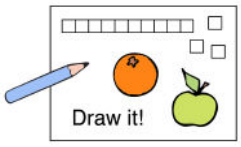


A) Approximate area = 12 cm²

B) Approximate area = 8 cm²

C) Approximate area = 12.5 cm²

Next Step for Depth



Draw 3 different shapes with an area of 12cm².
Will the perimeter of these shapes be the same? Why? Why not?
(There is grid paper at the back of this book)