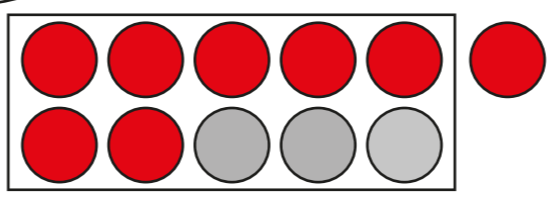


4 + 1, 6 + 3, 10 + 4
 Number facts
 Single digit numbers
 Doubles
 Ten and single digits

I just knew it!

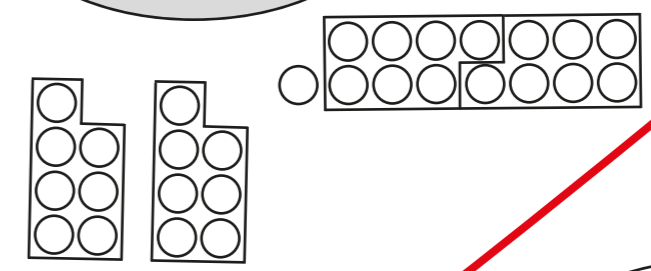
3 + 7
 Use known addition facts

If I know 3 + 7 = 10
 then I know
 3 + 8 = 11
 because it is 1 more

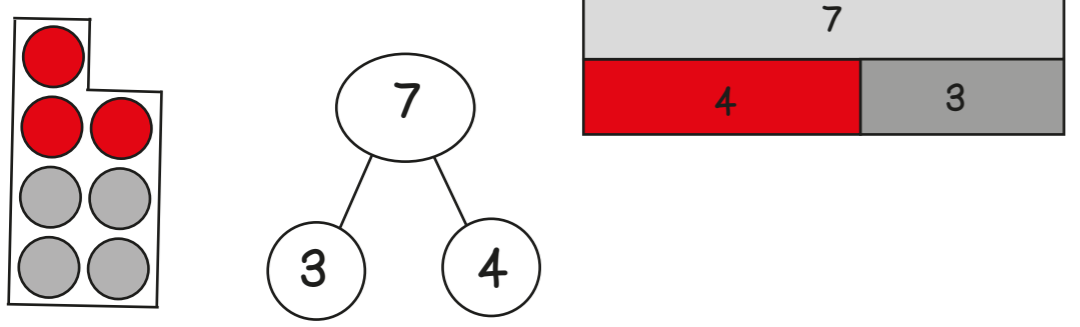


7 + 8
 Use near doubles

If I know 7 + 7 = 14
 then I know
 7 + 8 = 15
 because it is 1 more

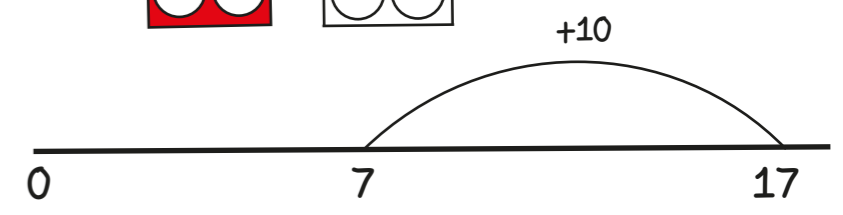
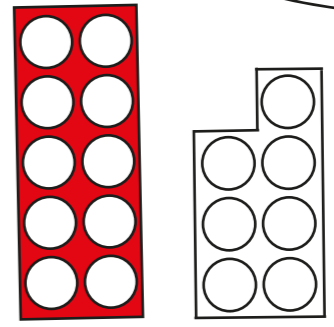


7 = 3 + 4
 Secure addition bonds of
 single digits and ten

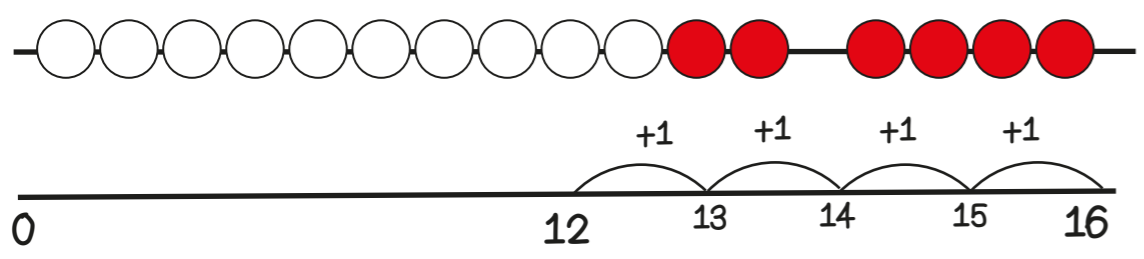


How shall I add?

7 + 10
 Add ten



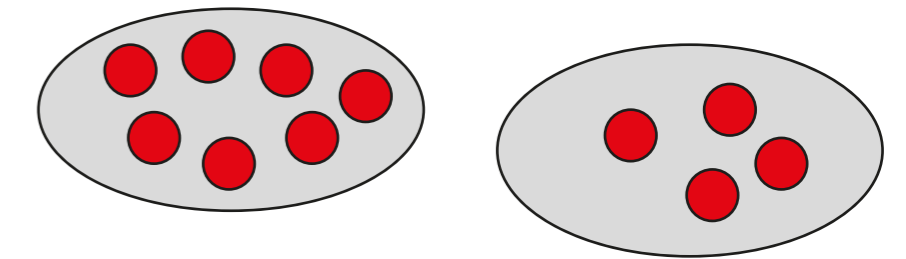
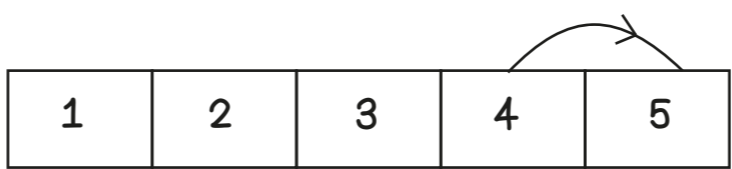
12 + 4
 Counting on in 1s



Notice the relationships

24 + 1
 Find one more

1 more than 4 is 5
 1 more than 14 is 15
 1 more than 24 is 25



7 + 4
 Count all

5 - 1, 7 - 3, 10 - 6
Number facts
Single digit numbers
Teens subtract single digits

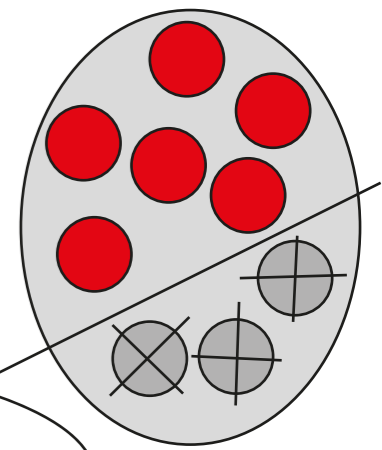
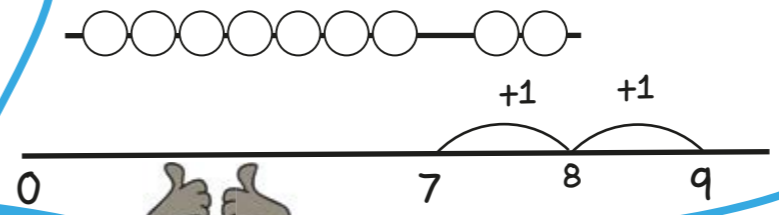
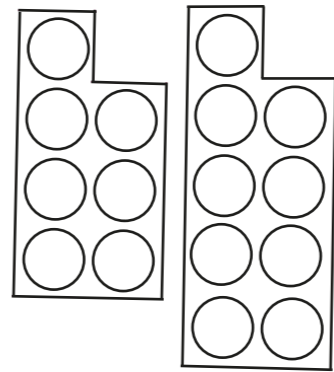
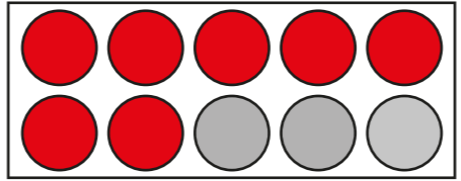
I just knew it!

3 + 7
Use known addition facts
to derive subtraction facts

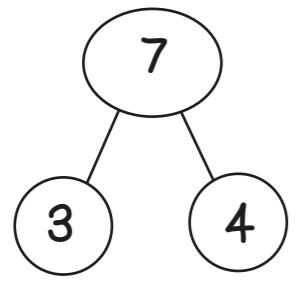
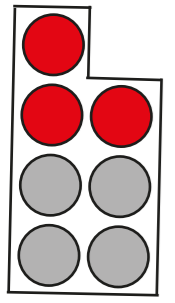
If I know $3 + 7 = 10$
then I know
 $10 - 3 = 7$

9 - 7
Find the difference between
two numbers

9 is 2 more than 7
7 is 2 less than 9 so
the difference
between 7 and 9 is 2



7 - 3 = 4
Secure subtraction facts of
single digits and ten



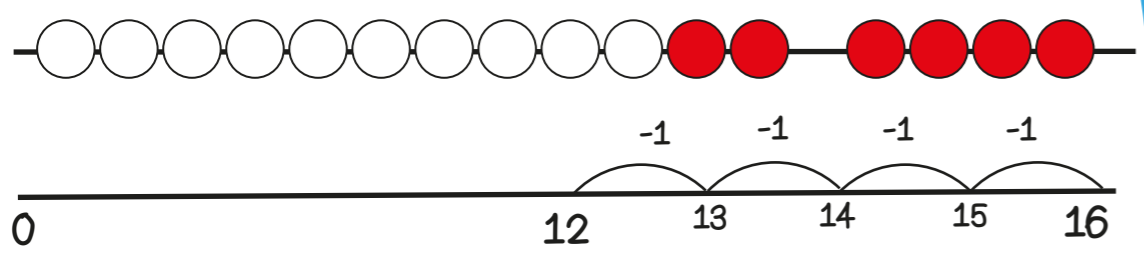
7	
4	3

How shall I subtract?



9 - 3
Take away

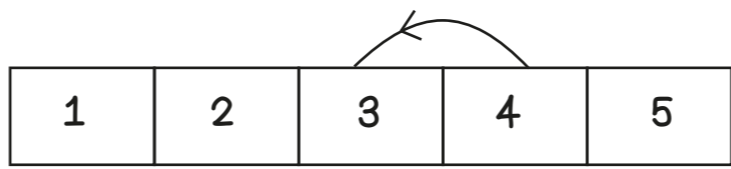
16 - 4
Counting back in 1s



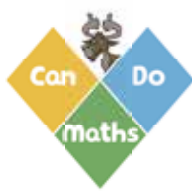
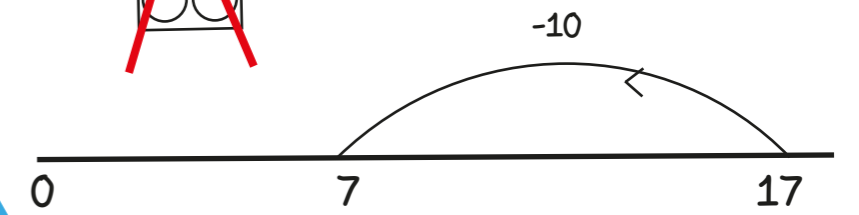
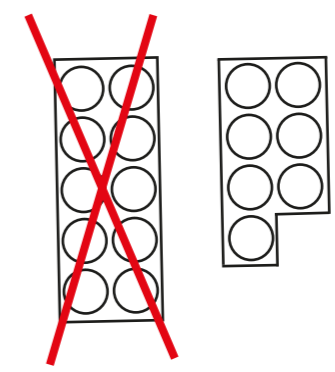
Notice the relationships

23 - 1
Find one less

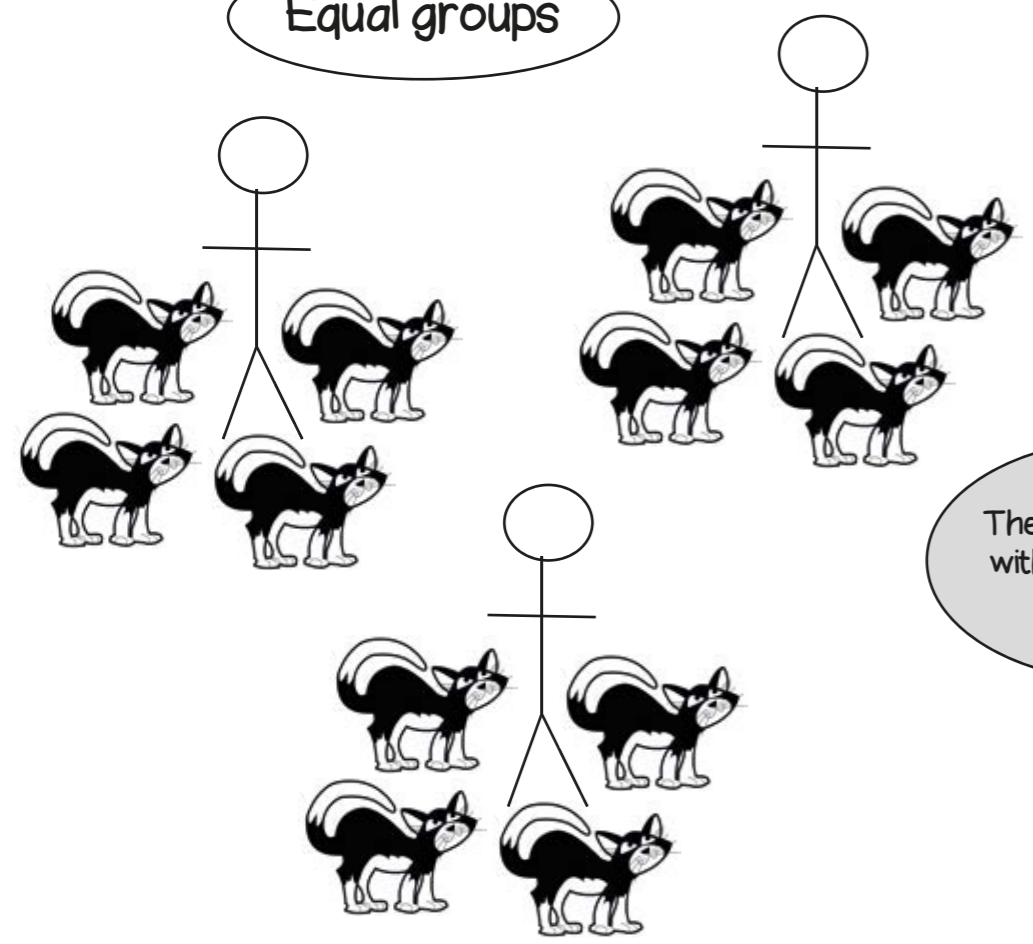
1 less than 4 is 3
1 less than 14 is 13
1 less than 24 is 23



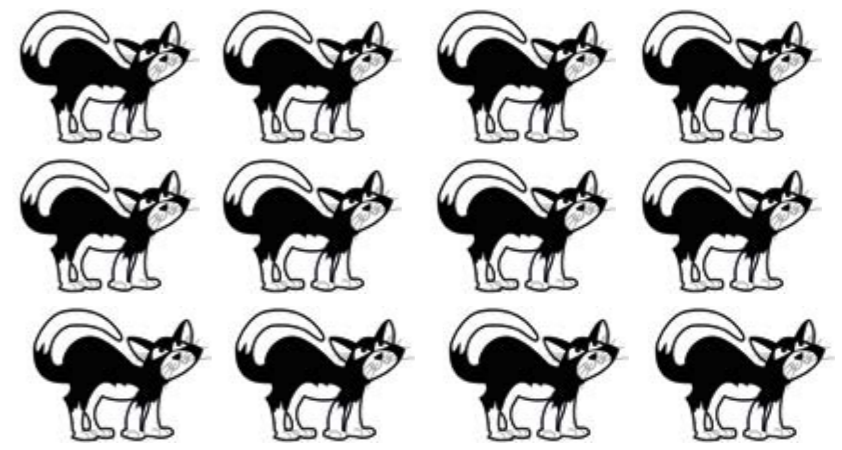
17 - 10
Take away ten



Equal groups

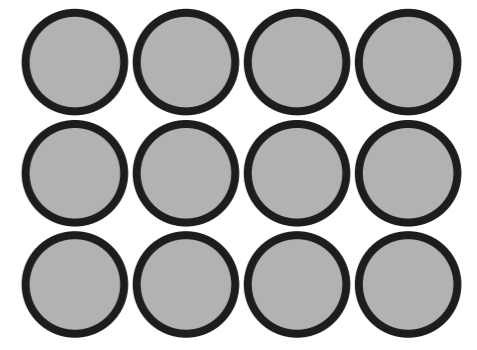


3 people each have 4 cats.
How many cats are there in total?



There are 3 groups with 4 cats in each group

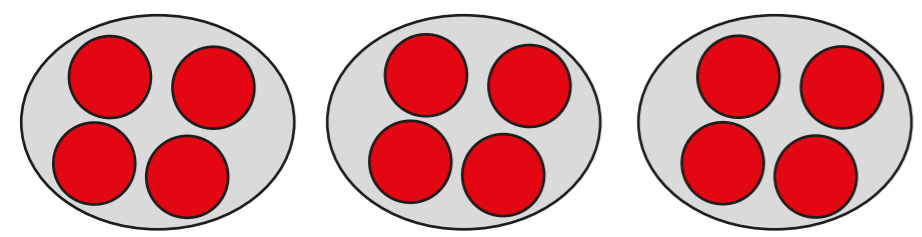
Arrays



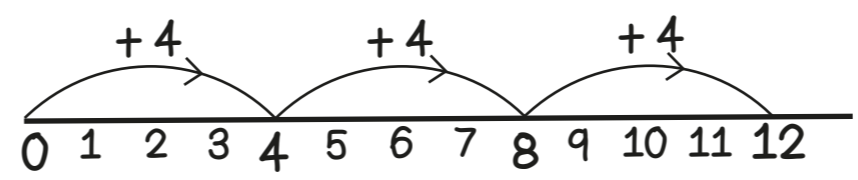
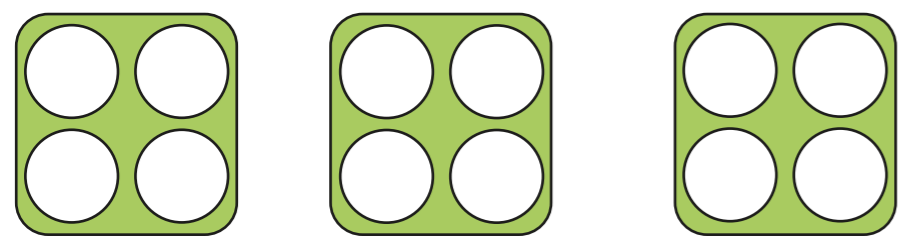
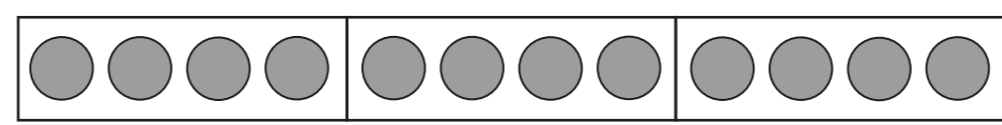
How shall I multiply?

Count in ones

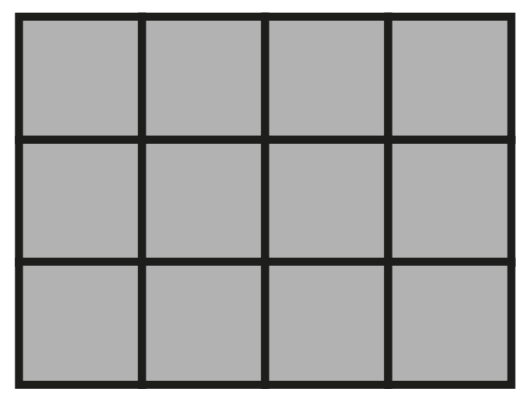
1,2,3,4,5,6,7,8,9,10,11,12



Repeated addition



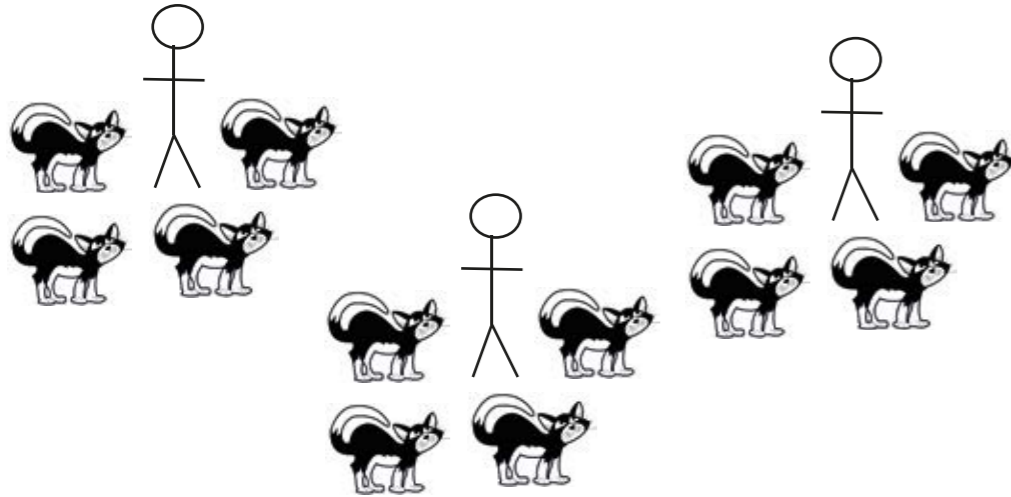
$4 + 4 + 4 = 12$



Sharing

12 shared into 3 equal groups

There are 12 cats.
Three people each have the same number of cats.
How many do they have each?



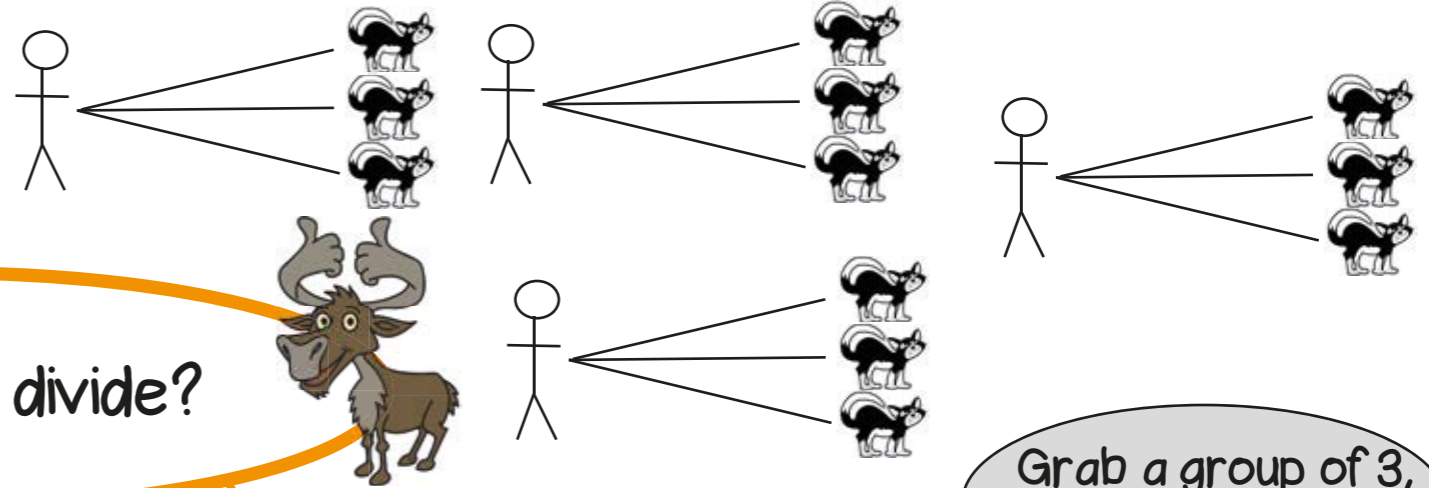
1 for you, 1 for you,
1 for you...

$$12 \div 3 = 4$$

Grouping

How many groups of 3 are there in 12?

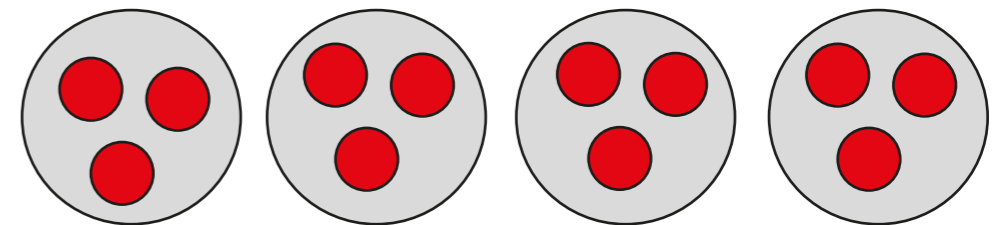
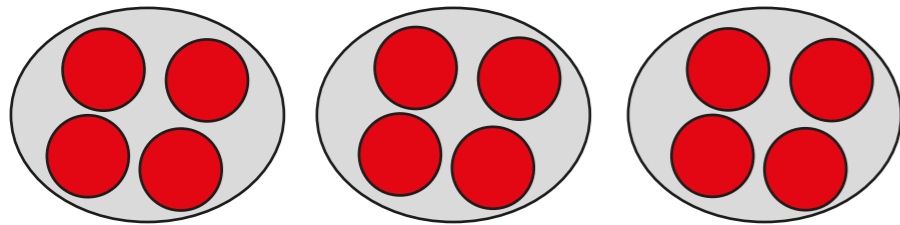
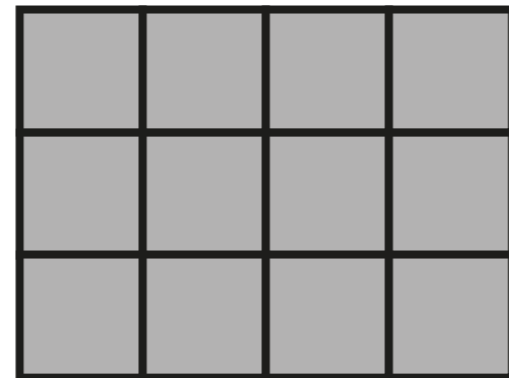
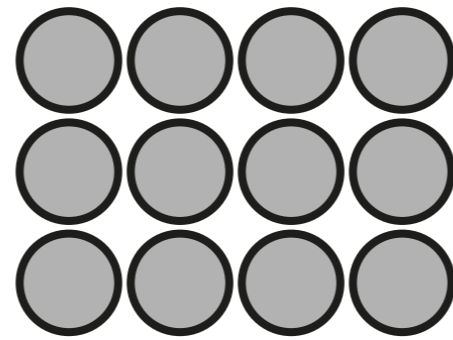
There are 12 cats.
Each person owns 3 cats.
How many people are there?



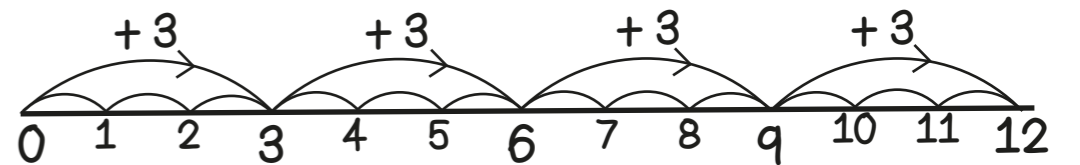
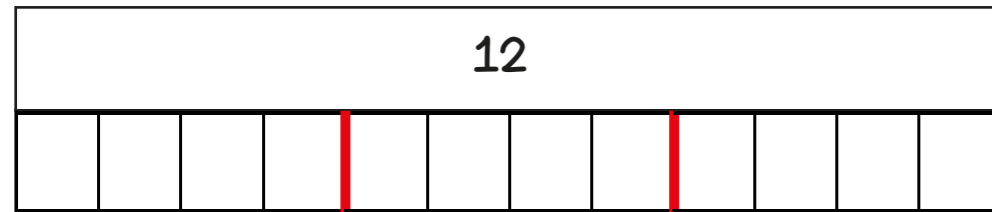
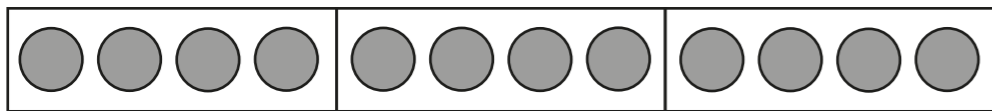
Grab a group of 3,
grab a group of 3...

How shall I divide?

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



Bar model



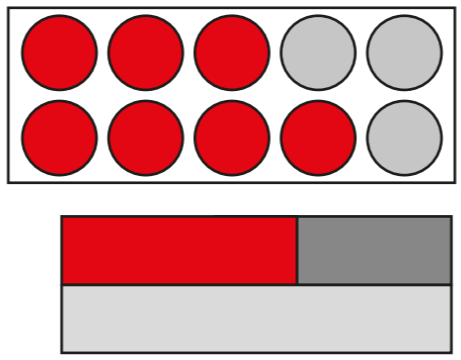
8 + 7, 9 + 9, 14 + 3
 Number facts
 Single digit numbers
 Doubles
 Teens and single digits

I just knew it!

13 + 17
 Use known facts
 30 + 70

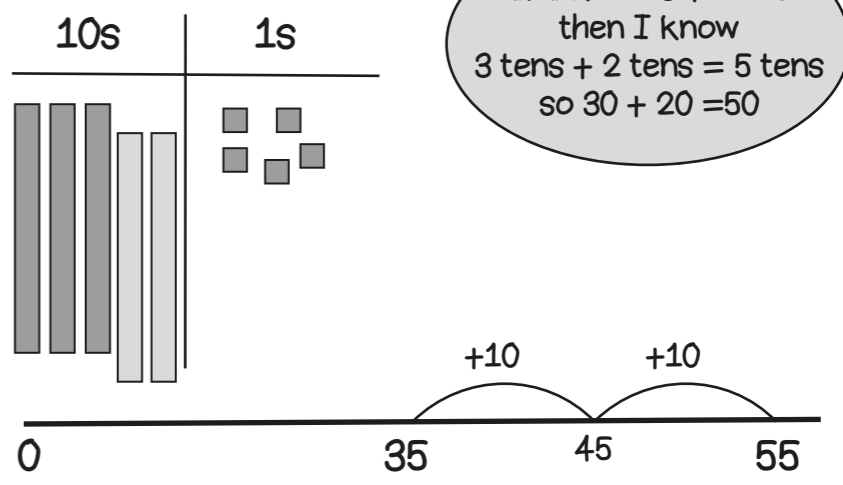
If I know 3 + 7 = 10
 then I know
 3 tens + 7 tens = 10 tens

If I know 3 + 7 = 10
 then I know
 13 + 17 is 2 tens more

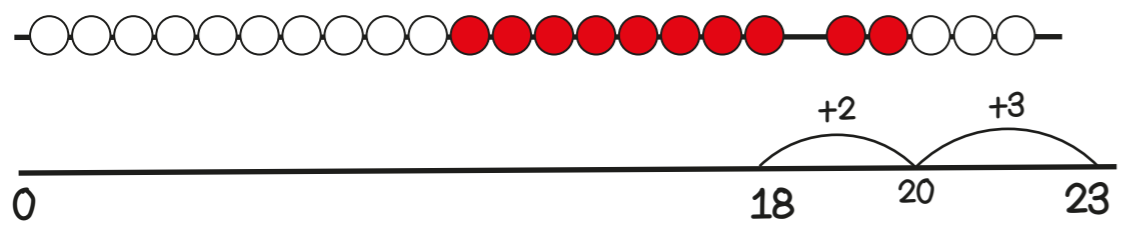


35 + 20
 Add multiples of ten

If I know 3 + 2 = 5
 then I know
 3 tens + 2 tens = 5 tens
 so 30 + 20 = 50



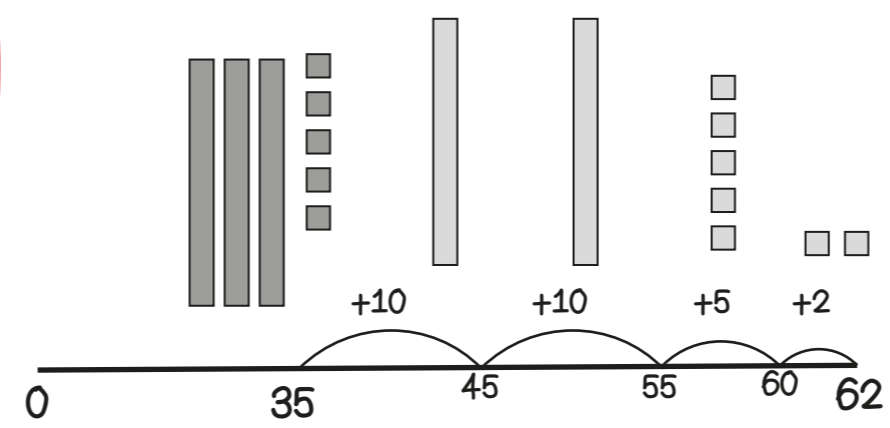
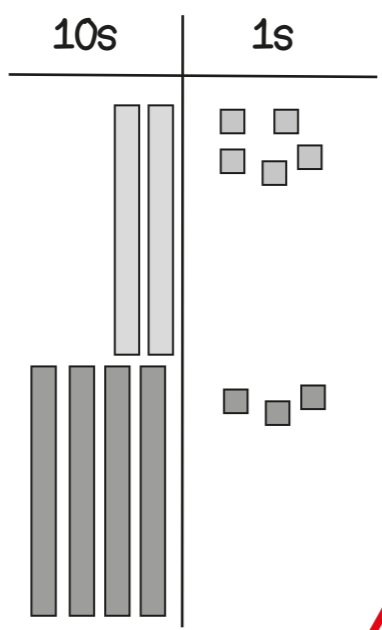
5 + 18
 Greatest number first
 then bridge



How shall I add?

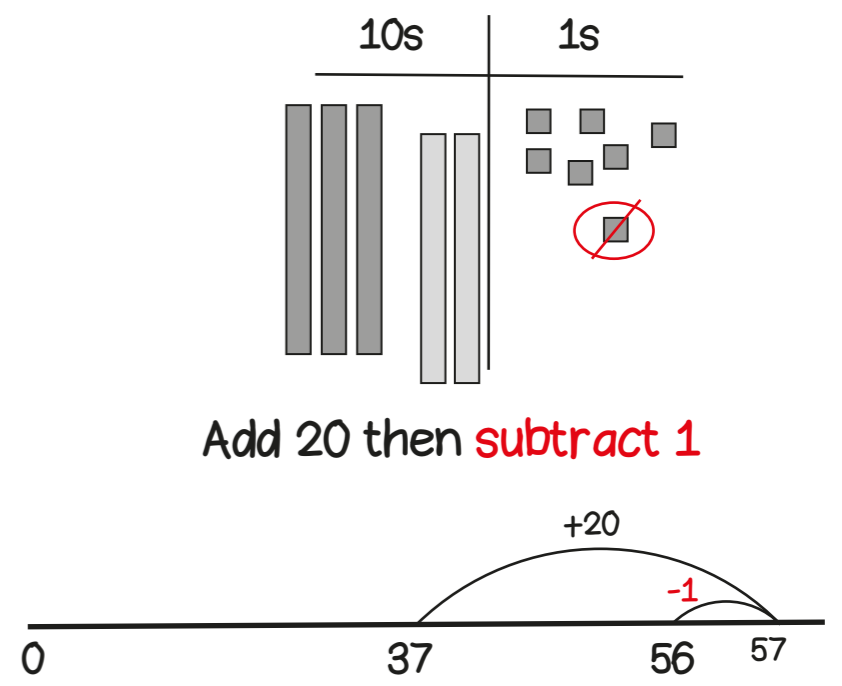
25 + 43
 Partition and recombine

25 + 43
 20 + 5 + 40 + 3
 60 + 8 = 68



35 + 27
 Count on in tens then ones

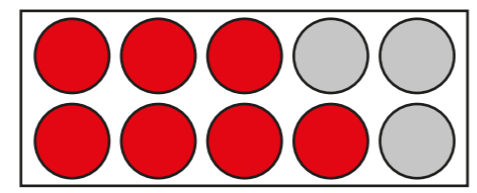
37 + 19
 Round then adjust



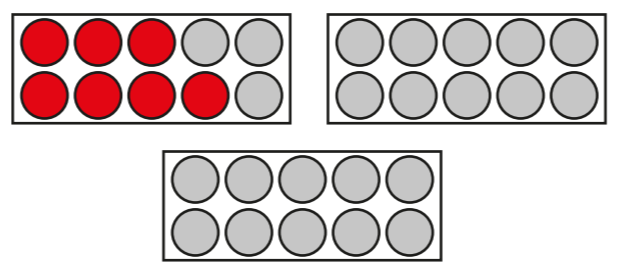
9 - 4, 13 - 5, 18 - 9
Number facts
Single digit numbers
Halves
Teens and single digits

I just knew it!

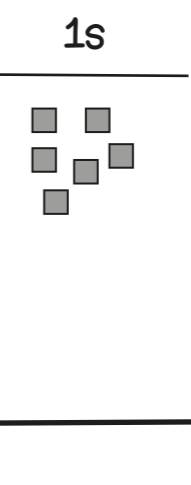
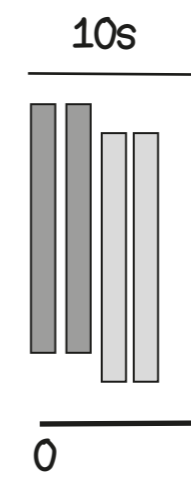
30 - 7
Use known facts
100 - 70



If I know 10 - 7 = 3
then I know
30 - 7 is 2 tens and 3

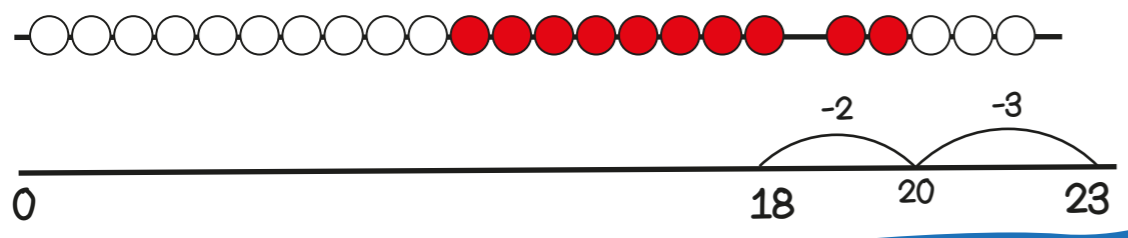


46 - 20
Count back: multiples of ten



If I know 4 - 2 = 2
then I know
4 tens - 2 tens = 2 tens
so 40 - 20 = 20

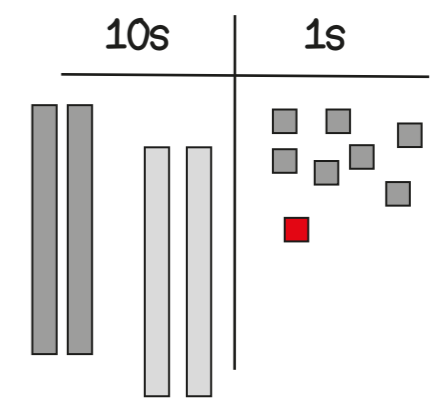
23 - 5
Count back: bridge through
a multiple of ten



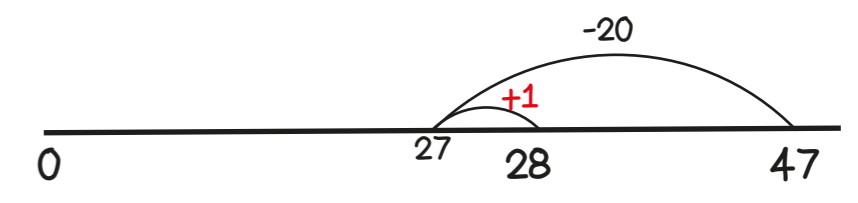
How shall I subtract?



47 - 19
Round then adjust

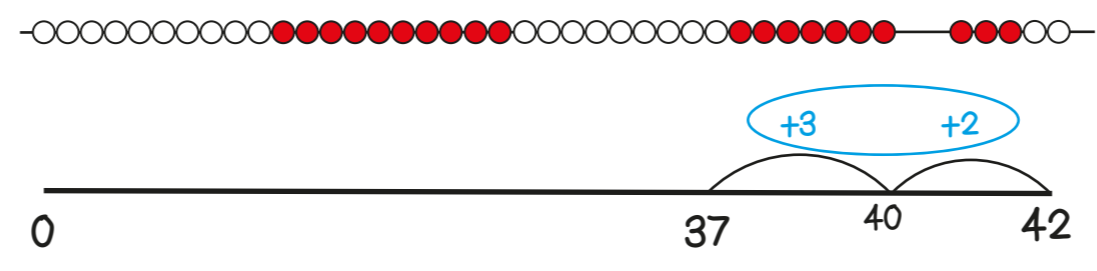
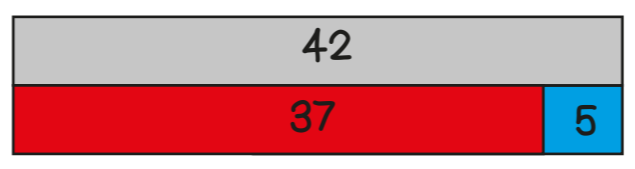


Take away 20 then **add 1**

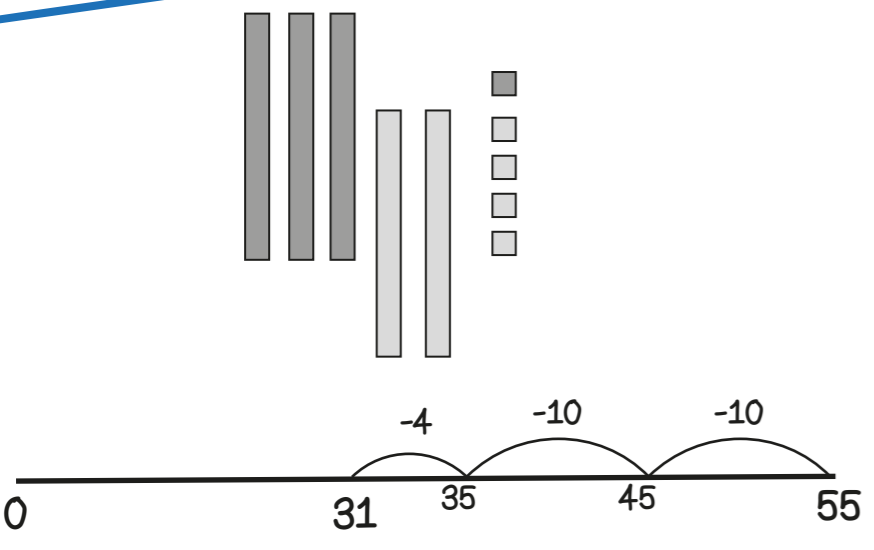


42 is 5 more than 37,
37 is 5 less than 42 so
the difference between
37 and 42 is 5

42 - 37
Find the difference between
two numbers

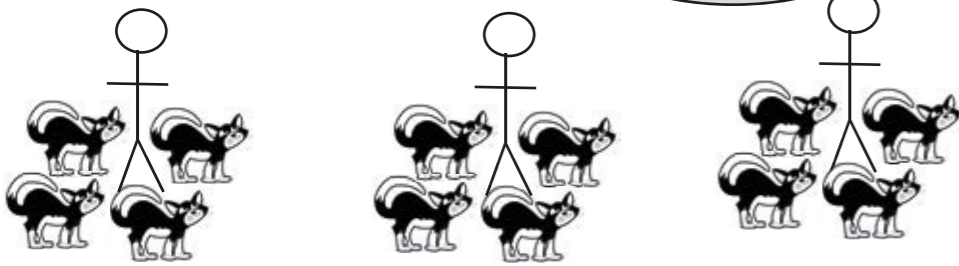


55 - 24
Count back in tens then ones

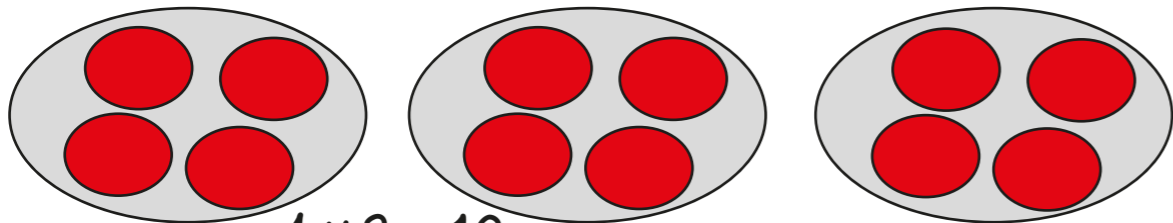


Equal groups

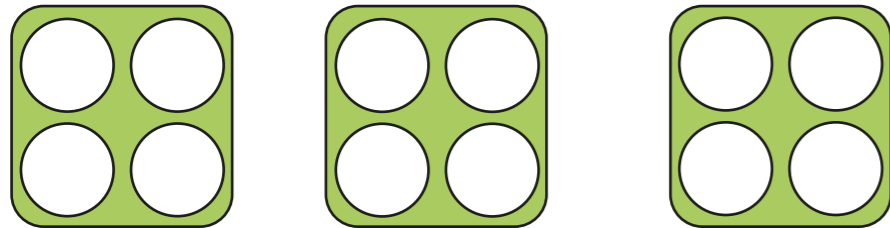
There are 3 groups with 4 cats in each group



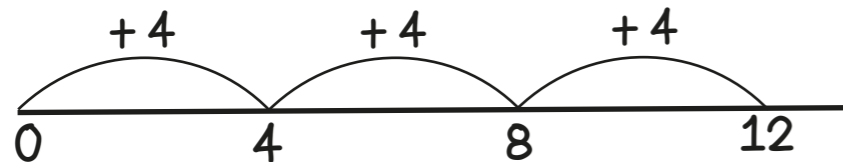
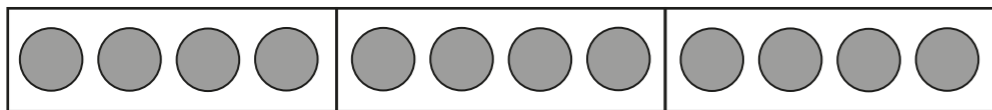
Four cats, multiplied by 3



4 x 3 = 12



Repeated addition



4 + 4 + 4 = 12

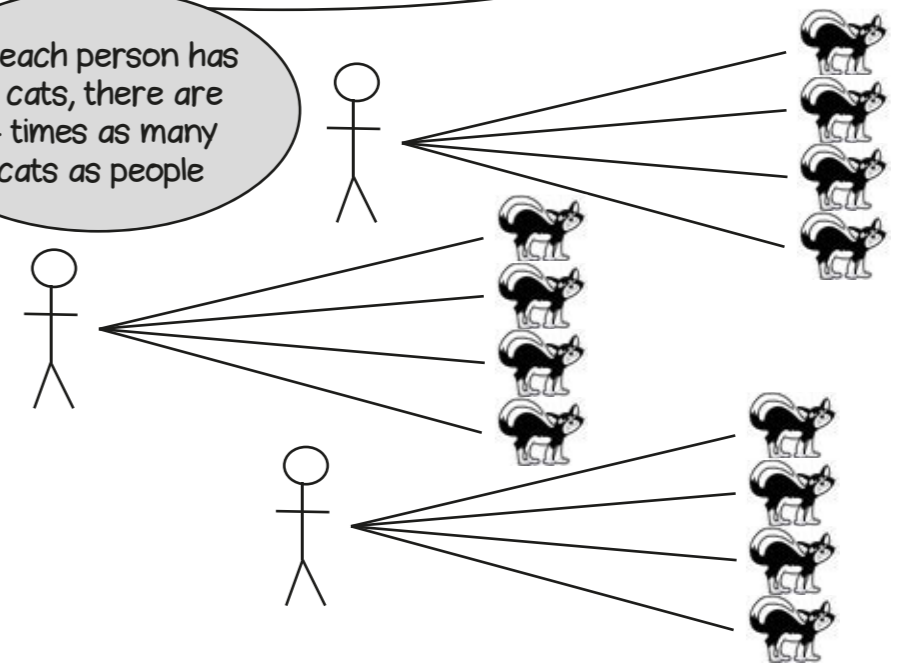
3 people each have 4 cats. How many cats are there in total?

Recall of 2x, 5x and 10x tables

People	Cats
1	4
2	8
3	12

One to many correspondence

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



How shall I multiply?

Count in ones

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

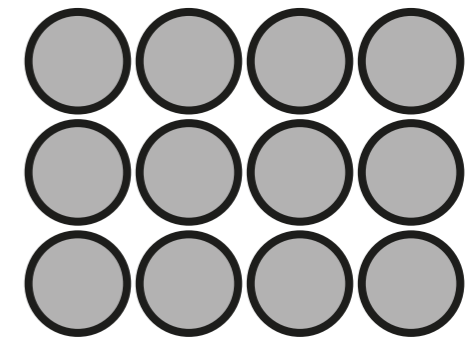
Count in twos

2, 4, 6, 8, 10, 12

Use a known fact

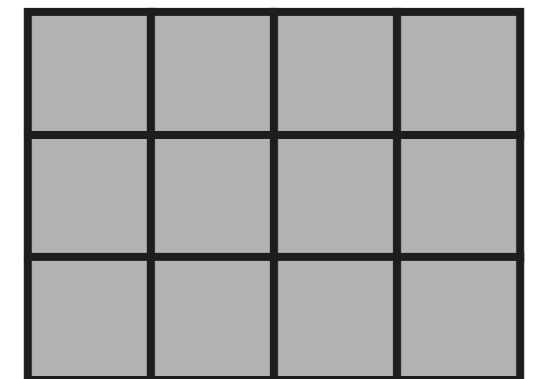
If 2 x 3 is 6, then 4 x 3 is double 6.

Arrays



4 x 3 = 12

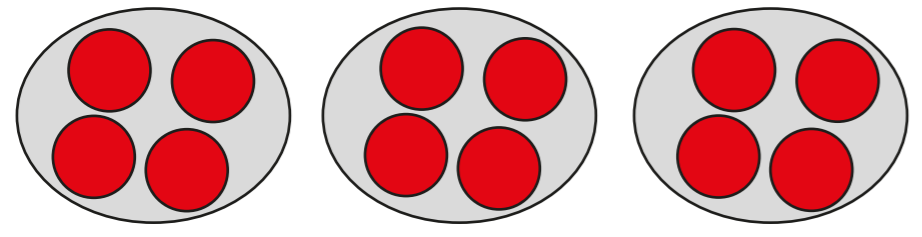
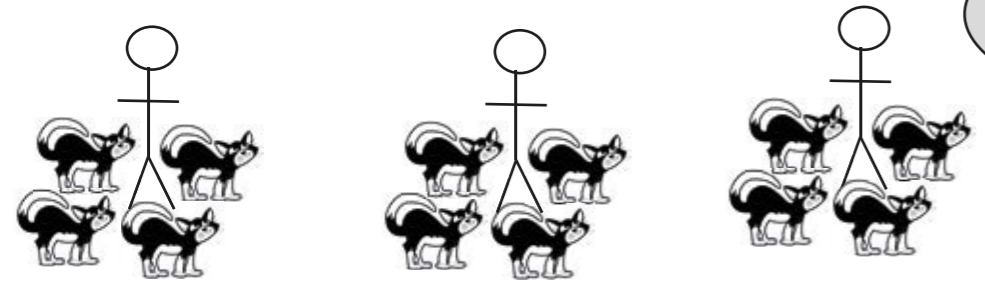
3 x 4 = 4 x 3



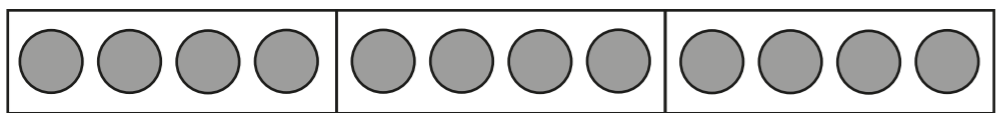
Sharing

12 shared into 3 equal groups

There are 12 cats.
Three people each have the same number of cats.
How many do they have each?



Bar model



12		
4	4	4

Link to fractions.
One third of 12 is 4

$12 \div 3 = 4$

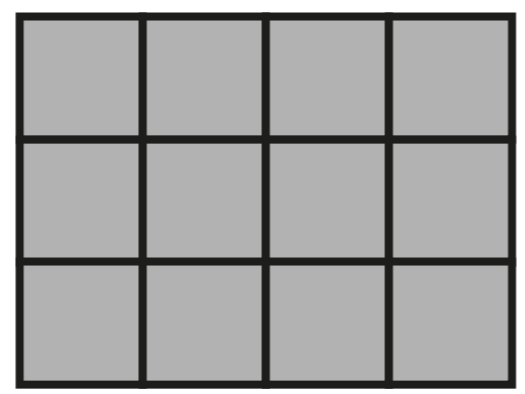
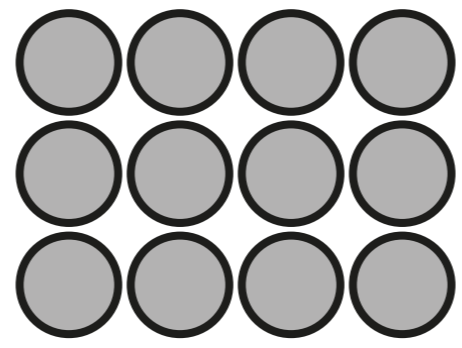
Recall and use 2x, 5x and 10x tables

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

Grab a group of 3,
grab a group of 3...

How shall I divide?

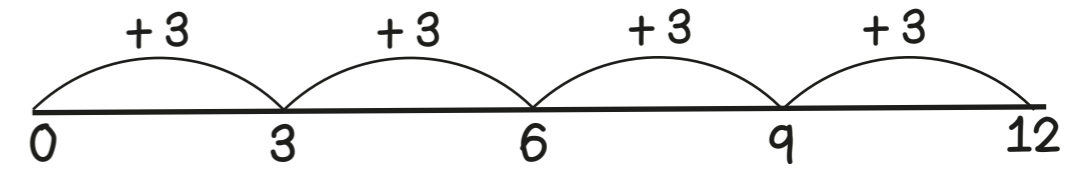
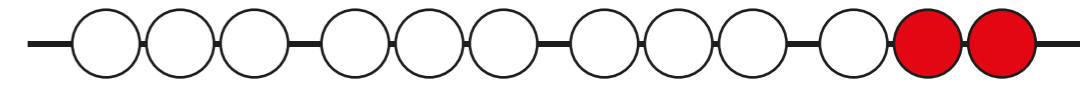
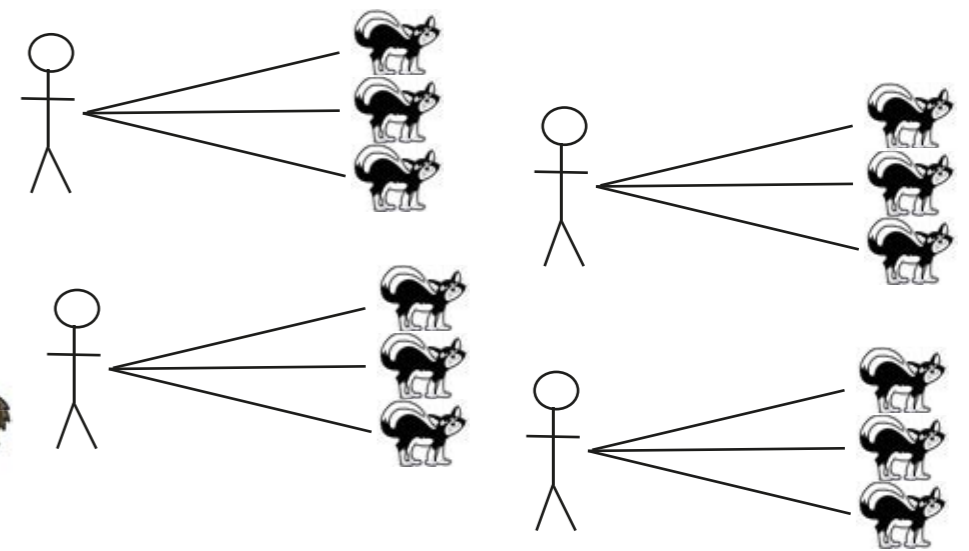
12 can be described as
3 columns of 4
or 4 rows of three



Grouping

How many groups of 3 are there in 12?

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



If I know $3 \times 4 = 12$
then I know $12 \div 3 = 4$



8 + 7, 9 + 9, 14 + 3
 Number facts
 Single digit numbers
 Doubles
 Tens to make 100

I just knew it!

243 + 7
 Use known facts
 300 + 700

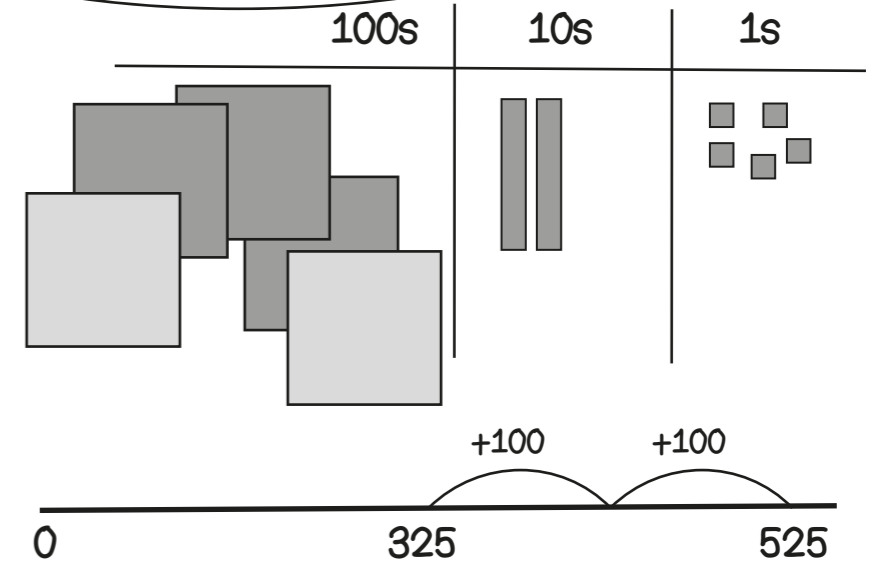
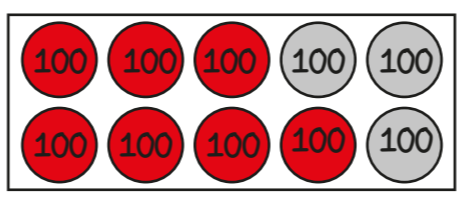
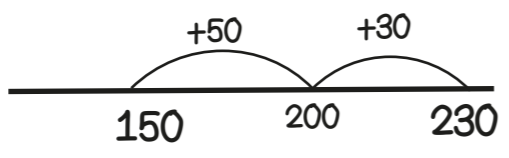
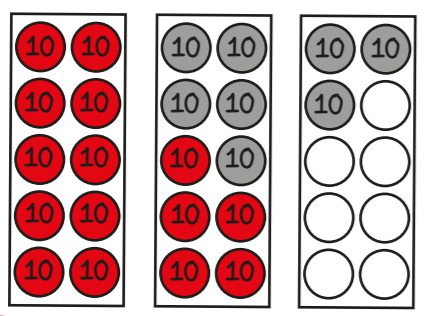
If I know 3 + 7 = 10
 then I know
 3 hundreds + 7 hundreds
 = 10 hundreds

If I know 3 + 7 = 10
 then I know
 243 + 7 makes the
 next multiple of 10

325 + 200
 Add multiples of ten and hundred

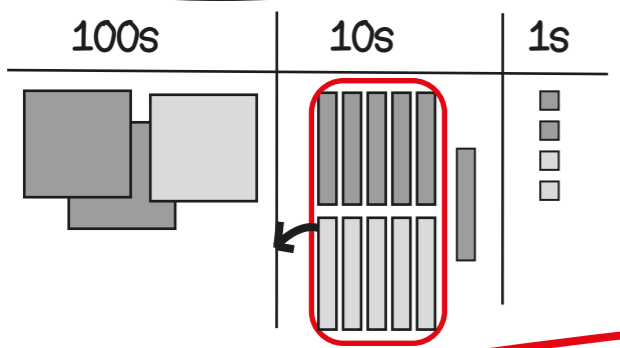
If I know 3 + 2 = 5
 then I know
 3 hundreds + 2 hundreds
 = 5 hundreds

150 + 80
 Bridging boundaries



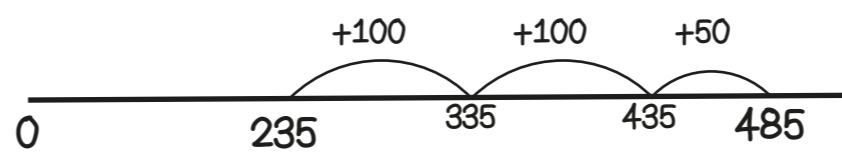
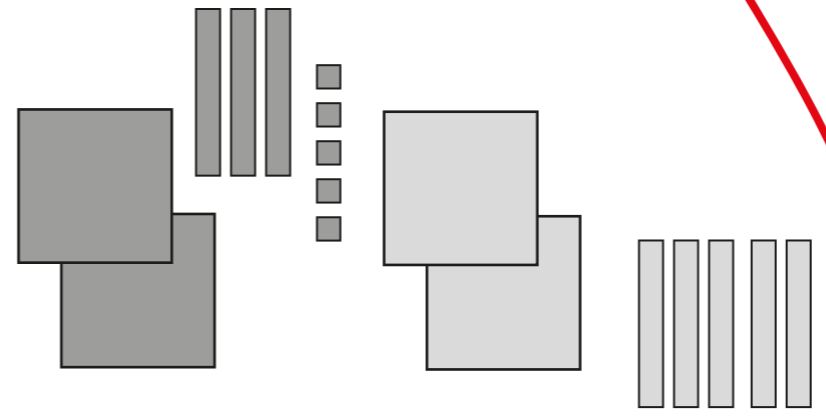
How shall I add?

262 + 152
 Formal written method

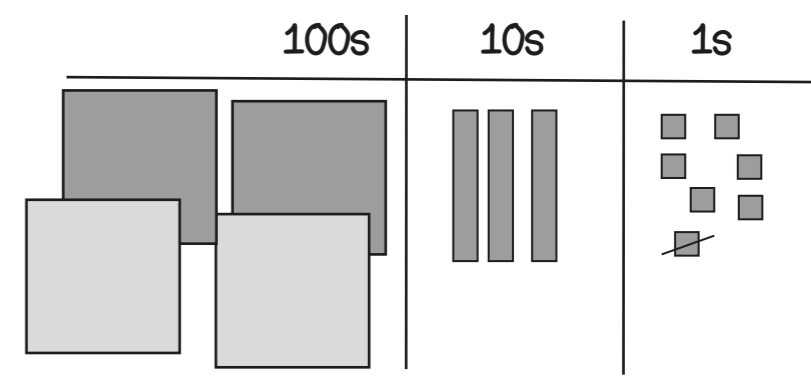


6 tens add 5 tens
 = 11 tens or 110

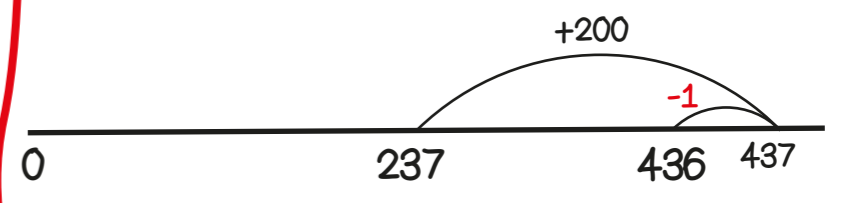
$$\begin{array}{r} 262 \\ + 152 \\ \hline 414 \\ \hline 1 \end{array}$$



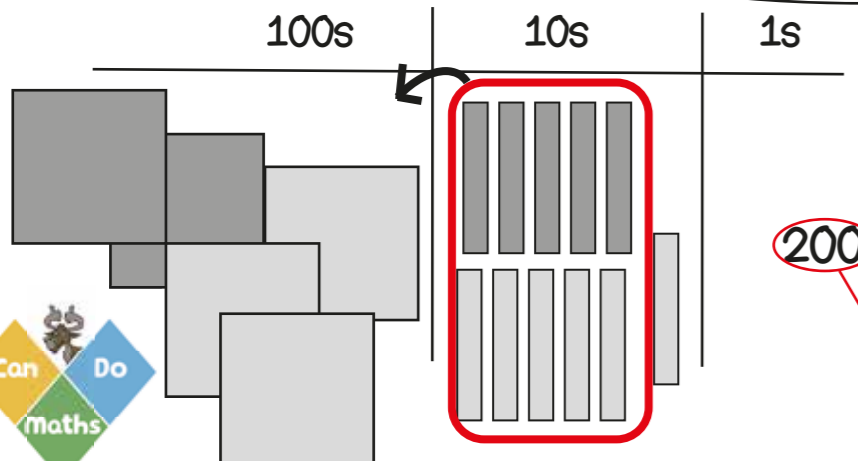
237 + 199
 Round then adjust



Add 200 then subtract 1



250 + 360
 Partition and recombine



$$\begin{array}{l} (200) + (50) + (300) + (60) \\ (500) + (110) = 610 \end{array}$$

235 + 250
 Count on in hundreds then tens

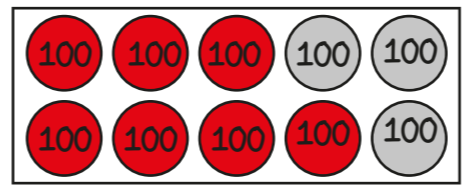


15 - 8, 18 - 5
Number facts
Single digit numbers
Teens and single digits

I just knew it!

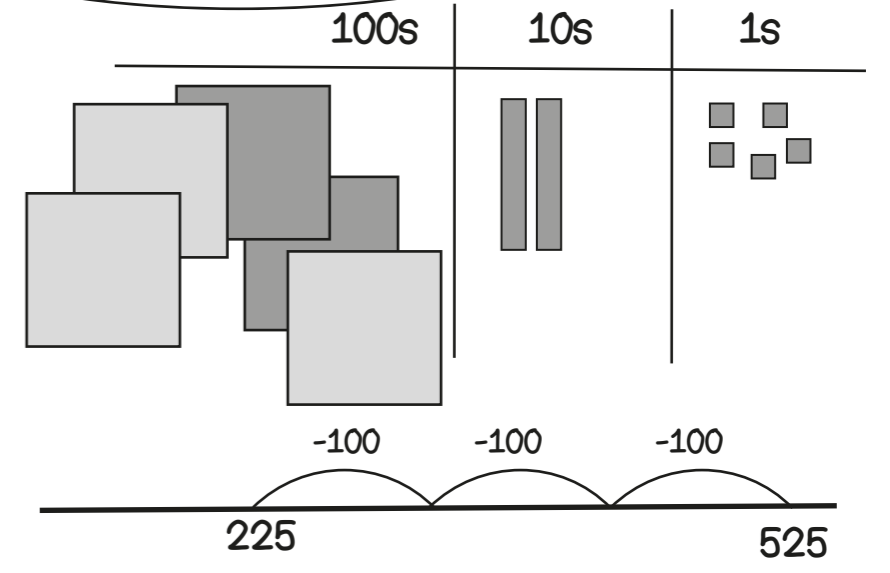
240 - 7
Use known facts
1000 - 700

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

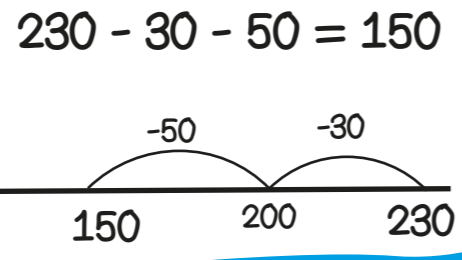
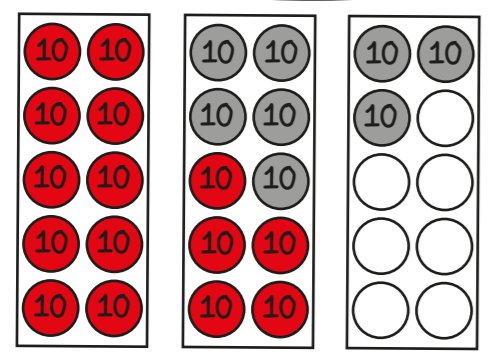


525 - 300
Take away multiples of ten
and a hundred

If I know 5 - 3 = 2
then I know
5 hundreds - 3 hundreds
= 2 hundreds



230 - 80
Bridging boundaries
by counting back in efficient steps



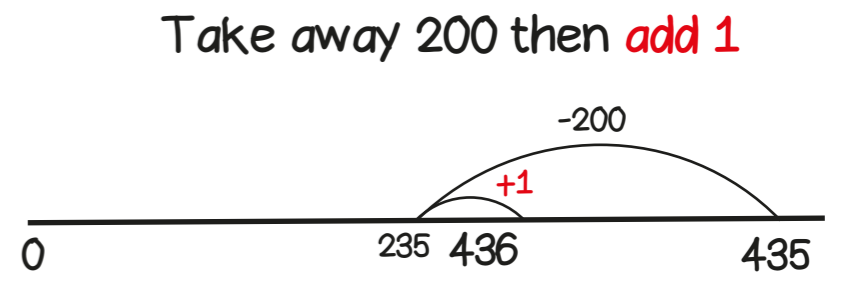
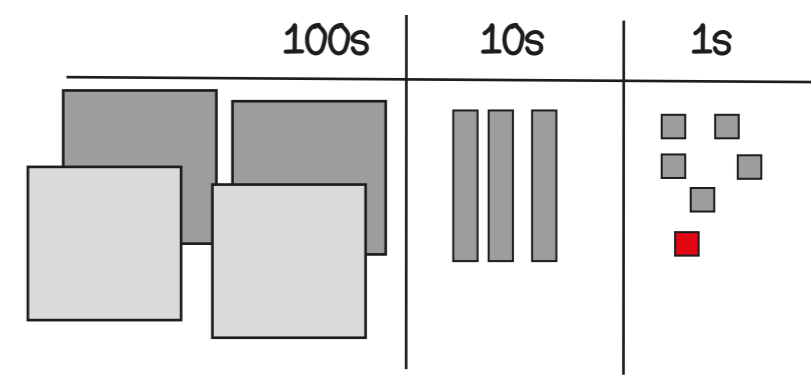
10 - 7 = 3

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



How shall I subtract?

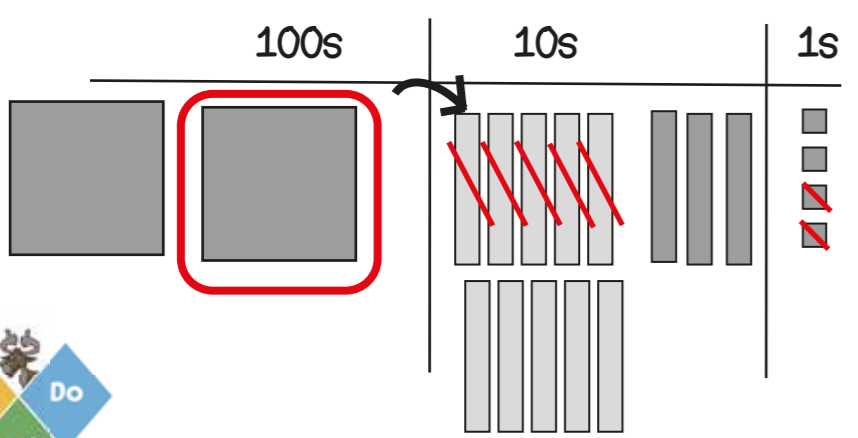
435 - 199
Round then adjust



234 - 152
Formal written method

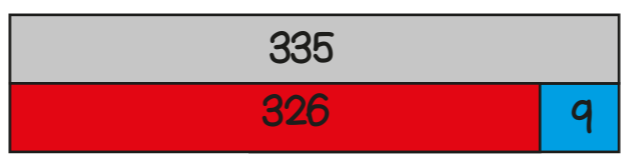
$$\begin{array}{r} 234 \\ - 152 \\ \hline 182 \end{array}$$

234 = 100 + 130 + 4



335 - 326
Find the difference
between two numbers

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

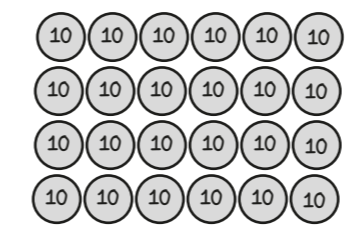
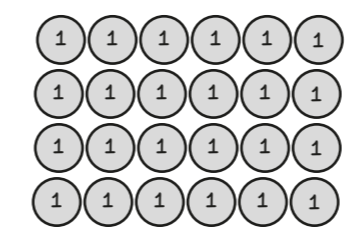


Rapid recall of
2x, 5x, 10x (year 2)
3x, 4x, 8x (year 3)
multiplication tables

6 x 4
Use known facts
and place value

40 is ten times
greater than 4

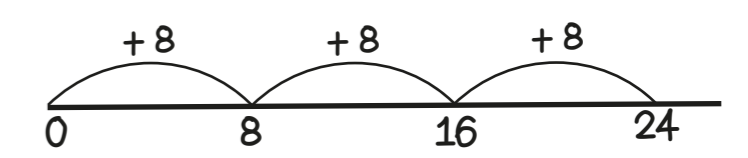
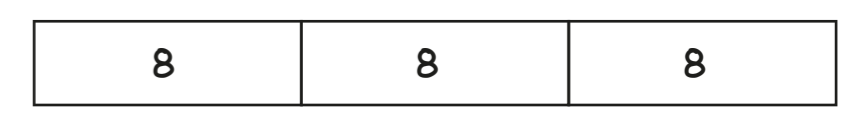
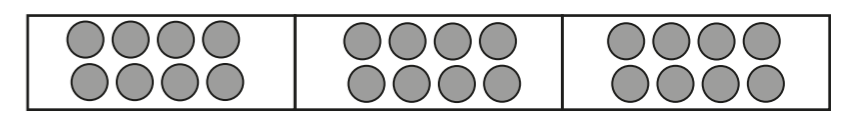
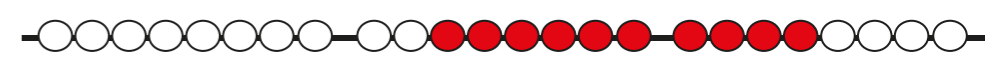
$6 \times 4 = 24$
 $60 \times 4 = 240$
 $6 \times 40 = 240$



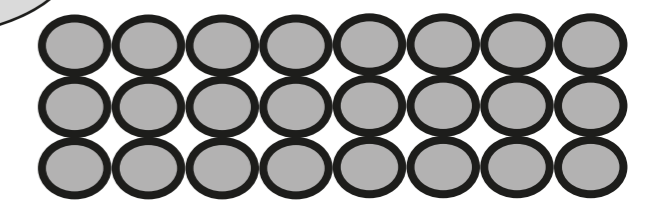
$6 \times 10 \times 4$
 $= 24 \times 10$

8 x 3
Repeated addition

$8 + 8 + 8 =$
 $3 + 3 + 3 + 3 + 3 + 3 + 3 + 3$

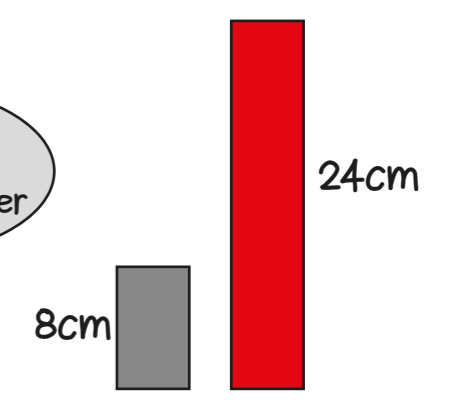


Arrays
If I know 3 x 8
then I know 8 x 3



Scaling

The red tower is
3 times taller
than the grey tower

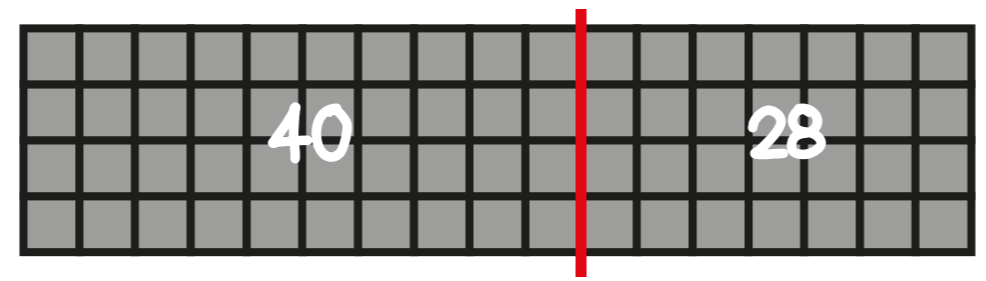
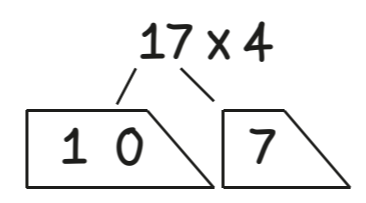


How shall I multiply?



17 x 4
Partition and recombine

$10 \times 4 + 7 \times 4$
 $40 + 28 = 68$

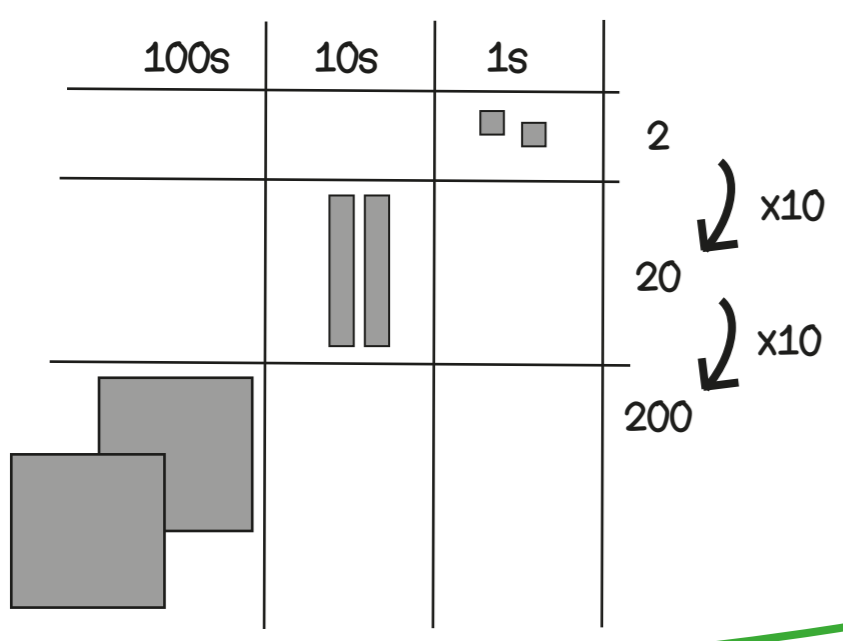


17 x 4
Formal written method

	10	7
4	40	28

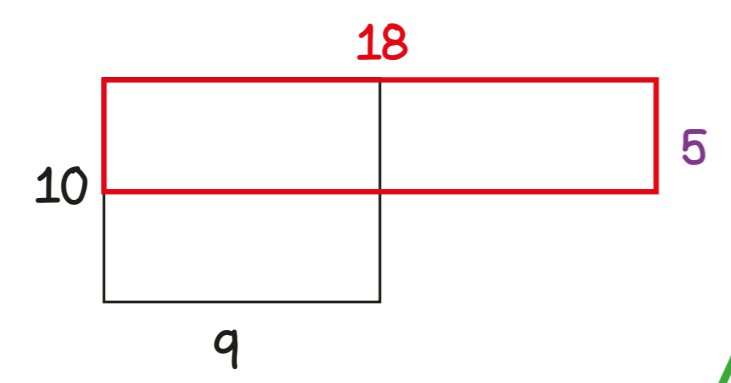
$$\begin{array}{r} 17 \\ \times 4 \\ \hline 68 \\ \hline 2 \end{array}$$

Multiply by 10



5 x 18
Double and halve

5×18
 $= 5 \times 2 \times 18 \div 2$
 $= 10 \times 9$
 $= 90$



Known facts:
Use 2x, 5x, 10x (year 2)
3x, 4x, 8x (year 3)
multiplication tables to
derive division facts

$24 \div 4$
Use known facts
and place value

240 is ten times
greater than 24

$24 \div 4 = 6$
 $240 \div 40 = 6$
 $240 \div 4 = 60$

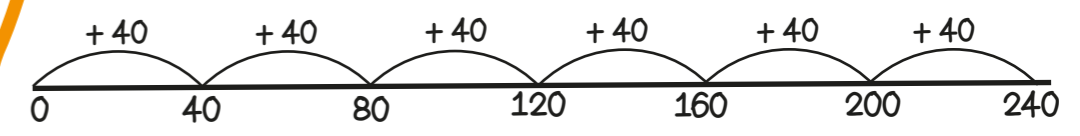
24 biscuits shared between
4 people means they will get
6 biscuits each.
If there are 10 times as many
people and 10 times as many
biscuits, how many biscuits
each now?

$240 \div 40$
Repeated addition

How many 40s
are there in 240?

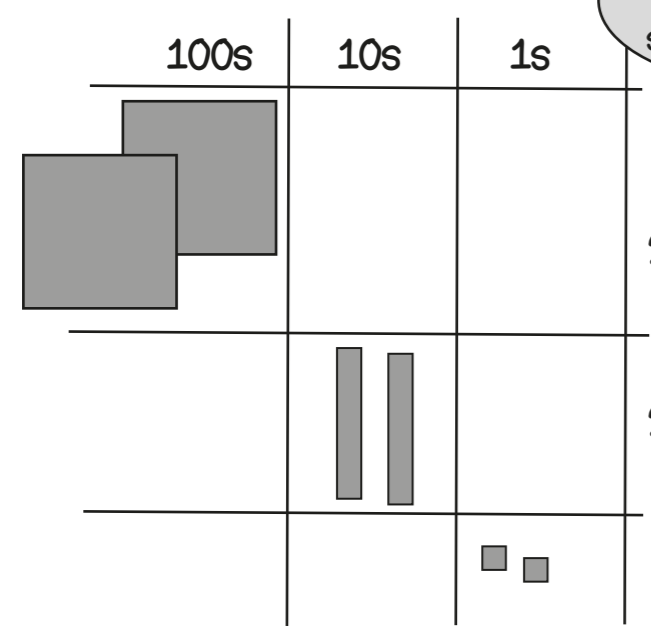
$240 \div 40 = 6$

How many steps of 40 make 240?



$200 \div 10$
Divide by 10

$200 \div 10 = 20$ so
20 is ten times
smaller than 200



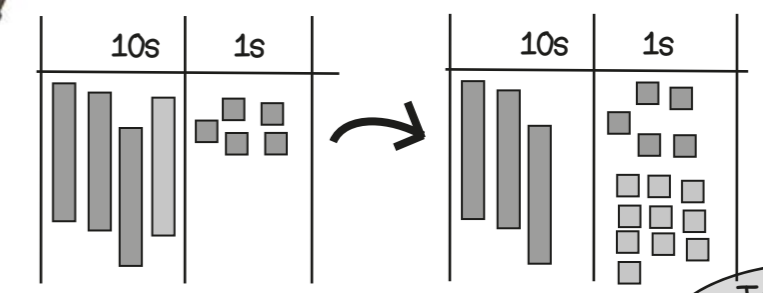
$200 \div 10 = 20$
 $20 \div 10 = 2$

A tenth of 100 is 10
A tenth of 1 is 1 tenth
so $1 \div 10 = \frac{1}{10}$

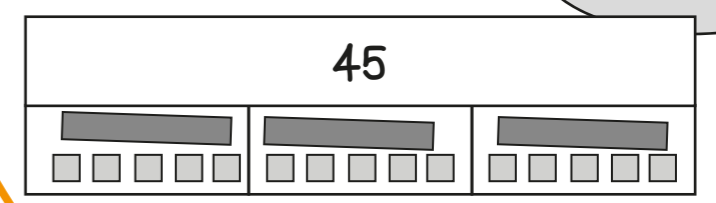
How shall I divide?



$45 \div 3$
Sharing equally



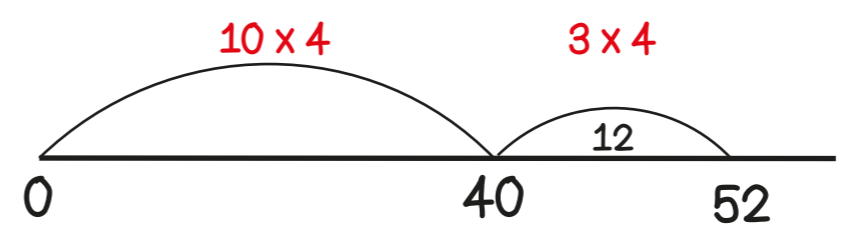
Ten for you,
ten for you,
ten for you...



$52 \div 4$
Partition and recombine

ten lots and the rest

$52 \div 4$
 $40 \div 4 = 10$
 $12 \div 4 = 3$
 $10 + 3 = 13$



$42 \div 6$
Double and halve

If there are half as many
biscuits and half as many
people...

$42 \div 6 = 21 \div 3$

42					
7	7	7	7	7	7
21					
7	7	7			

Link to fractions



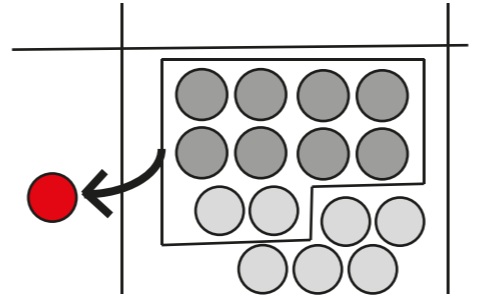
0.9 + 0.9, 74 + 26
 Number facts
 Single digit decimals
 Doubles
 Bonds of 100

I just knew it!

7 + 8
 Use known facts

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

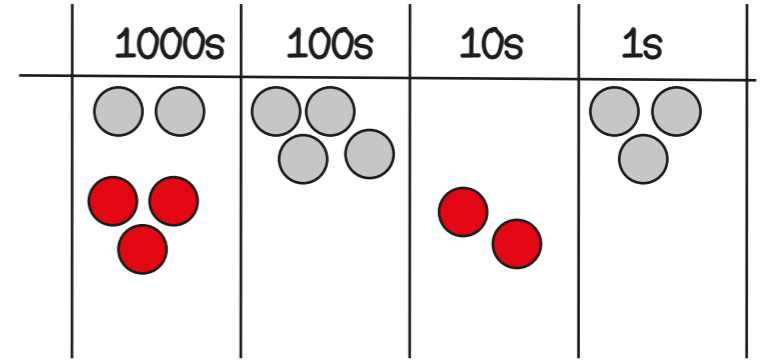
70 + 80 = 150
 700 + 800 = 1,500



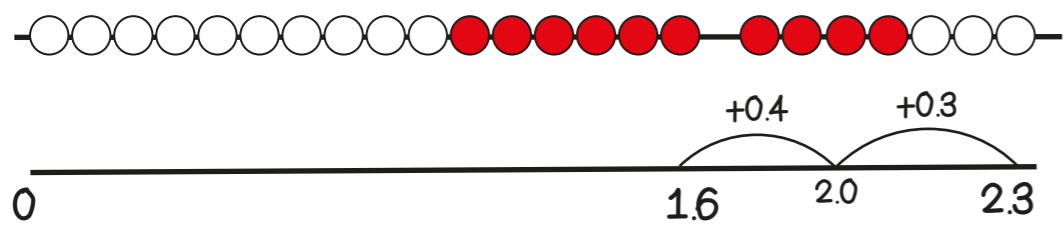
2,403 + 3,020
 Use place value to add

If I know 2 + 3 = 5
 then I know
 2000 + 3000 = 5 000

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



1.6 + 0.7
 Bridge through boundaries
 by counting in efficient steps



How shall I add?

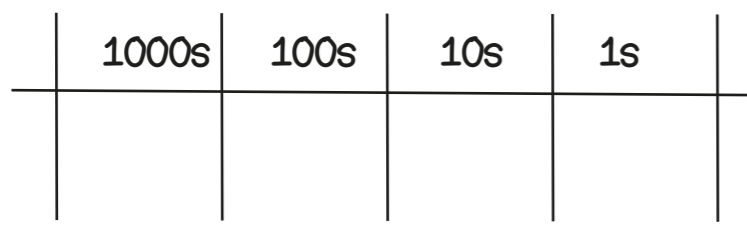


5,748 + 3,374
 Formal written method

Exchange ten of
 these for one of
 those!

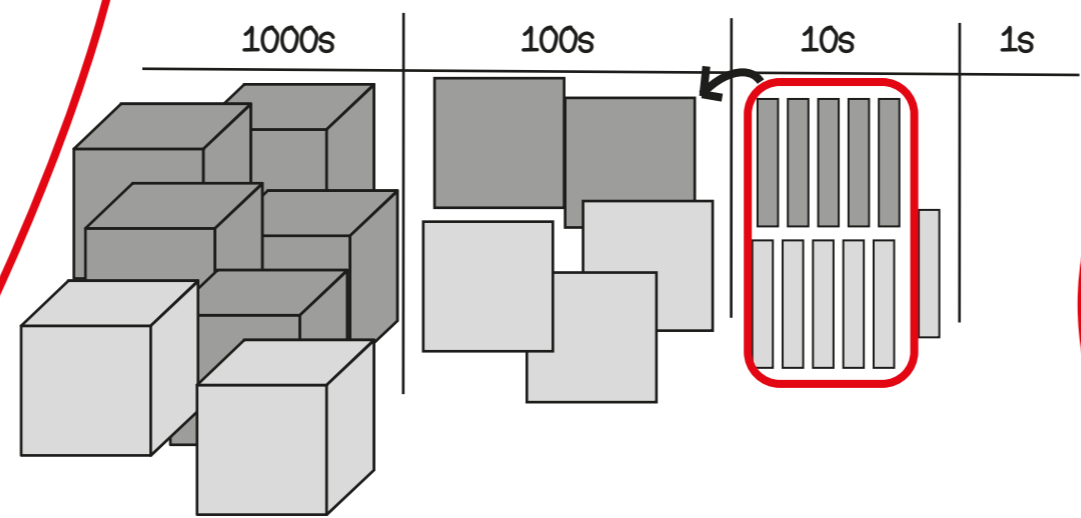
$$\begin{array}{r} 5,748 \\ + 3,374 \\ \hline 9,122 \\ \hline 1 \ 1 \ 1 \end{array}$$

Regroup and rename

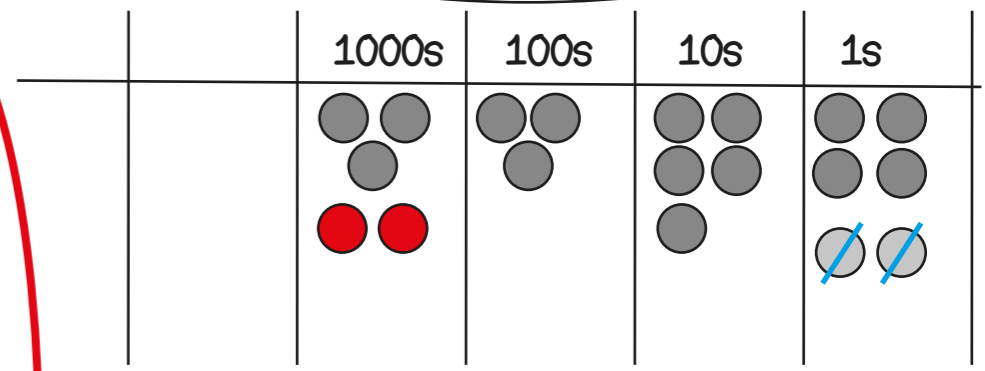


5,250 + 2,360
 Partition and recombine

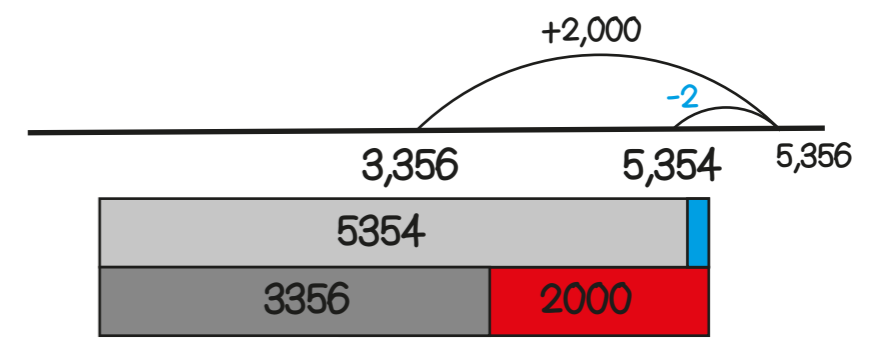
$$5000 + 200 + 50 + 2000 + 300 + 60 = 7000 + 500 + 110 = 7610$$



3,356 + 1,998
 Round then adjust



Add 2,000 then take away 2



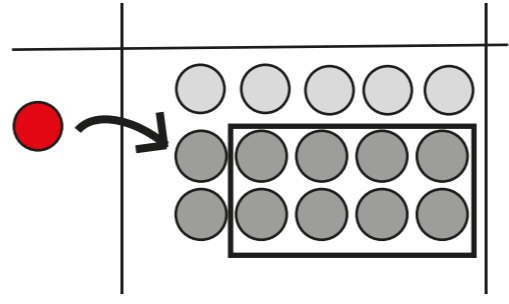
13 - 5, 1.8 - 0.8
 Number facts
 Single digit numbers
 Halves
 Wholes and tenths

I just knew it!

15 - 8 = 7
 Use known facts

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

150 - 80 = 70
 1500 - 800 = 700

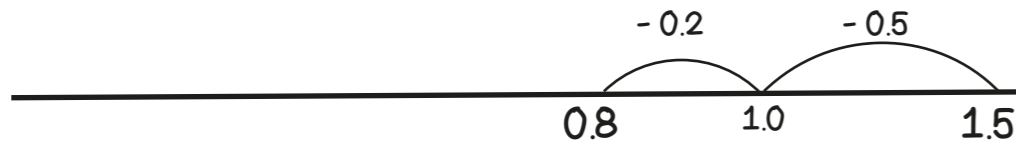


6,342 - 3,020
 Use place value to subtract

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

	1000s	100s	10s	1s
6,342	6 red	3 blue	4 green	2 yellow
- 3,020	3 red	0 blue	0 green	0 yellow
3,322	3 red	3 blue	2 green	2 yellow

1.5 - 0.7
 Bridge through boundaries
 by counting in efficient steps



How shall I subtract?



5,352 - 2,136
 Formal written method

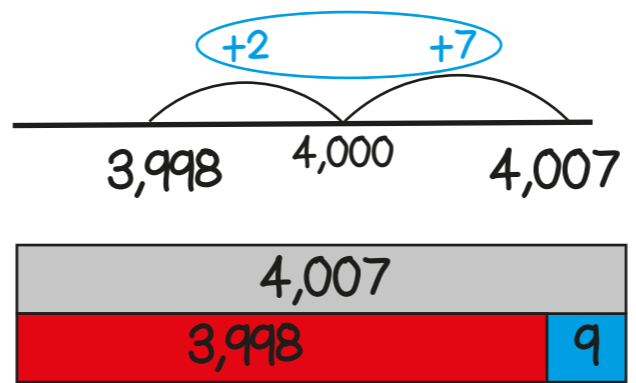
Exchange ten of these for one of those!

$$\begin{array}{r} 5,352 \\ - 2,136 \\ \hline 2,916 \end{array}$$

Regroup and rename

1000s	100s	10s	1s

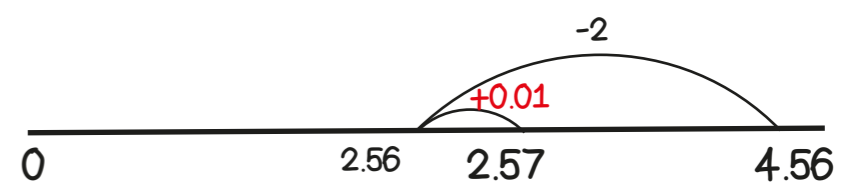
4007 - 3998
 Find the difference between two numbers



4.56 - 1.99
 Round then adjust

1s	1/10 s	1/100 s
4 grey	5 grey	6 grey
1 grey	9 grey	9 grey
		1 red

Take away 2 then add one hundredth

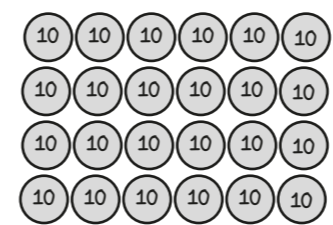
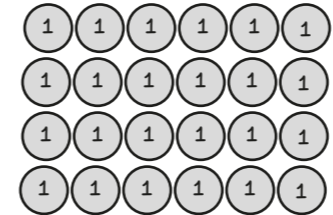


Known facts:
Rapid recall of all multiplication tables up to 12 x 12

6 x 4
Use known facts and place value

40 is ten times greater than 4

6 x 4 = 24
60 x 4 = 240
60 x 40 = 2400

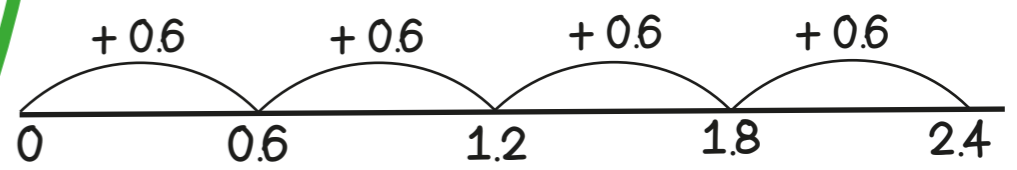


6 x 10 x 4 x 10
= 24 x 100

0.6 is ten times smaller than 6

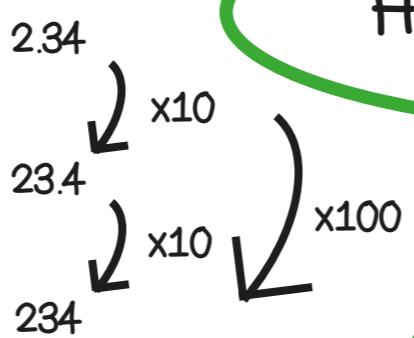
6 x 4
Use known facts and place value

0.6 x 4 = 2.4
4 jumps of 0.6



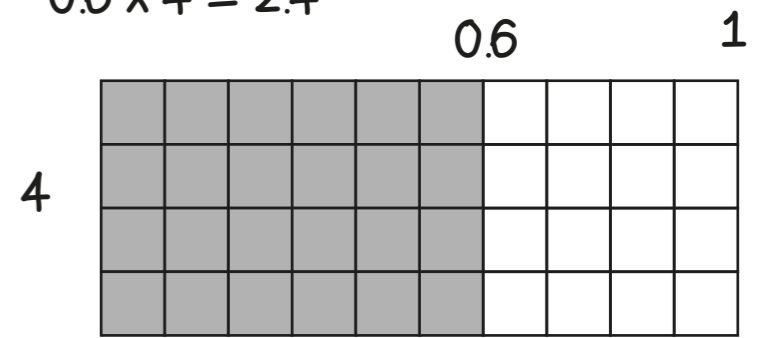
2.34 x 100
Multiply by 10, 100

1000s	100s	10s	1s	1/10 s	1/100 s
			● ●	● ● ●	● ●
		● ●	● ● ●	● ● ●	
	● ●	● ● ●	● ● ●		



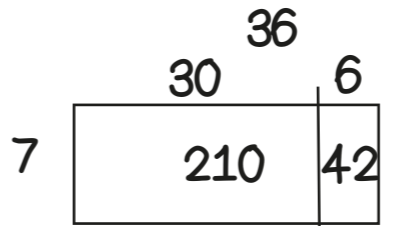
How shall I multiply?

0.6 x 4 = 24 tenths
0.6 x 4 = 2.4

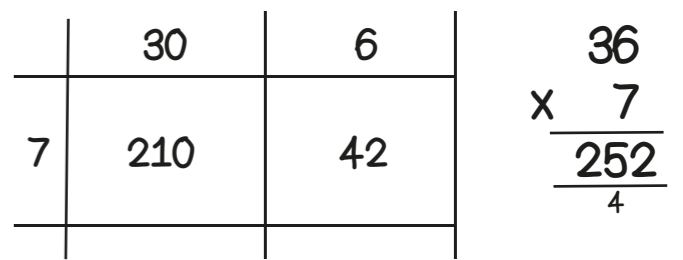


7 x 36
Use the distributive law

7 x 36
= 7 x 30 + 7 x 6
= 210 + 42
= 252



36 x 7
Formal written method



45 x 6
Use factors and commutativity

Write as factors then re-order

2 x (5 x 6) = (2 x 5) x 6
2 x 30 = 10 x 6

45 x 6
= 5 x 9 x 6
= 5 x 6 x 9
= 30 x 9
= 270

236 x 7
200 x 7 = 1400
30 x 7 = 210
6 x 7 = 42
1400 + 210 + 42 = 1652



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

$24 \div 4$
Use known facts and place value

240 is ten times greater than 24

$24 \div 4 = 6$
 $240 \div 40 = 6$
 $2400 \div 400 = 6$

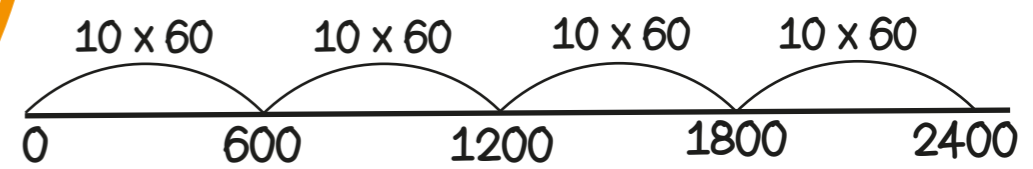
24 biscuits shared between 4 people means they will get 6 biscuits each.
If there are 100 times as many people and 100 times as many biscuits, how many biscuits each now?

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

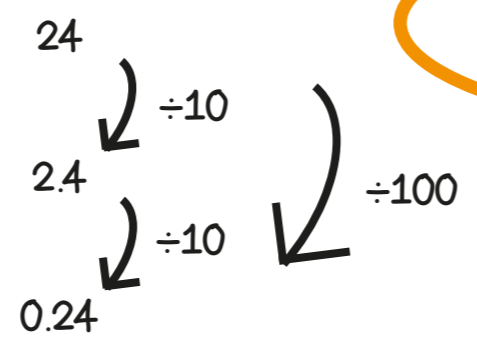
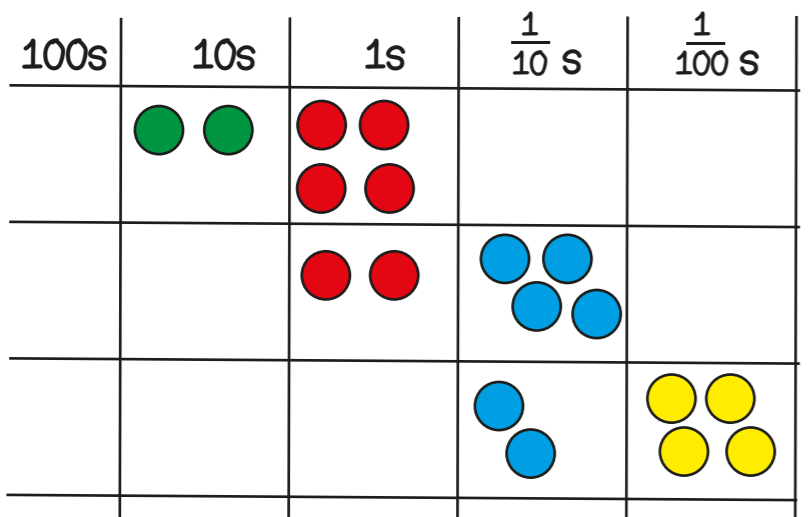
60 is ten times greater than 6

$2400 \div 60$
Use known facts and place value

$2400 \div 60 = 40$
How many steps of 60 make 2400?

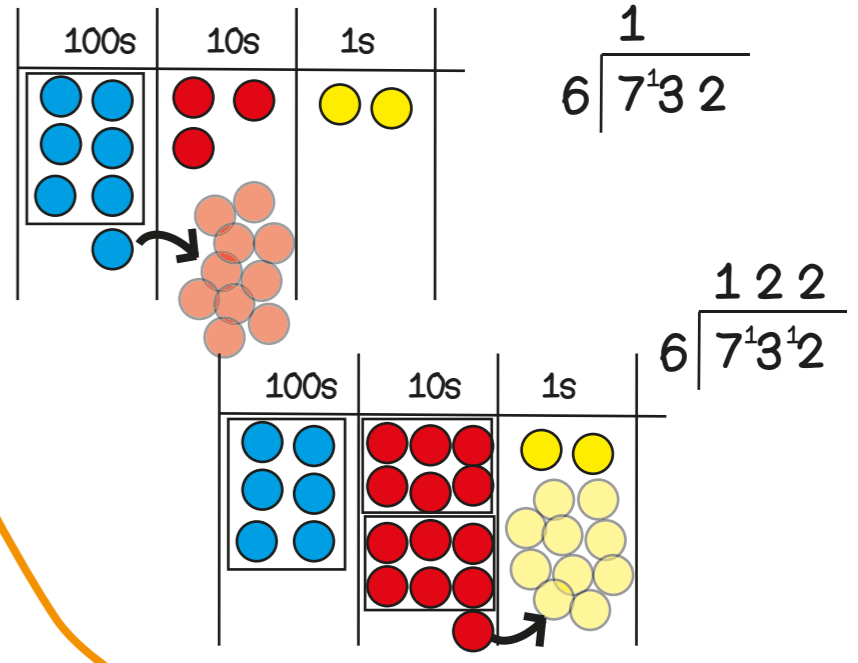


$24 \div 100$
Divide by 10, 100



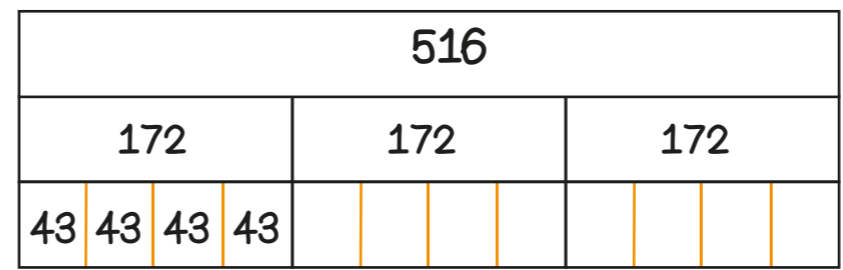
How shall I divide?

$732 \div 6$
Formal written method



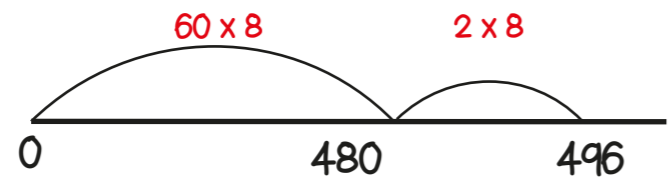
$516 \div 12$
Using factors

$516 \div 3 \div 4$



$496 \div 8$
Partition and recombine

$496 \div 8$
480 16
÷ 8 ÷ 8
60 + 2 = 62



$0.8 + 0.7, 45 + 45$
 Number facts
 Single digit decimals
 Doubles
 Bonds of 1 and 100

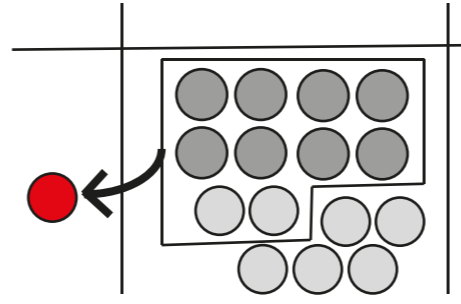
I just knew it!

Rapid fluency of
 2 digit add 2 digit numbers

$7 + 8$
 Use known facts

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

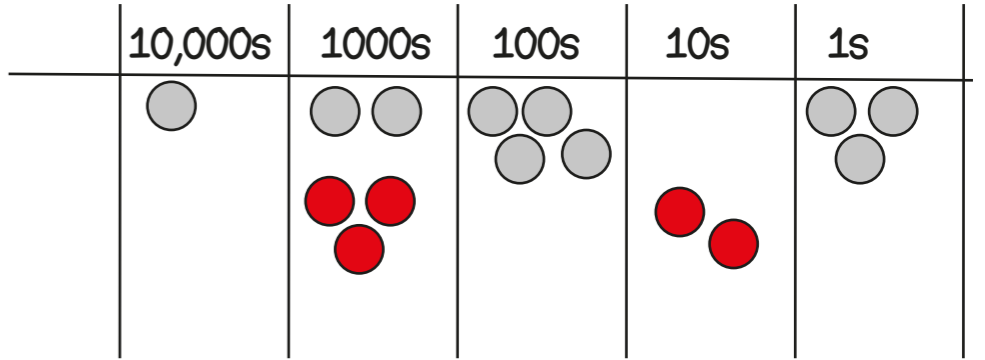
$7,000 + 8,000 = 15,000$
 $70,000 + 80,000 = 150,000$
 $700,000 + 800,000 = 1,500,000$



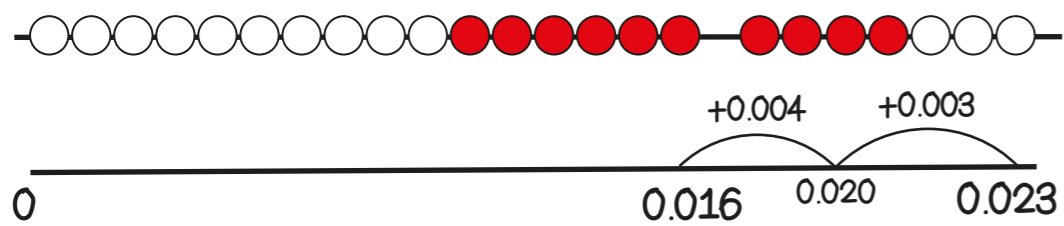
$12,403 + 3,020$
 Use place value to add

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

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



$0.016 + 0.007$
 Bridge through boundaries
 by counting in efficient steps



How shall I add?

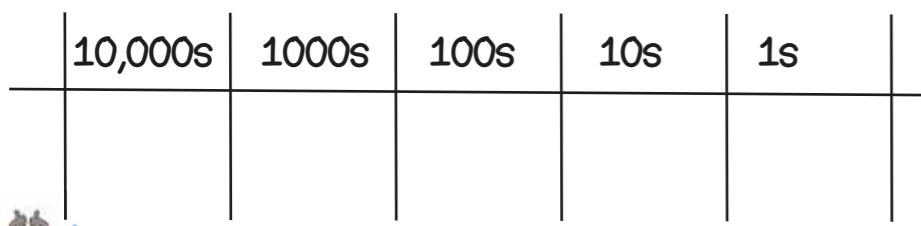


$25,748 + 46,374$
 Formal written method

Exchange ten of
 these for one of
 those!

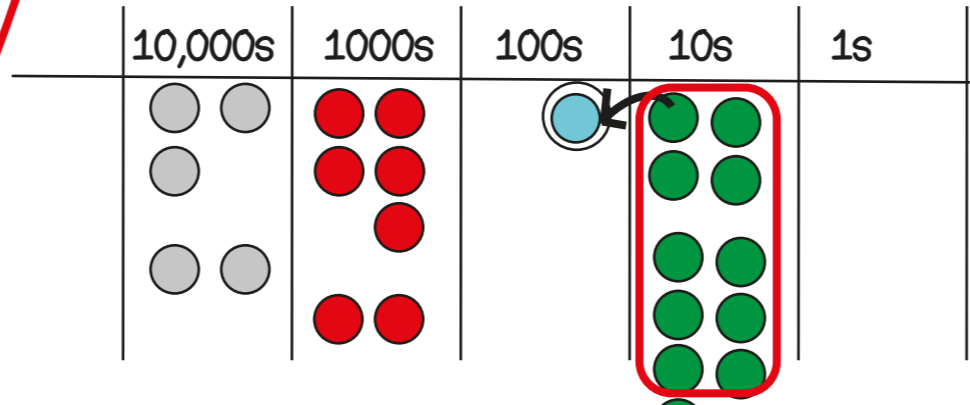
$$\begin{array}{r} 25,748 \\ + 46,374 \\ \hline 72,122 \end{array}$$

Regroup and rename

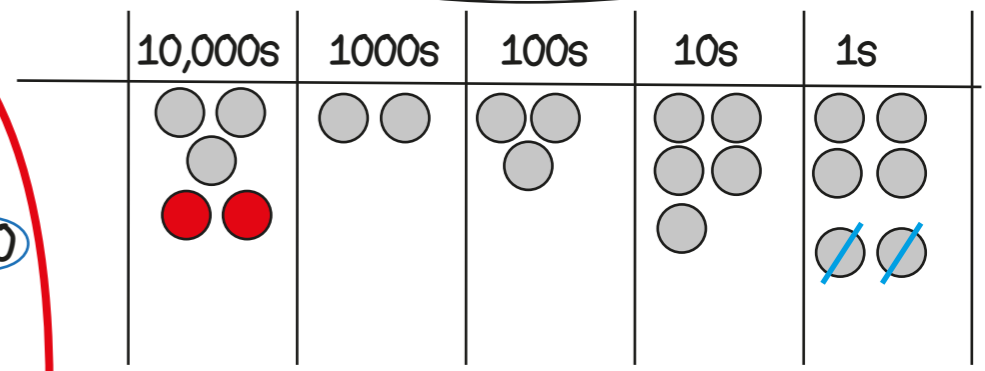


$35,040 + 22,070$
 Partition and recombine

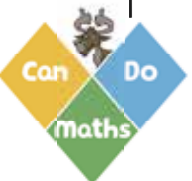
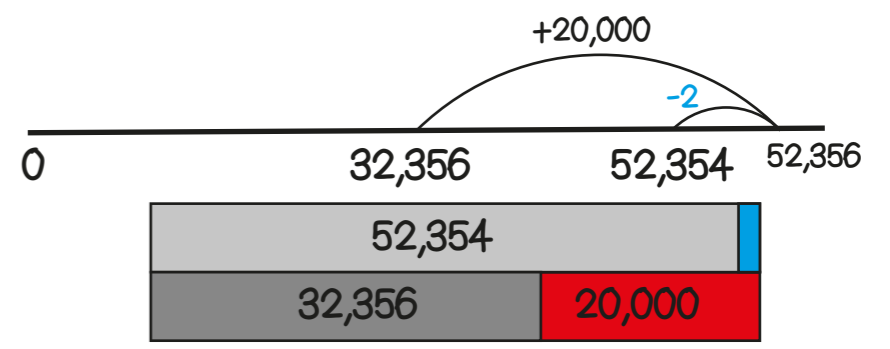
$$30,000 + 5,000 + 40 + 20,000 + 2,000 + 70 = 57,110$$



$32,356 + 19,998$
 Round then adjust



Add 20,000 then subtract 2



9 - 4, 13 - 5, 18 - 9
 Number facts
 Single digit decimals
 Halves
 Subtract from 1 and 100

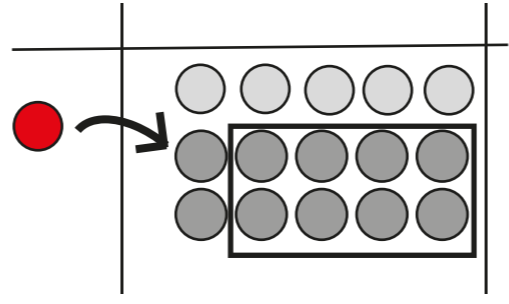
I just knew it!

Rapid fluency of
 2 digit subtract
 2 digit numbers

15 - 8 = 7
 Use known facts

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

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

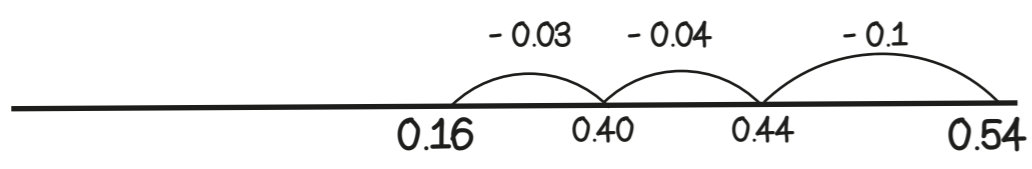
5 less than 12 is 7
 Now it is easy to
 take away 3000

If I know 40 - 3 = 37
 then 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.

0.54 - 0.17
 Bridge through boundaries
 by counting in efficient steps



How shall I subtract?



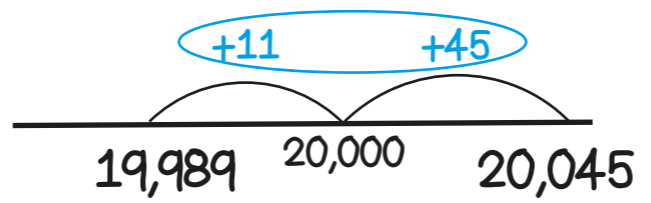
45,748 - 26,374
 Formal written method

Exchange ten of
 these for one of
 those!

$$\begin{array}{r} 3 \quad 1 \quad 6 \quad 1 \\ 45,748 \\ - 26,374 \\ \hline 19,374 \end{array}$$

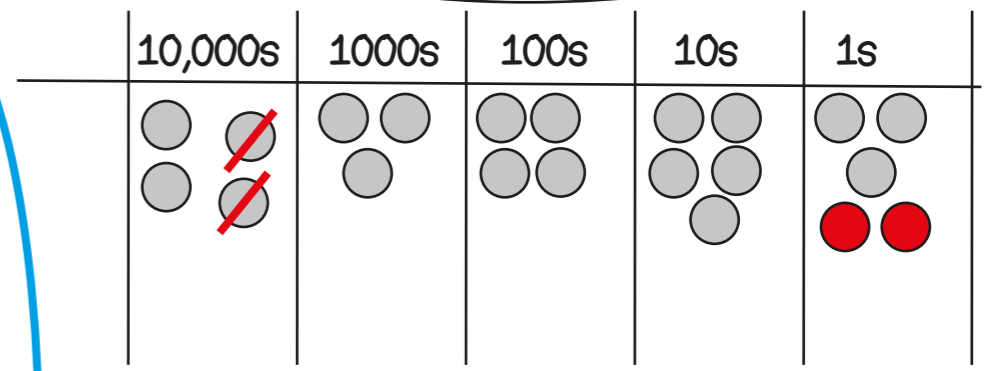
Regroup and rename

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

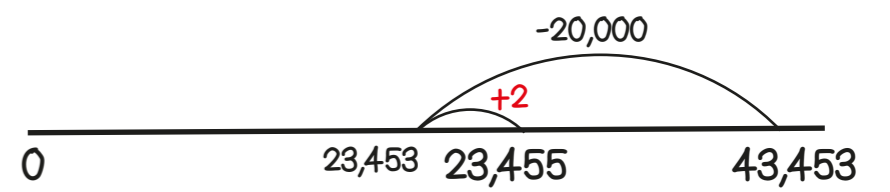


20,045	
19,989	56

43,453 - 19,998
 Round then adjust



Take away 20,000 then add 2



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

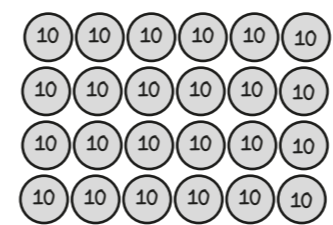
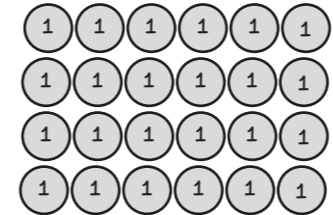


Known facts:
Rapid recall of all multiplication tables up to 12 x 12

6 x 4
Use known facts and place value

40 is ten times greater than 4

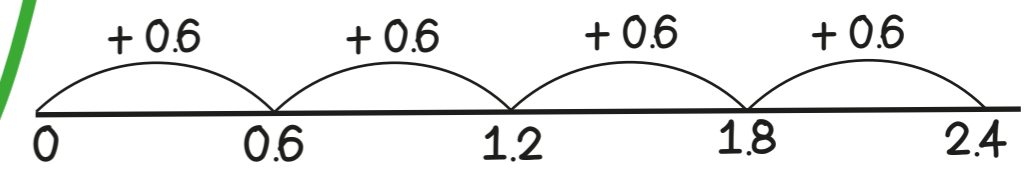
6 x 4 = 24
60 x 4 = 240
60 x 40 = 2400



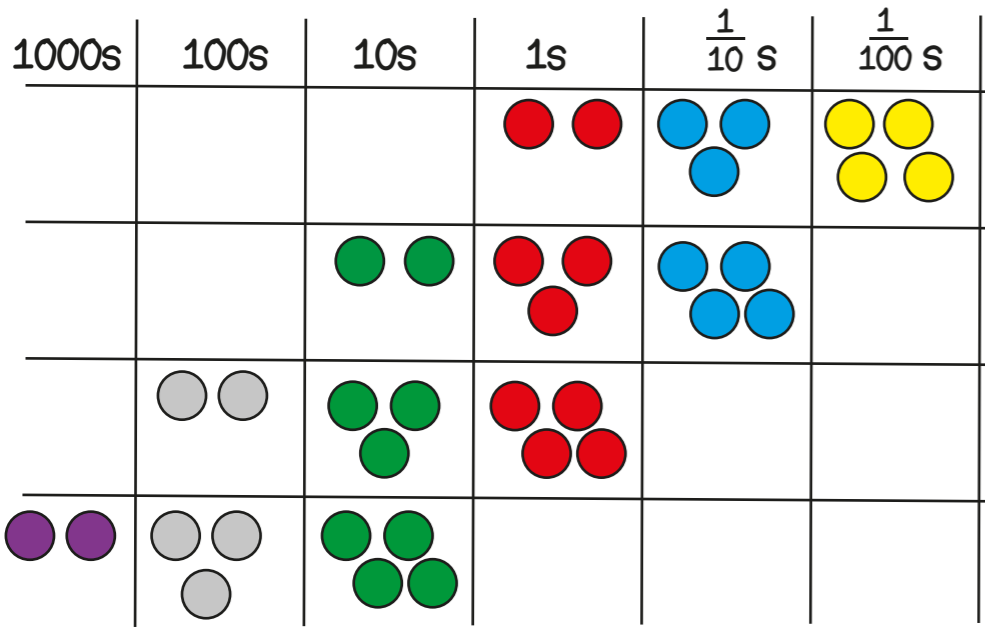
0.6 is ten times smaller than 6

6 x 4
Use known facts and place value

0.6 x 4 = 2.4
4 jumps of 0.6



2.34 x 1000
Multiply by 10, 100, 1000

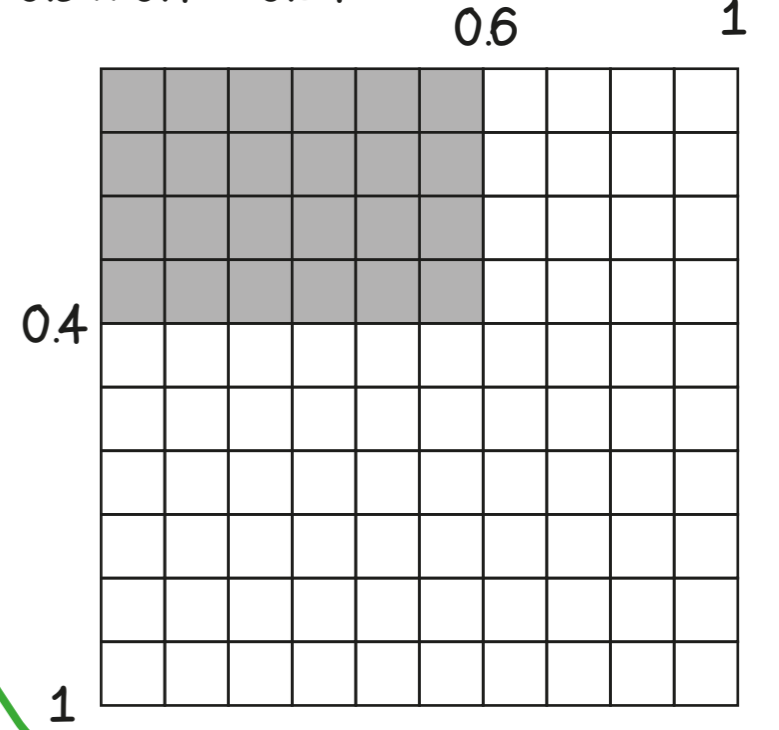


How shall I multiply?

15 x 42
Using factors and distributive law

15 x 48
= 15 x 6 x 8
= 90 x 8
= 720

0.6 x 0.4 = 24 hundredths
0.6 x 0.4 = 0.24

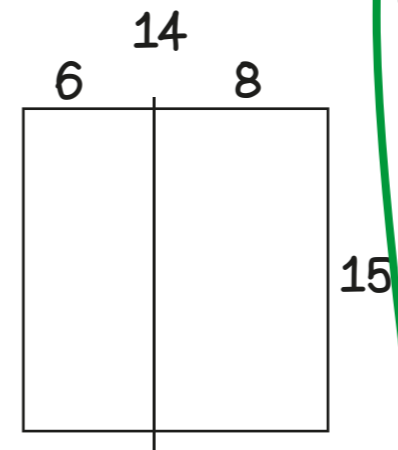


423 x 4
Partition and recombine

423 x 4

400	20	3	
x4	x4	x4	
1600	80	12	= 1692

15 x 14
= 15 x 6 + 15 x 8
= 90 + 120
= 210



427 x 38
Formal written method

	400	20	7	
30	12,000	600	210	
8	3,200	160	56	

427	
x 38	
3416	
12810	
16226	



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

Include calculations 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 ÷ 0.6
Use known facts and place value

$$24 \div 4 = 6$$

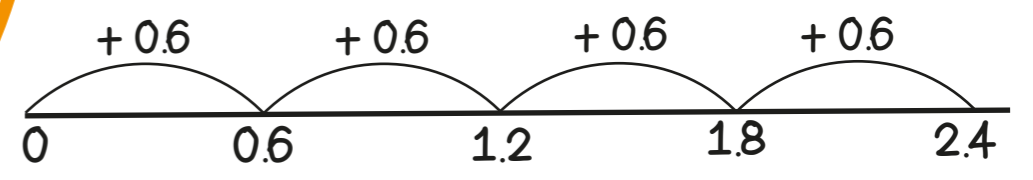
$$240 \div 40 = 6$$

$$2400 \div 400 = 6$$

$$24,000 \div 4000 = 6$$

24 biscuits shared between 4 people means they will get 6 biscuits each.
If there are 1000 times as many people and 1000 times as many biscuits, how many biscuits each now?

$2.4 \div 0.6 = 4$
How many steps of 0.6 make 2.4?



24 ÷ 1000
Divide by 10, 100, 1000

100s	10s	1s	$\frac{1}{10}$ s	$\frac{1}{100}$ s	$\frac{1}{1000}$ s
	● ●	● ● ● ●			
		● ●	● ● ● ●		
			● ●	● ● ● ●	
				● ● ● ●	
				● ●	● ● ● ●

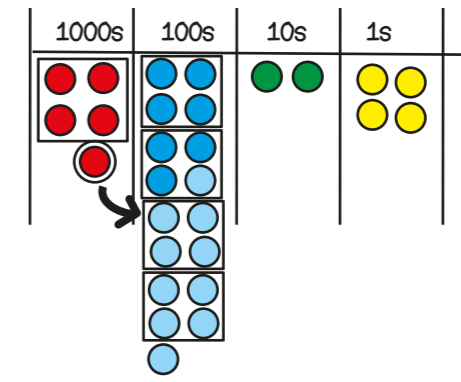
$$24,000 \div 400 = \frac{24 \times 1000}{4 \times 100}$$

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

How shall I divide?

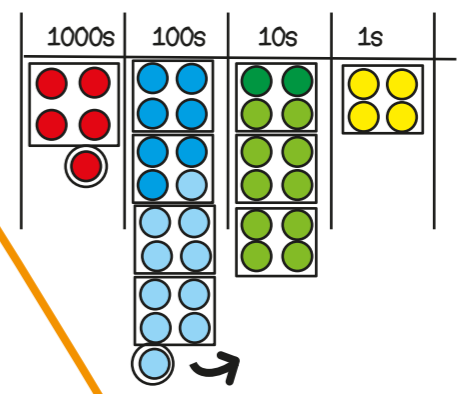


5724 ÷ 4
Formal written method



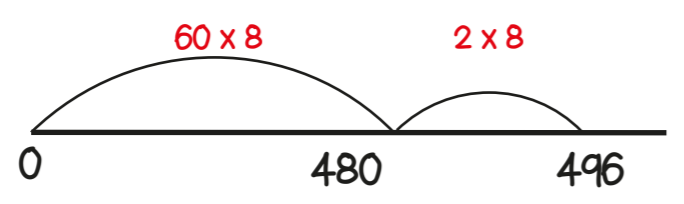
$$\begin{array}{r} 14 \\ 4 \overline{) 5724} \end{array}$$

1512 ÷ 24
Using factors



$$\begin{array}{r} 1431 \\ 4 \overline{) 5724} \end{array}$$

496 ÷ 8
Partition and recombine



$$496 \div 8$$

480	16
÷ 8	÷ 8
60	+ 2 = 62

$1512 \div 6 \div 4$

1512					
252	252	252	252	252	252
63	63	63	63		



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

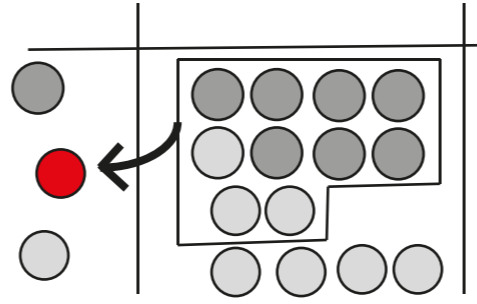
I just knew it!

Rapid fluency of
 2 digit add 2 digit numbers

17 + 17
 Use known facts

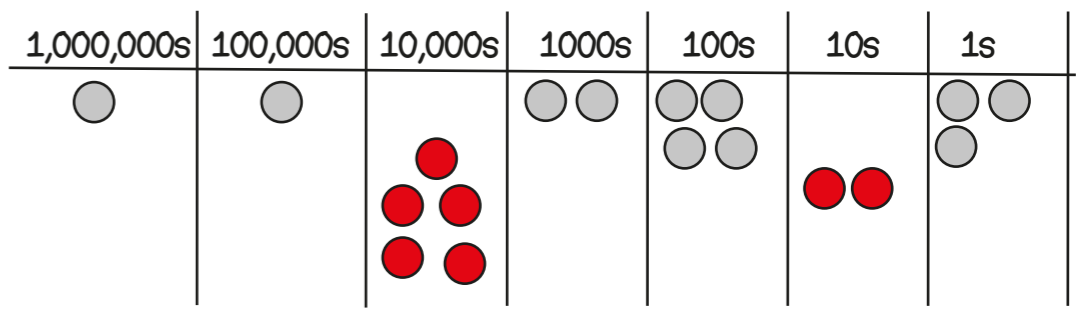
If I know 17 + 17 = 34
 then I know
 1.7 + 1.7 = 3.4

17,000 + 17,000 = 34,000
 170,000 + 170,000 = 340,000
 1,700,000 + 1,700,000 = 3,400,000

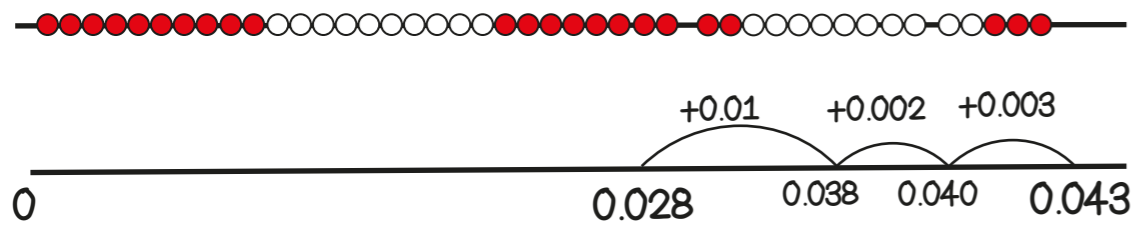


1,102,403 + 50,020
 Use place value to add

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



0.028 + 0.015
 Bridge through boundaries
 by counting in efficient steps



How shall I add?

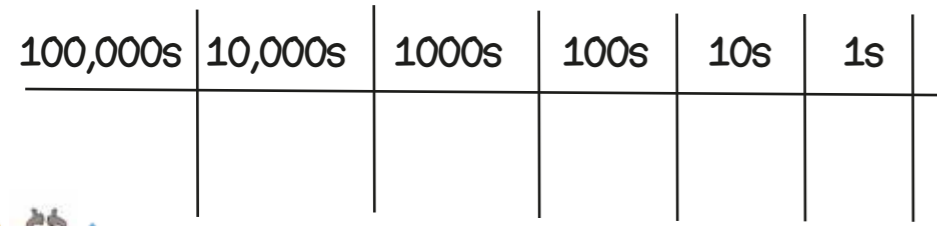


325,748 + 246,374
 Formal written method

$$\begin{array}{r} 325,748 \\ + 246,374 \\ \hline 572,122 \end{array}$$

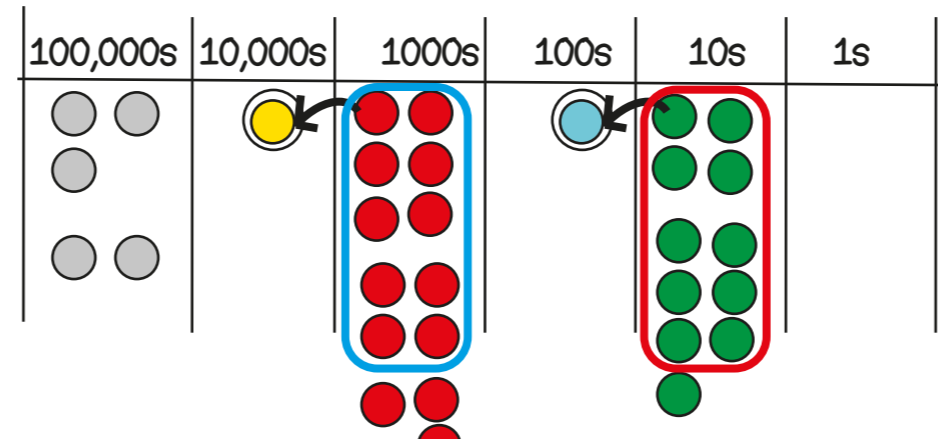
Regroup and rename

Exchange ten of
 these for one of
 those!

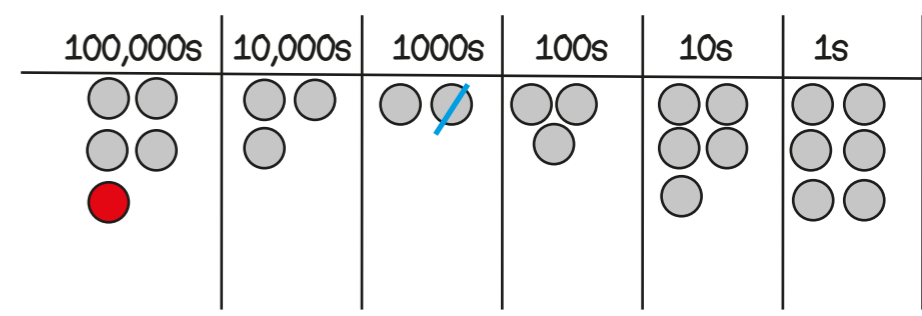


307,040 + 206,070
 Partition and recombine

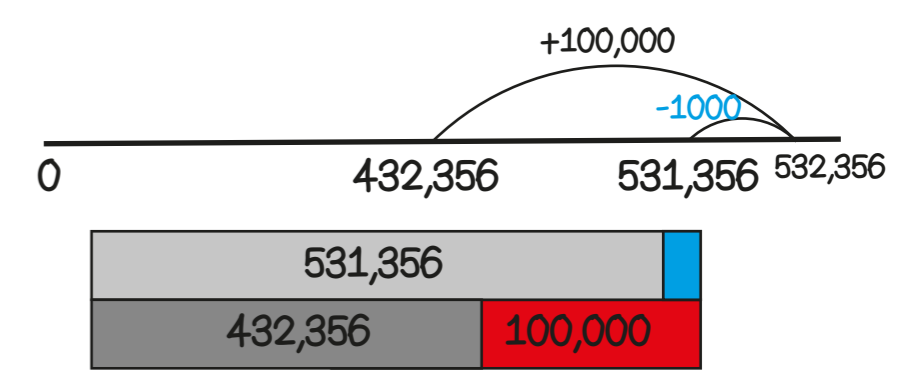
$$300,000 + 7,000 + 40 + 200,000 + 6,000 + 70 = 500,000 + 13,000 + 110 = 513,110$$



432,356 + 99,000
 Round then adjust



Add 100,000 then take away 1,000

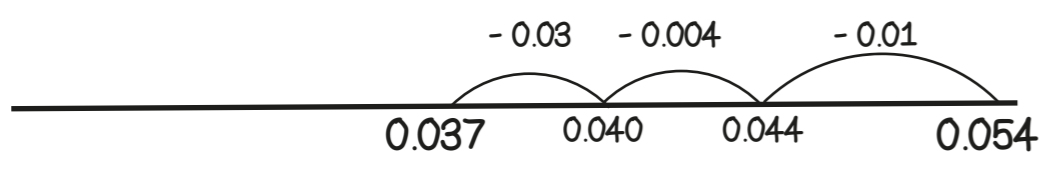


0.9 - 0.4, 100 - 65
Number facts
Single digit decimals
Halves
Bonds of 1 and 100

I just knew it!

Rapid fluency of
2 digit subtract
2 digit numbers

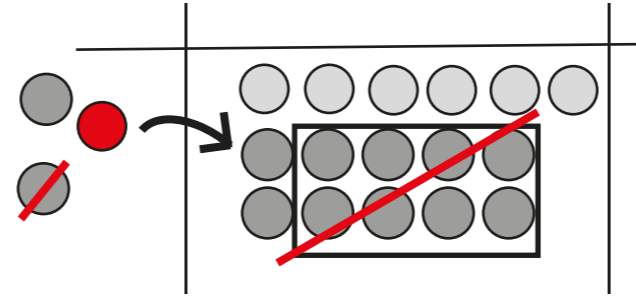
0.054 - 0.017
Bridge through boundaries
by counting in efficient steps



36 - 18 = 18
Use 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



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

How shall I subtract?



445,748 - 126,374
Formal written method

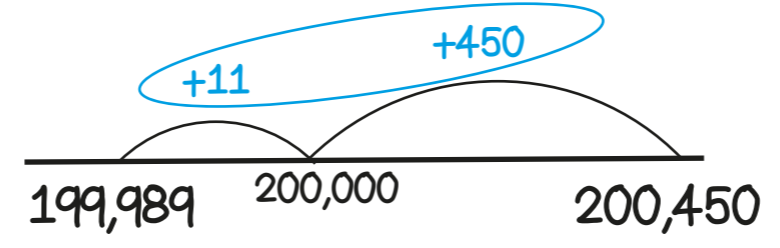
Exchange ten of
these for one of
those!

$$\begin{array}{r} 445,748 \\ + 126,374 \\ \hline 319,374 \end{array}$$

Regroup and rename

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

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

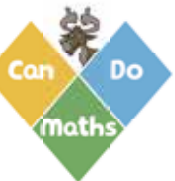
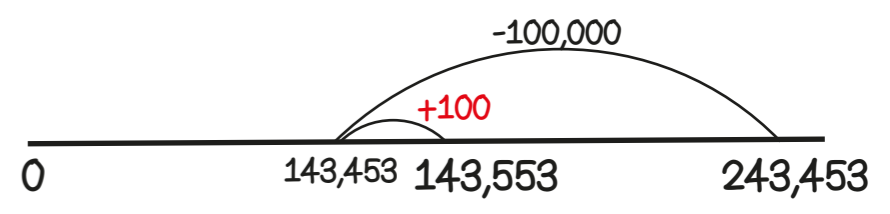


200,450	
199,989	461

243,453 - 99,900
Round then adjust

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

Take away **100,000** then **add 100**



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

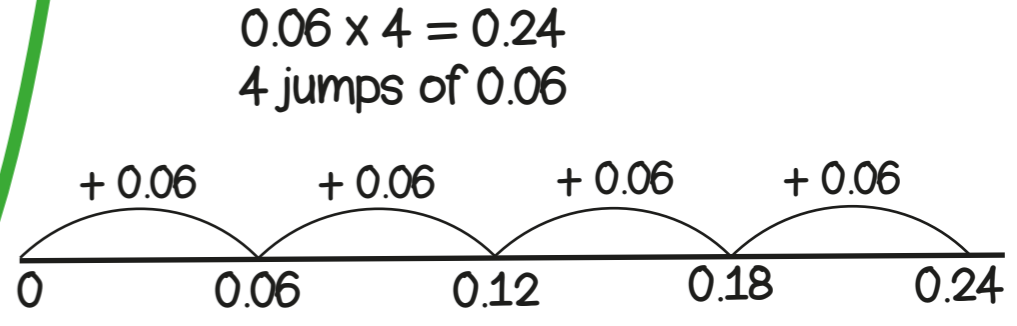
6 x 4
Use known facts and place value

40 is ten times greater than 4

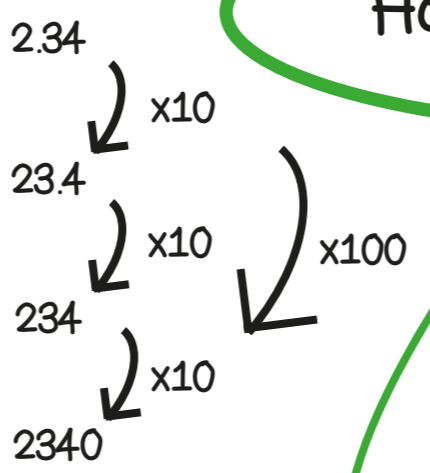
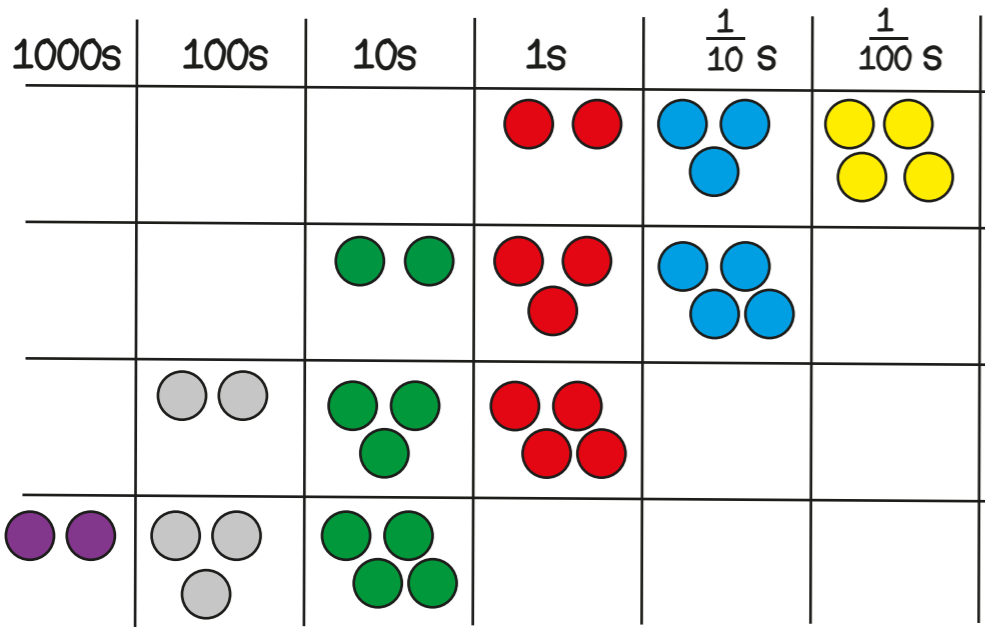
0.6 is ten times smaller than 6

6 x 4
Use known facts and place value

60 x 40 = 2400
600 x 400 = 240,000
6000 x 4000 = 24,000,000

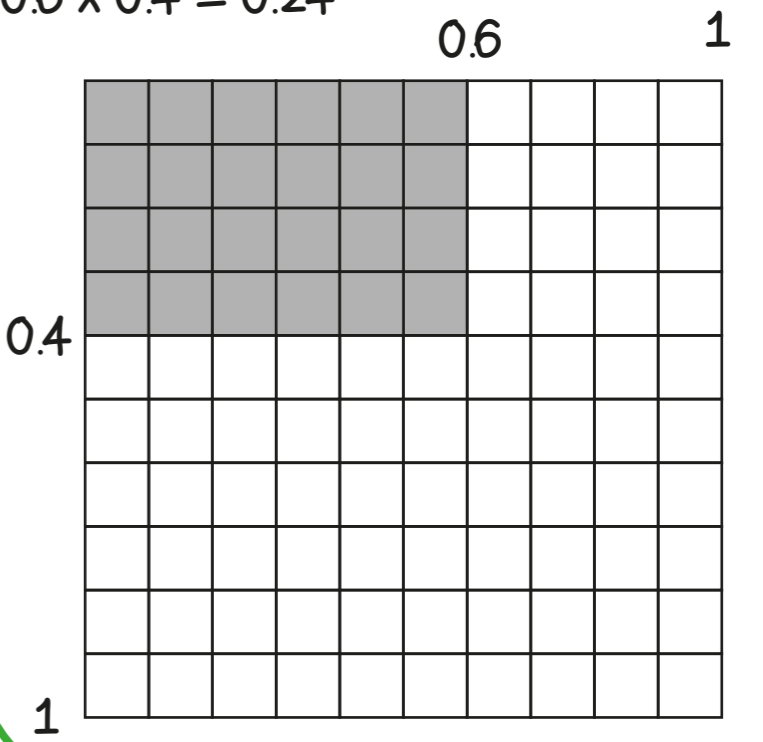


2.34 x 1000
Multiply by 10, 100, 1000



How shall I multiply?

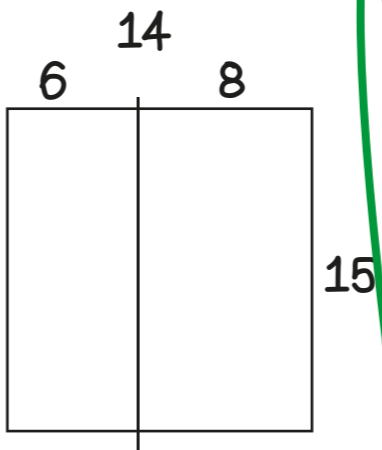
0.6 x 0.4 = 24 hundredths
0.6 x 0.4 = 0.24



15 x 42
Using factors and distributive law

15 x 48
Factor pair
= 15 x 6 x 8
= 90 x 8
= 720

15 x 14
= 15 x 6 + 15 x 8
= 90 + 120
= 210



4203 x 4
Partition and recombine

4203 x 4

4000	200	3	
x4	x4	x4	
16,000	800	12	= 16,812

2427 x 38
Formal written method

2427
x 38

19416
72810

92226



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

Include calculations where remainders occur

24 ÷ 4
Use known facts and place value

240 is ten times greater than 24

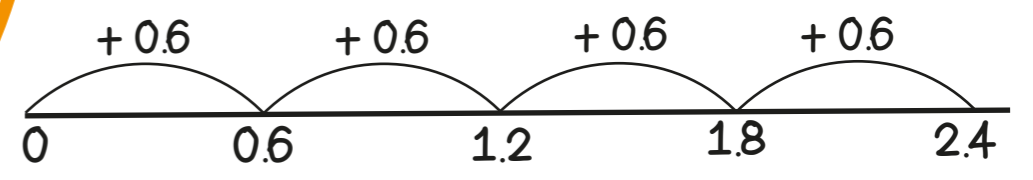
0.6 is ten times smaller than 6

2.4 ÷ 0.6
Use known facts and place value

$240 \div 40 = 6$
 $2400 \div 400 = 6$
 $24,000 \div 4000 = 6$
 $240,000 \div 40,000 = 6$
 $2,400,000 \div 400,000 = 6$

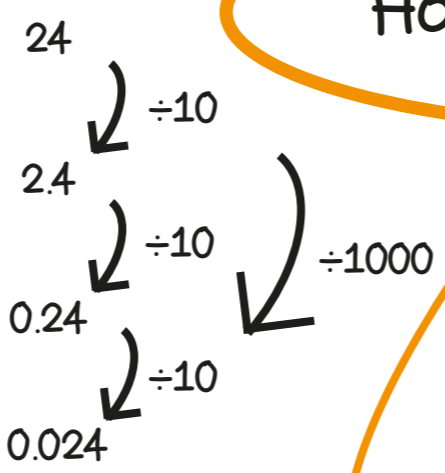
24 biscuits shared between 4 people means they will get 6 biscuits each.
If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

$2.4 \div 0.6 = 4$
 How many steps of 0.6 make 2.4?



24 ÷ 1000
Divide by 10, 100, 1000

100s	10s	1s	1/10 s	1/100 s	1/1000 s
	● ●	● ● ● ●			
		● ●	● ● ● ●		
			● ●	● ● ● ●	
				● ●	● ● ● ●



How shall I divide?



7182 ÷ 21
Formal written method

1000s	100s	10s	1s
● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●

$$4 \overline{) 143124}$$

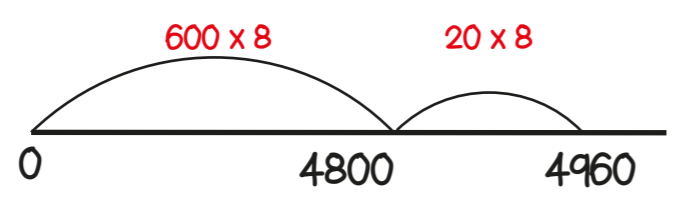
$$\underline{5724}$$

1512 ÷ 24
Using factors

1512					
252	252	252	252	252	252
63	63	63	63		

4960 ÷ 8
Partition and recombine

$4960 \div 8$
 $4800 \div 8 = 600$
 $160 \div 8 = 20$
 $600 + 20 = 620$



$1512 \div 6 \div 4$

$$\begin{array}{r} 342 \\ 21 \overline{) 7182} \\ \underline{63} \\ 88 \\ \underline{84} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

