

Sharing

12 shared into 3 equal groups

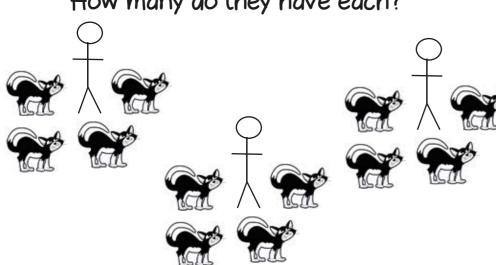
 $12 \div 3 = 4$

How many groups Grouping of 3 are there in 12?

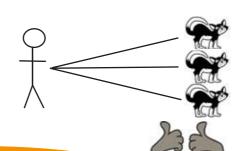
There are 12 cats. Each person owns 3 cats. How many people are there?

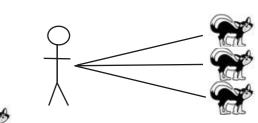
There are 12 cats.

Three people each have the same number of cats. How many do they have each?



1 for you, 1 for you, 1 for you...



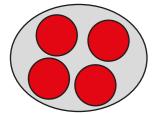


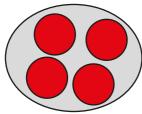
How shall I divide?

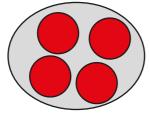




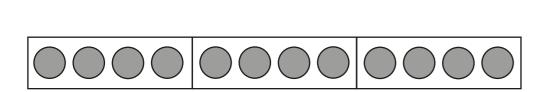


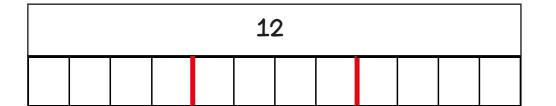


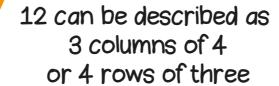


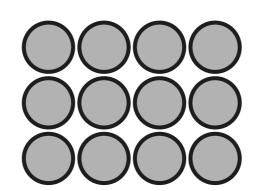


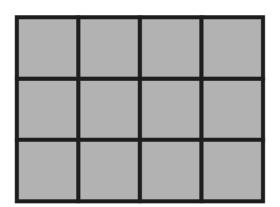
Bar model

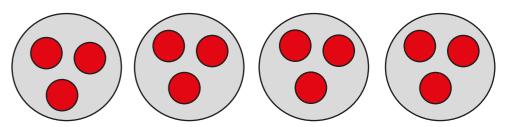




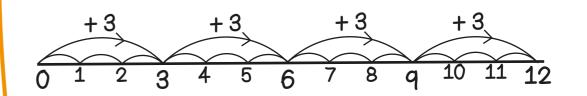




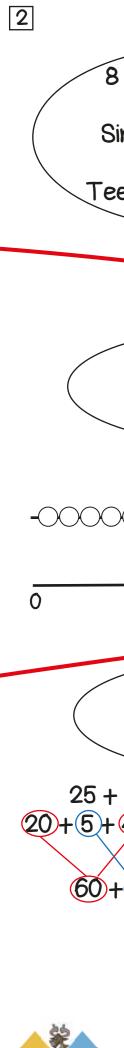












8 + 7, 9 + 9, 14 + 3

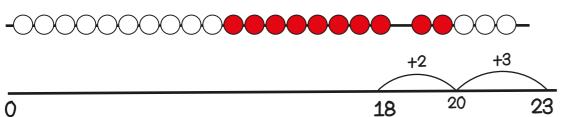
Number facts

Single digit numbers

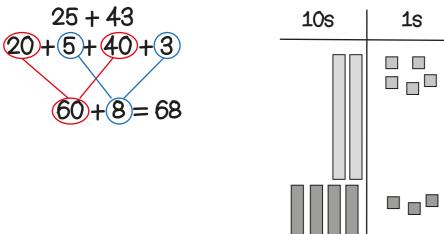
Doubles

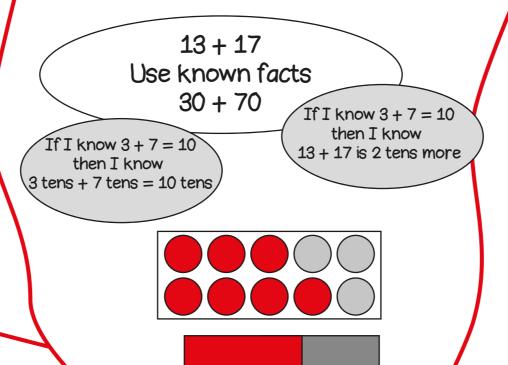
Teens and single digits

5 + 18 Greatest number first then bridge

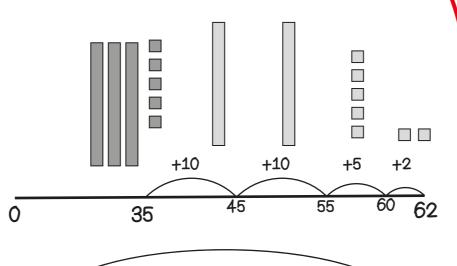


25 + 43 Partition and recombine



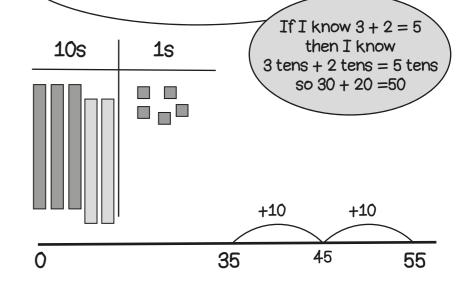


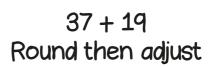


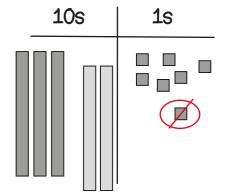


35 + 27 Count on in tens then ones

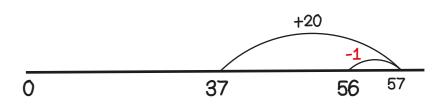
35 + 20 Add multiples of ten

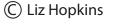






Add 20 then subtract 1



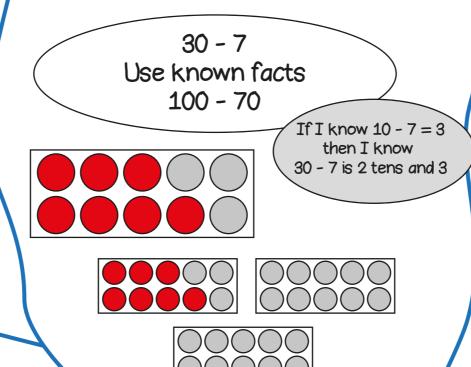




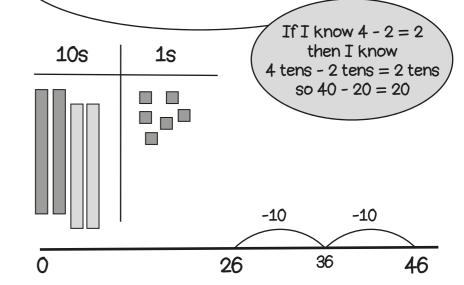
9 - 4, 13 - 5, 18 - 9 (Number facts Single digit numbers Halves Teens and single digits

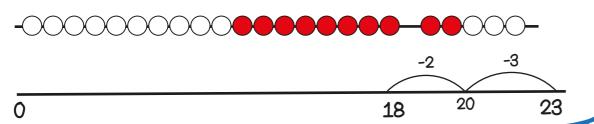
I just knew it!

23 - 5 Count back: bridge through a multiple of ten

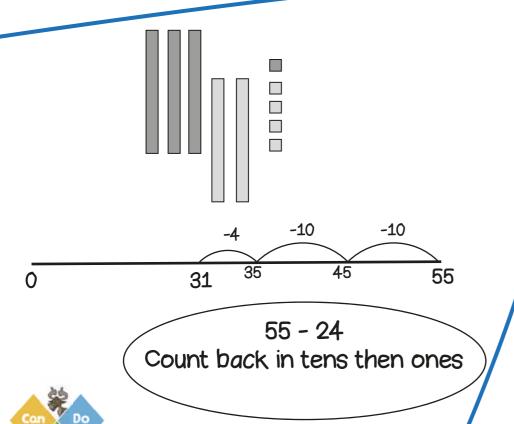


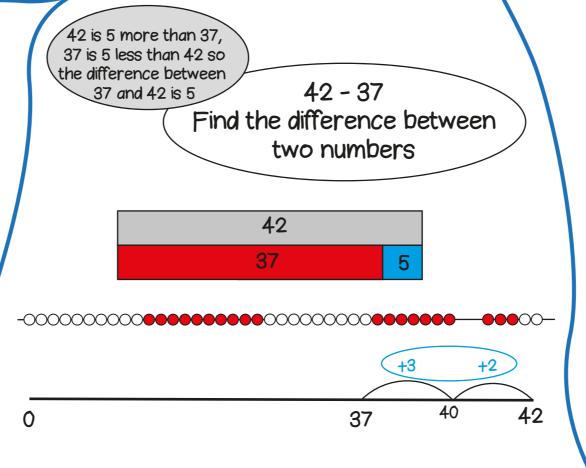
46 - 20 Count back: multiples of ten

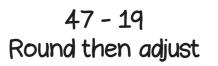


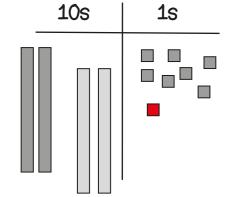


How shall I subtract?

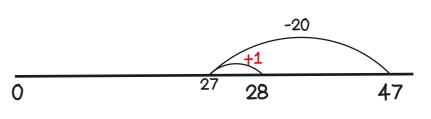






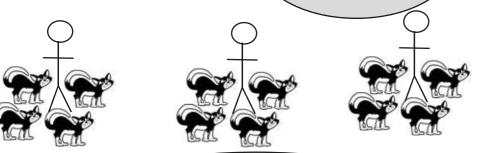


Take away 20 then add 1



Equal groups

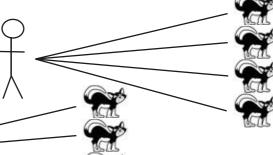
There are 3 groups with 4 cats in each group



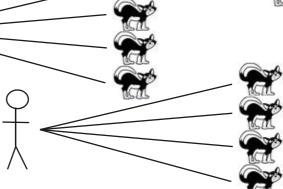
3 people each have 4 cats. How many cats are there in total?

One to many correspondence

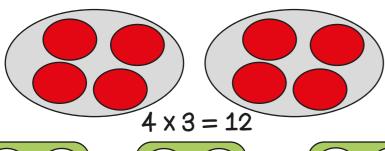
If each person has 4 cats, there are 4 times as many cats as people

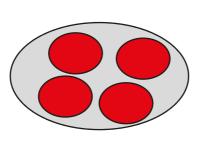


Recall of 2x, 5x and 10x tables



Four cats, multiplied by 3





People	Cats
1	4
2	8
3	12
	G

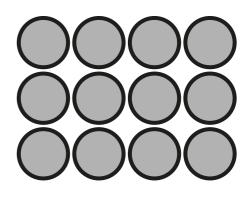






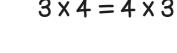
How shall I multiply?

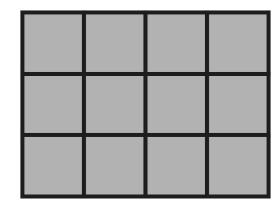




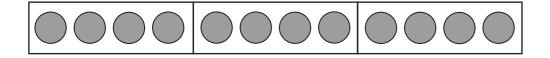
$$4 \times 3 = 12$$

$$3 \times 4 = 4 \times 3$$

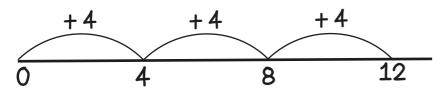




Repeated addition



4 4 4



4 + 4 + 4 = 12

Count in ones

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Count in twos

2, 4, 6, 8, 10,12

Use a known fact

If 2 x 3 is 6, then 4 x 3 is double 6. Sharing

12 shared into 3 equal groups

 $12 \div 3 = 4$

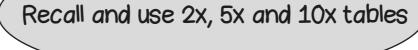
Grouping

How many groups of 3 are there in 12?

There are 12 cats.

Three people each have the same number of cats.

How many do they have each?

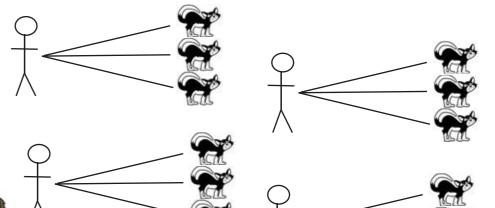


There are 12 cats. Each person owns 3 cats. How many people are there?

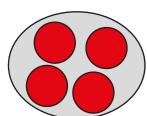


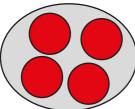
1 for you, 1 for you, 1 for you...

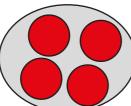
Grab a group of 3 grab a group of 3.



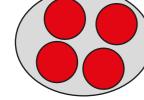
How shall I divide?





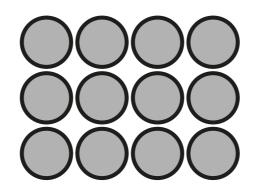


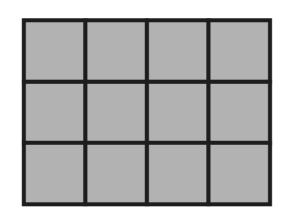
Bar model

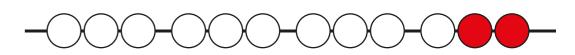


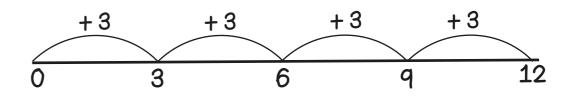


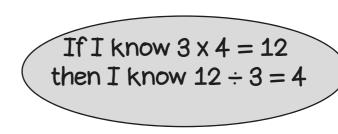
12 can be described as 3 columns of 4 or 4 rows of three

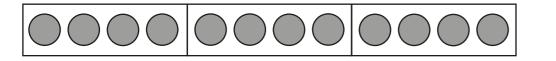








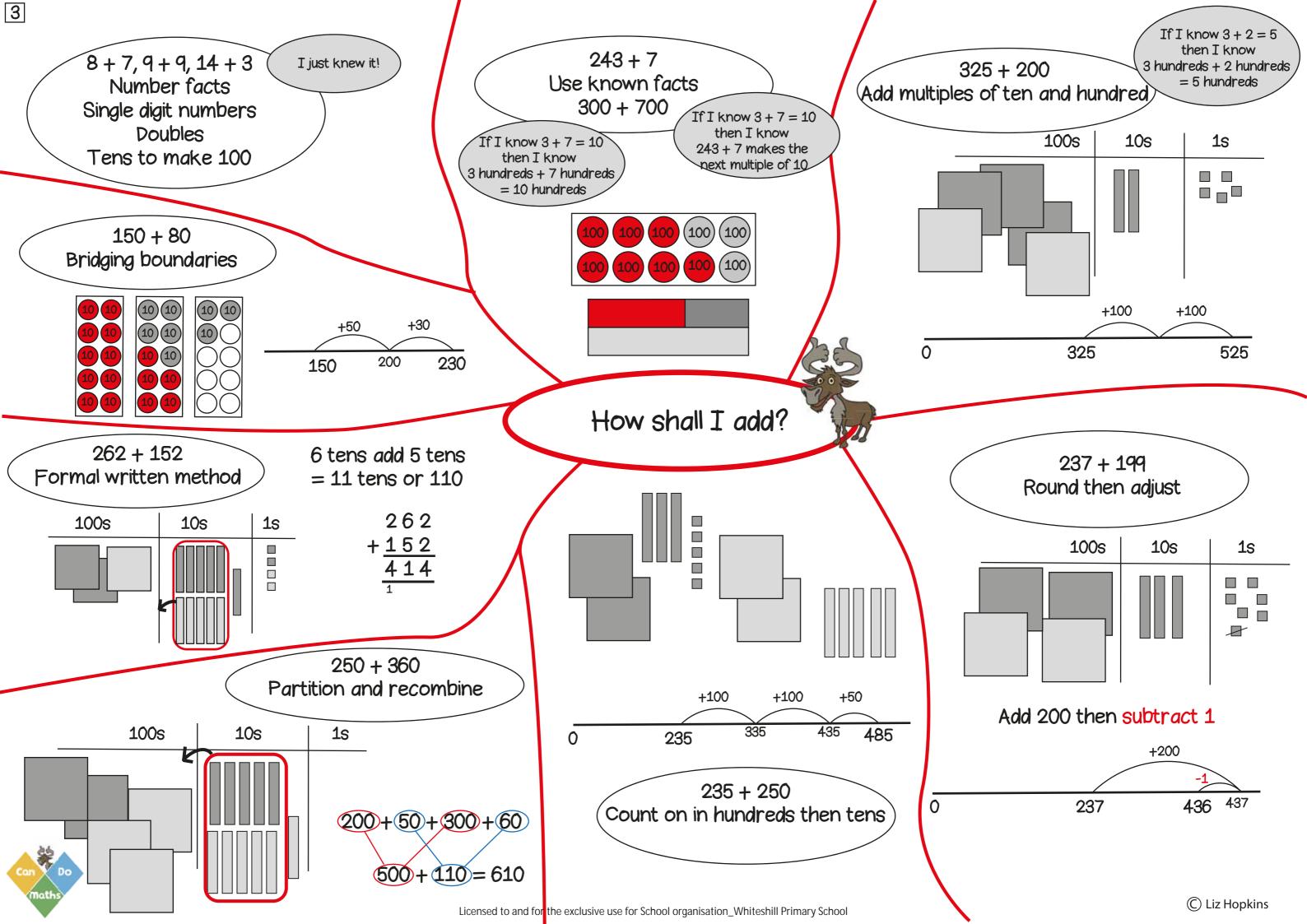




	12	
4	4	4

Link to fractions. One third of 12 is 4







15 - 8, 18 - 5 Number facts Single digit numbers Teens and single digits

230 - 80

Bridging boundaries

by counting back in efficient steps

10 10

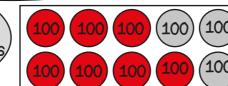
10 10

10 10

I just knew it!

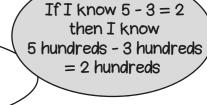
240 - 7 Use known facts 1000 - 700

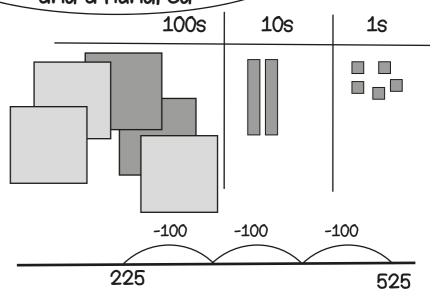
If I know 10 - 7 = 3then I know 10 hundreds - 7 hundreds = 3 hundreds



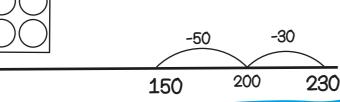
If I know 10 - 7 = 3then I know any multiple of 10, take away 7 leaves 3 in the ones.

525 - 300 Take away multiples of ten and a hundred

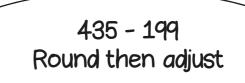


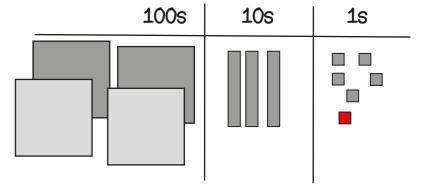


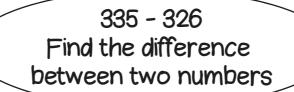
230 - 30 - 50 = 150



How shall I subtract?



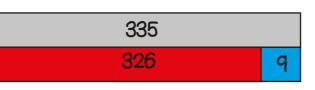


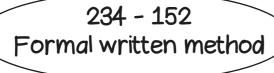


326

335 is 9 more than 326 326 is 9 less than 335 so the difference between them is 9

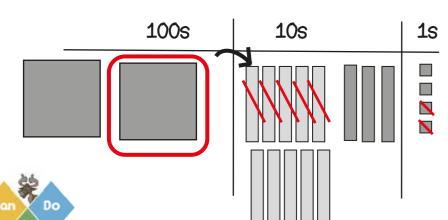
330





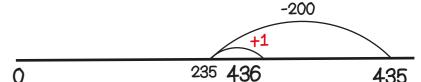
¹2 ¹3 4 -<u>152</u> 182

234 = 100 + 130 + 4

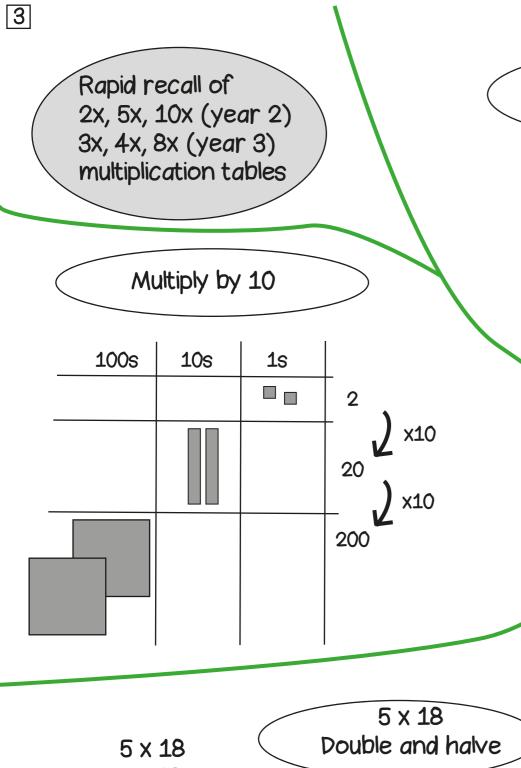


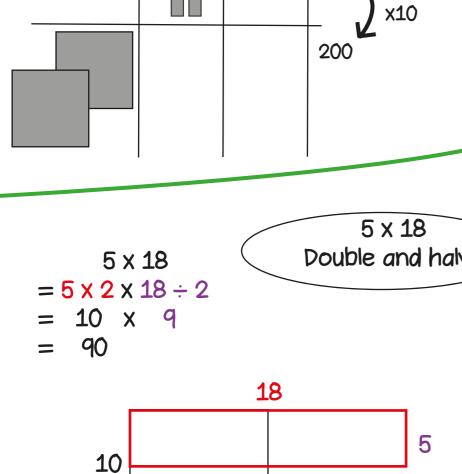
0

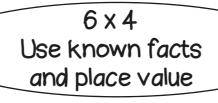
335

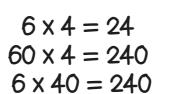


Take away 200 then add 1







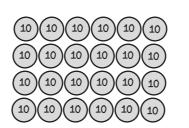




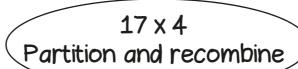
6x10x4

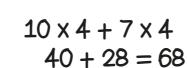
40 is ten times greater than 4

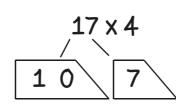


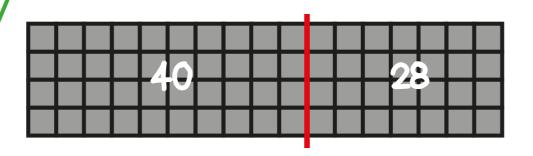


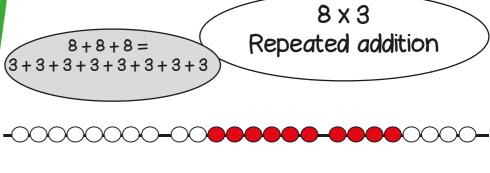
How shall I multiply?

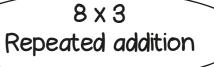


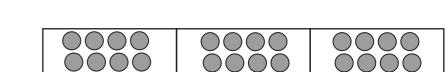


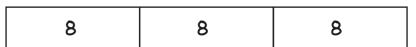


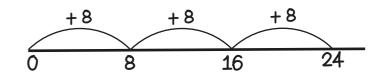




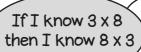




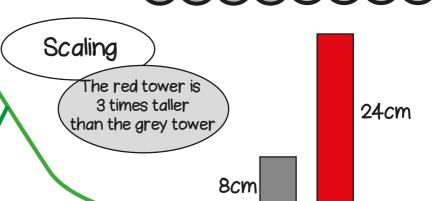




Arrays



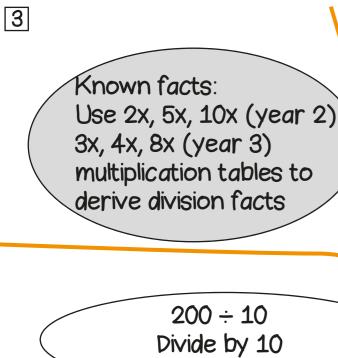


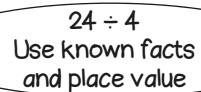


17 x 4 Formal written method

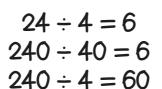
	10	7
4	40	28







240 is ten times greater than 24

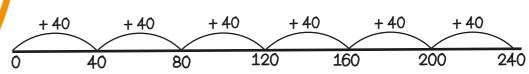


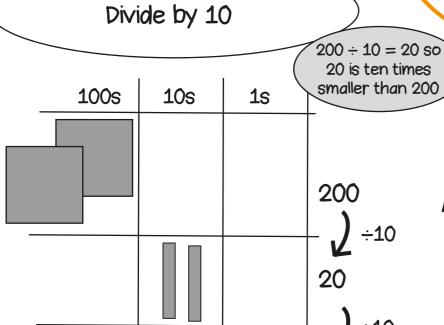
24 biscuits shared between 4 people means they will get 6 biscuits each.

If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?



 $240 \div 40 = 6$ How many steps of 40 make 240?



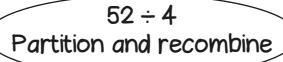


How shall I divide?

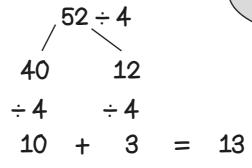
A tenth of is

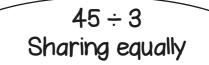
A tenth of 1 is 1 tenth so $1 \div 10 = \frac{1}{10}$

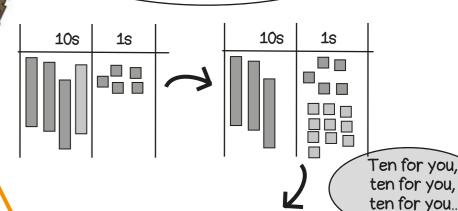
tenth

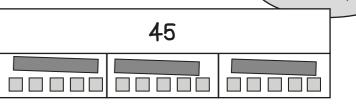


ten lots and the rest









Link to fractions

42 ÷ 6 Double and halve

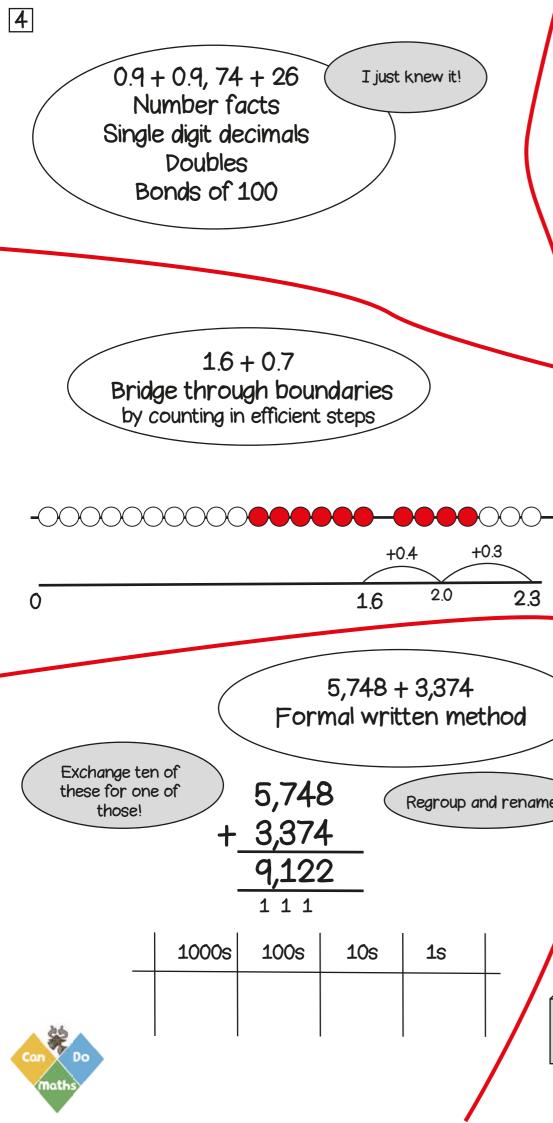
 $42 \div 6 = 21 \div 3$

If there are half as many

biscuits and half as many people...

			42		
7	7	7	7	7	7
	21				
7	7	7			
4040	•		•		

10 x 4 3 x 4 0 40 52



I just knew it!

+0.3

Regroup and rename

2.3

2.0

1.6

10s

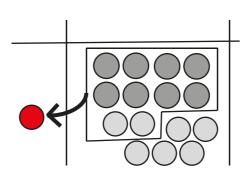
1s

7 + 8Use known facts

> If I know 7 + 8 = 15then I know 0.7 + 0.8 = 1.5

$$70 + 80 = 150$$

 $700 + 800 = 1,500$



2,403 + 3,020Use place value to add

If I know 2+3=5then I know 2000 + 3000 = 5000

I have noticed, one number has no hundreds or ones, the other has no tens

1000s	100s	10s	1 s
			00

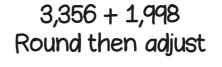
How shall I add?

5,250 + 2,360Partition and recombine

100s

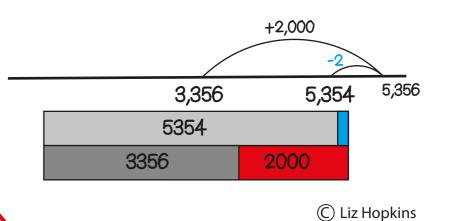
10s

1s



1000s	100s	10s	1 s

Add 2,000 then take away 2



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1000s

13 - 5, 1.8 - 0.8 Number facts Single digit numbers Halves Wholes and tenths

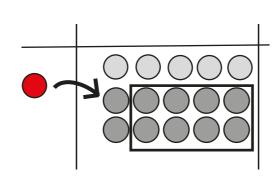
15 - 8 = 7I just knew it!

Use known facts

If I know 15 - 8 = 7then I know 1.5 - 0.8 = 0.7

$$150 - 80 = 70$$

 $1500 - 800 = 700$



6,342 - 3,020 Use place value to subtract

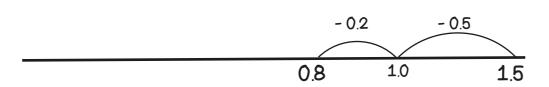
1000s

By using place value counters it is easy to see how to take away

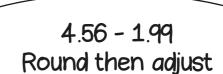
1s

10s

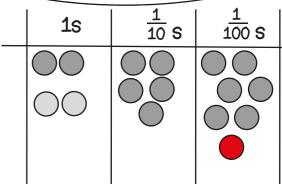
1.5 - 0.7Bridge through boundaries by counting in efficient steps

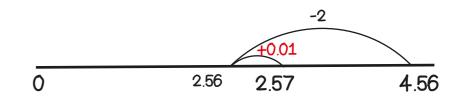


How shall I subtract?



100s





Take away 2 then add one hundredth

5,352 - 2,136 Formal written method

Exchange ten of these for one of those!

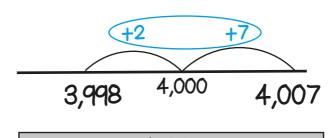
5,352

Regroup and rename

2,436 2,916

1000s	100s	10 s	1 s	

4007-3998 Find the difference between two numbers



4,007 3,998



Known facts: Rapid recall of all multiplication tables up to 12 x 12

6 x 4

Use known facts and place value



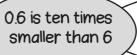
40 is ten times

greater than 4





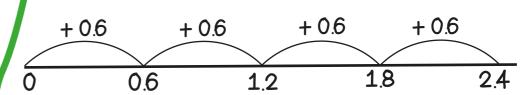




6 x 4 Use known facts and place value

$$0.6 \times 4 = 2.4$$

4 jumps of 0.6



$$0.6 \times 4 = 24 \text{ tenths}$$

 $0.6 \times 4 = 2.4$

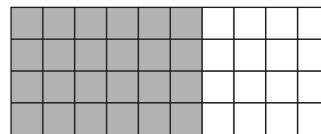
4

36

30

210

7



0.6

1

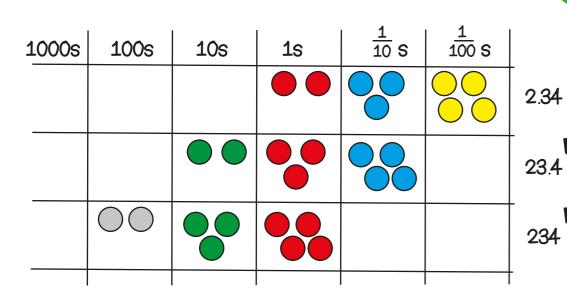
2.34 x 100 Multiply by 10, 100

6)x(1	0x4	x 10
		X	
	=(24) X C	100

 $6 \times 4 = 24$

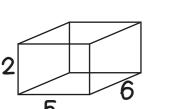
 $60 \times 40 = 2400$

How shall I multiply?



x10 x100 x10

7 x 36 Use the distributive law

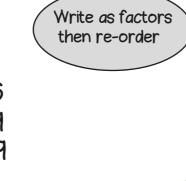


 $2 \times (5 \times 6) = (2 \times 5) \times 6$

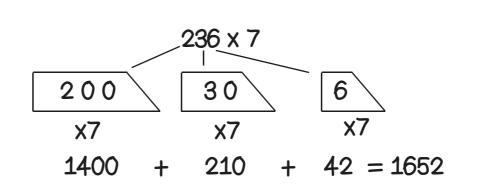
 $2 \times 30 = 10 \times 6$ 45 x 6 $=5\times9\times6$ $=5\times6\times9$ $= 30 \times 9$

= 270

45 x 6 Use factors and commutativity



7 x 36 $= 7 \times 30 + 7 \times 6$ = 210 + 42= 252

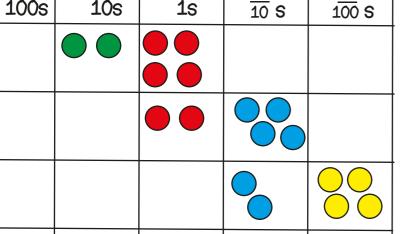


36 x 7 Formal written method

	30	6	
7	210	42	

Known facts: Use recall of all multiplication tables up to 12 x 12 to derive division facts

> 24 ÷ 100 Divide by 10, 100



 $240 \div 40 = 6$ $2400 \div 400 = 6$

24 ÷ 4 Use known facts and place value

$$24 \div 4 = 6$$

 $240 \div 40 = 6$
 $2400 \div 400 = 6$

$$2400 \div 400 = \frac{24 \times 100}{4 \times 100}$$
$$\frac{24}{4} = 6$$

240 is ten times greater than 24

24 biscuits shared between 4 people means they will get 6 biscuits each.

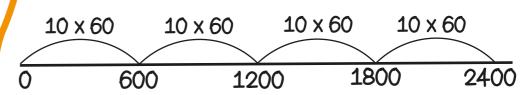
If there are 100 times as many people and 100 times as many biscuits, how many biscuits each now?

60 is ten times areater than 6

2400 ÷ 60 Use known facts and place value

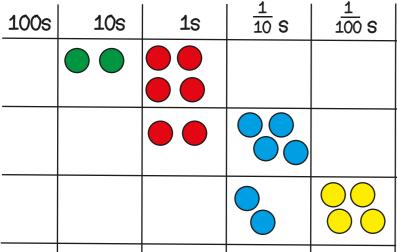
 $2400 \div 60 = 40$

How many steps of 60 make 2400?



732 ÷ 6

Formal written method

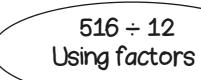


24 2.4 ÷100 0.24

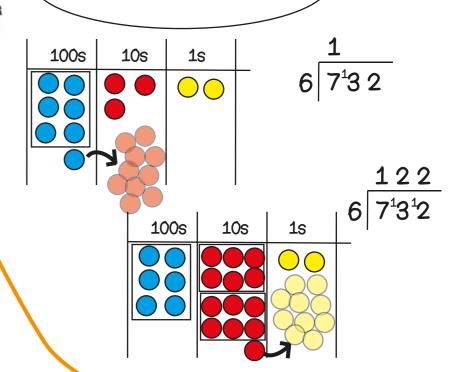
2 x 8

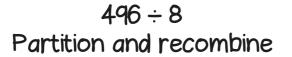
496

How shall I divide?

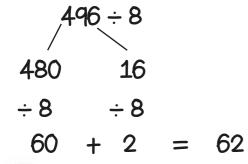


516										
	172 172					17	'2			
43	43	43	43							

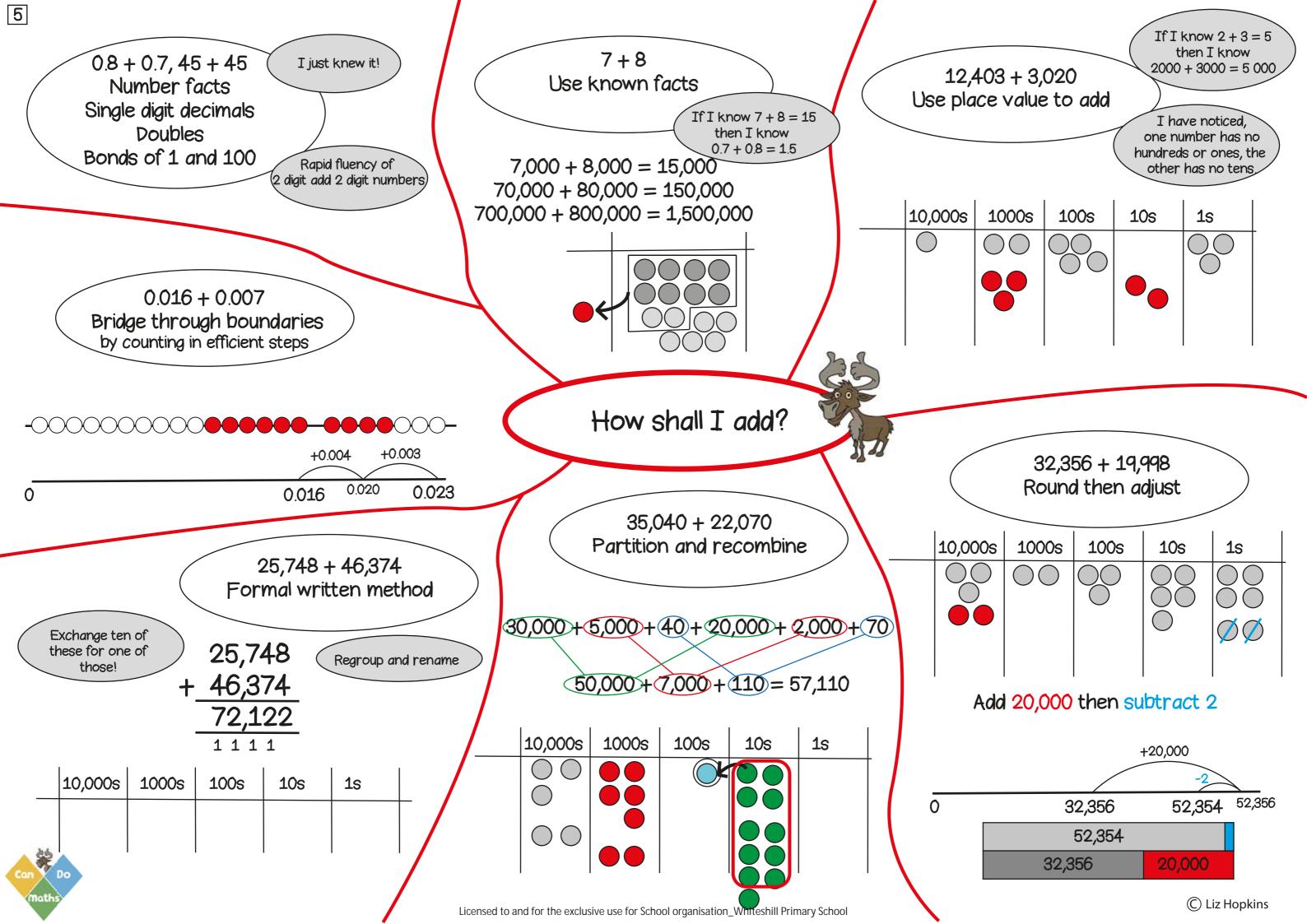




60 x 8







9-4, 13-5, 18-9 Number facts Single digit decimals Halves

I just knew it!

15 - 8 = 7Use known facts

15,000 - 8,000 = 7,000

150,000 - 80,000 = 70,000

1,500,000 - 800,000 = 700,000

40,012 - 3,005 Use place value to subtract

5 less than 12 is 7 Now it is easy to take away 3000

If I know 40 - 3 = 37then I know that 40 thousand take away 3 thousand is 37 thousand

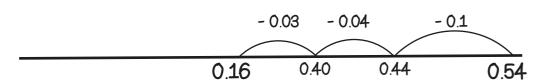
40,000 = 4 tens of thousands or 40 thousands 12 = 1 ten and 2 ones or 12 ones

40,012 = 40 thousands and 12 ones take away 3 thousands and 5 ones equals 37 thousands and 7 ones.

Subtract from 1 and 100

Rapid fluency of 2 digit subtract 2 digit numbers

0.54 - 0.17Bridge through boundaries by counting in efficient steps



How shall I subtract?

If I know 15 - 8 = 7

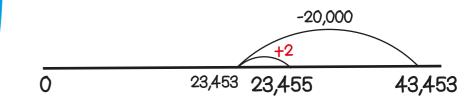
then I know

1.5 - 0.8 = 0.7

43,453 - 19,998 Round then adjust

1	2,000s	1000s	100s	10 s	1 s

Take away 20,000 then add 2



45,748 - 26,374 Formal written method

Exchange ten of these for one of those!

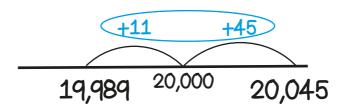
45,748

Regroup and rename

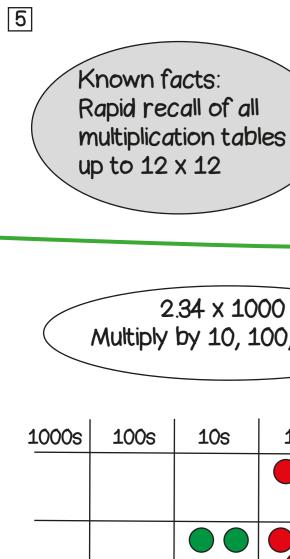
26,374 19,374

10,000s	1000s	100s	10s	1 s	

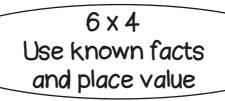
20,045 - 19,989 Find the difference between two numbers



20,045	
19,989	56



 $\bigcirc\bigcirc$



 $6 \times 4 = 24$

 $60 \times 4 = 240$

 $60 \times 40 = 2400$

6x10x4x10

 $=24 \times 100$

x10

x10

x100







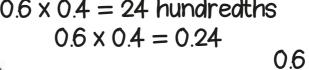








1.2



 $0.6 \times 4 = 2.4$

4 jumps of 0.6

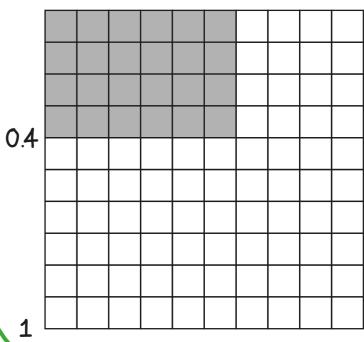
+ 0.6

0.6 is ten times

smaller than 6

0.6

+ 0.6



6 x 4

Use known facts

and place value

1.8

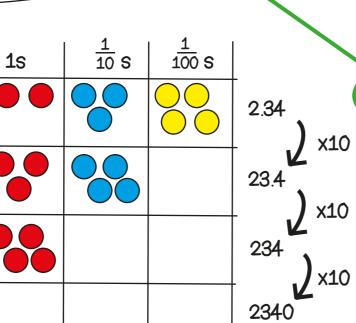
+ 0.6

2.4

1

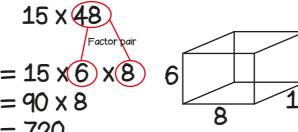
+ 0.6

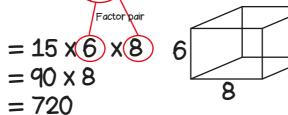
2.34 x 1000 Multiply by 10, 100, 1000



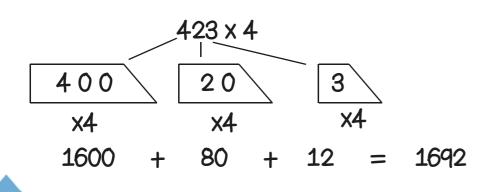
How shall I multiply?

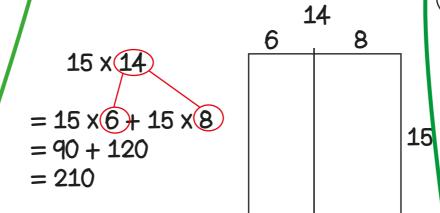
15 x 42 Using factors and distributive law

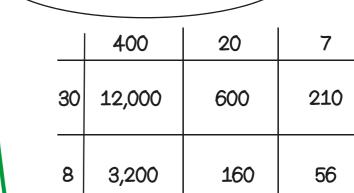




423 x 4 Partition and recombine







427 x 38

Formal written method

427

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Include calcuations where remainders occur

24 ÷ 4 Use known facts

and place value

24,000 is a thousand times greater than 24

0.6 is ten times smaller than 6

 $2.4 \div 0.6$ Use known facts and place value

$$24 \div 4 = 6$$
 24 biscuits shared between 4 people means they will get

÷1000

$$240 \div 40 = 6$$
 4 people Means triey will get 6 biscuits each.

How many steps of 0.6 make 2.4? If there are 1000 times as many people and 1000 times as many

biscuits, how many biscuits each now?

+ 0.6+ 0.6 + 0.6 + 0.60.6 1.2

 $2.4 \div 0.6 = 4$

24 ÷ 1000 Divide by 10, 100, 1000

Known facts:

Use recall of all

up to 12 x 12 to

multiplication tables

derive division facts

$$24,000 \div 400 = \underbrace{24 \times 1000}_{4 \times 100}$$

 $2400 \div 400 = 6$

 $24,000 \div 4000 = 6$

÷10

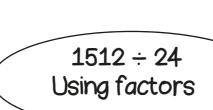
24

2.4

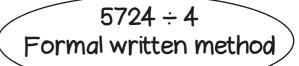
$$\frac{240}{4} = 60$$

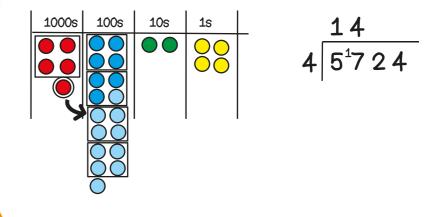
1 1000 S 1 100 S 1 10 S 100s **10**s 1s 0.24 0.024

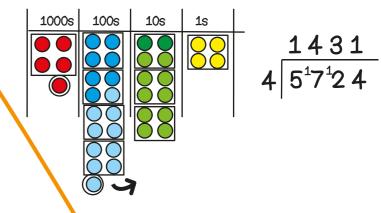
How shall I divide?



$1512 \div 6 \div 4$

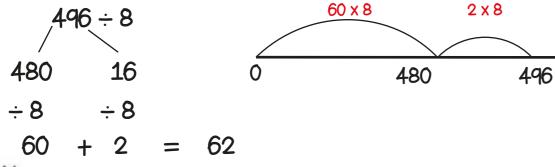






1512 252 252 252 252 252 252 63 63 63 63

496 ÷ 8 Partition and recombine







44 + 56, 27 + 27 Number facts Single digit decimals Doubles Bonds of 1 and 100

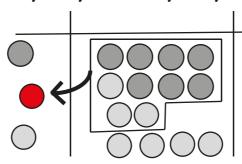
I just knew it!

Rapid fluency of 2 digit add 2 digit numbers 17 + 17 Use known facts

> If I know 17 + 17 = 34 then I know 1.7 + 1.7 = 3.4

17,000 + 17,000 = 34,000 170,000 + 170,000 = 340,000

1,700,000 + 1,700,000 = 3,400,000



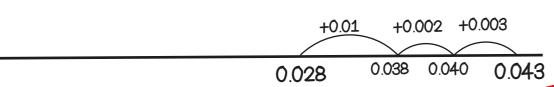
1,102,403 + 50,020 Use place value to add

I have noticed, one number has no hundreds or ones, the other has no tens

1,000,000s	100,000s	10,000s	1000s	100s	10s	1 s
						00

0.028 + 0.015 Bridge through boundaries by counting in efficient steps





325,748 + 246,374 Formal written method

Regroup and rename

Exchange ten of these for one of those!

325,748 + 246,374 572,122

1 1 1 1

100,000s	10,000s	1000s	100s	10s	1 s	

How shall I add?

307,040 + 206,070 Partition and recombine

300,000 + 7,000 + 40 + 200,000 + 6,000 + 70

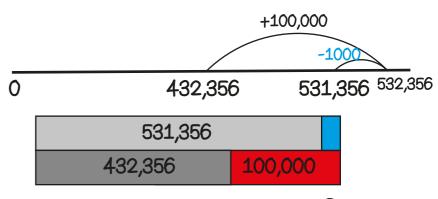
500,000 + 13,000 + 110 = 513,110

100,000s	10,000s	1000s	100s	10 s	1 s
00			OK		
00					

432,356 + 99,000 Round then *adjust*

100,000s	10,000s	1000s	100s	10s	1 s
	00	Ø		000	000

Add 100,000 then take away 1,000



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0.9 - 0.4, 100 - 65 (Number facts Single digit decimals Halves

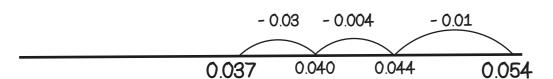
Bonds of 1 and 100

Rapid fluency of 2 digit subtract 2 digit numbers

I just knew it!

0.054 - 0.017

Bridge through boundaries by counting in efficient steps



445,748 - 126,374 Formal written method

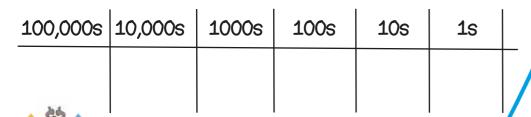
Regroup and rename

Exchange ten of these for one of those!

4³45,7⁴8

+ 126,374

319,374



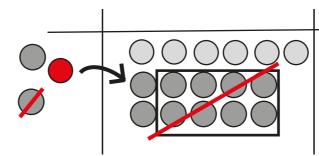
36 - 18 = 18Use known facts

> If I know 36 - 18 = 18 then I know 3.6 - 1.8 = 1.8

36,000 - 18,000 = 18,000

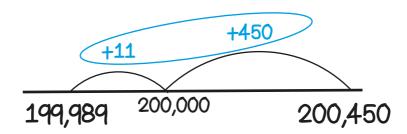
360,000 - 180,000 = 180,000

3,600,000 - 1,800,000 = 1,800,000



How shall I subtract?

200,450 - 199,989 Find the difference between two numbers



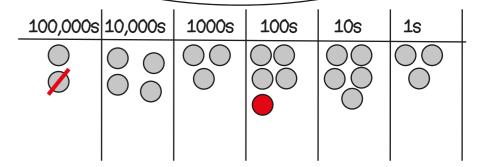
200,450 199,989 461 400,032 - 30,005 (Use place value to subtract 5 less than 32 is 27

400,000 = 4 hundreds of thousands or 400 thousands

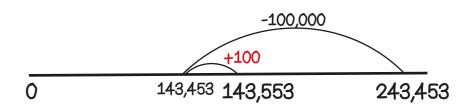
400 - 30 = 370 so 400,000 - 3,000 = 370,000

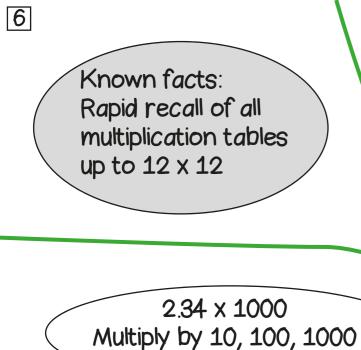
400,032 = 400 thousands and 32 ones take away 30 thousands and 5 ones = 370,027

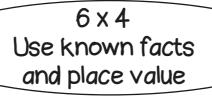
> 243,453 - 99,900 Round then *adjust*



Take away 100,000 then add 100





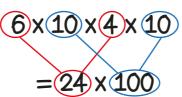


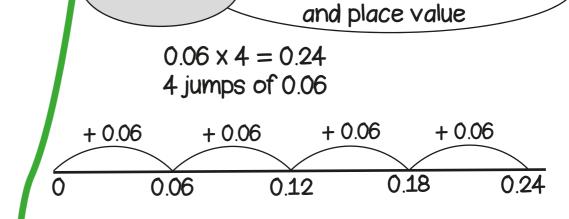
40 is ten times greater than 4

$$60 \times 40 = 2400$$

 $600 \times 400 = 240,000$

$$6000 \times 4000 = 24,000,000$$





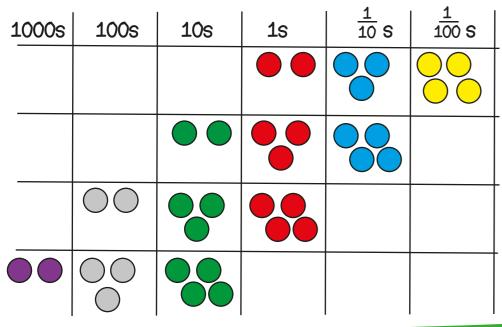
6 x 4

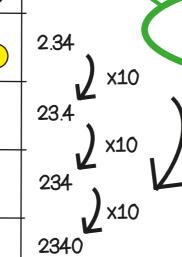
Use known facts

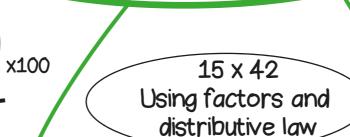
$0.6 \times 0.4 = 24$ hundredths $0.6 \times 0.4 = 0.24$

0.6 is ten times

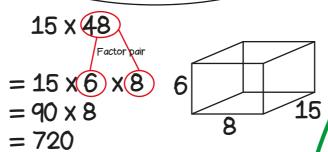
smaller than 6

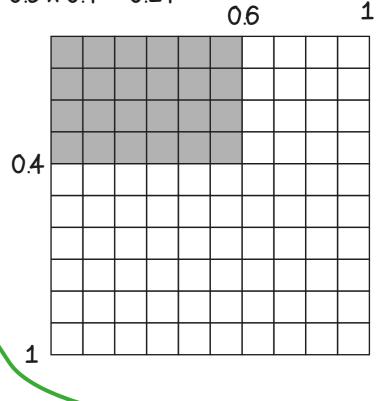




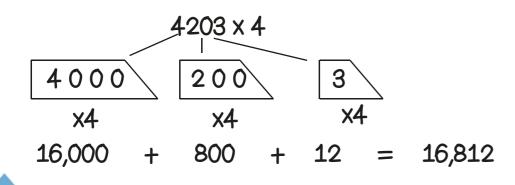


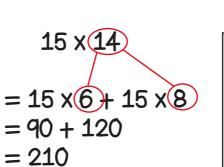
How shall I multiply?

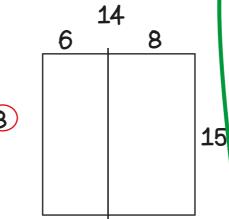




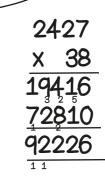
4203 x 4 Partition and recombine







2427 x 38 Formal written method



Known facts:
Use recall of all
multiplication tables
up to 12 x 12 to
derive division facts

6

Include calcuations where remainders occur

24 ÷ 4

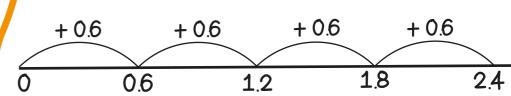
Use known facts and place value

240 is ten times greater than 24

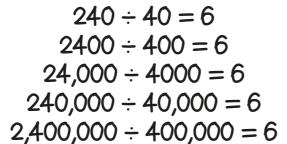
0.6 is ten times smaller than 6 2.4 ÷ 0.6 Use known facts and place value

$$2.4 \div 0.6 = 4$$

How many steps of 0.6 make 2.4?



24 ÷ 1000 Divide by 10, 100, 1000



÷10

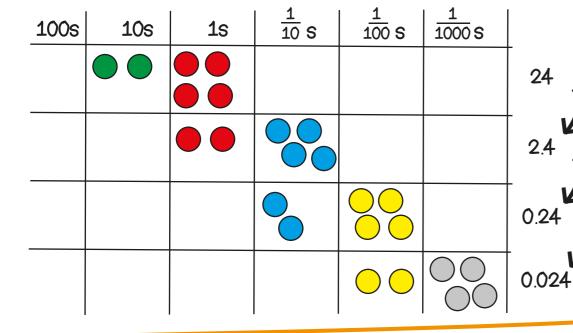
24 biscuits shared between 4 people means they will get 6 biscuits each. If there are 10 times as many

If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

$$\frac{4 \times 100}{4} = 600$$

 $240,000 \div 400 = 24 \times 10,000$

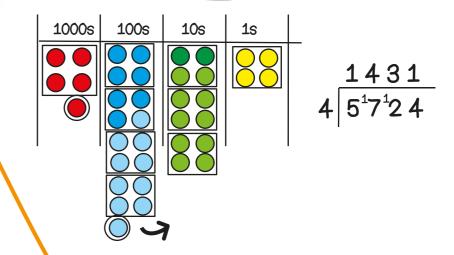
How shall I divide?



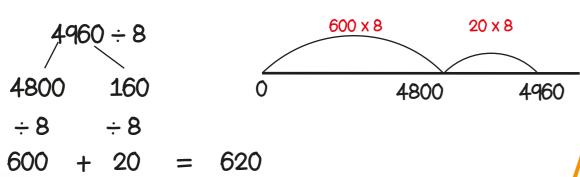
÷1000

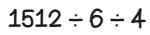
1512 ÷ 24 Using factors

7182 ÷ 21 Formal written method



4960 ÷ 8 Partition and recombine





1512							
252	252	252	252	252	252		
63 63 63 63							