1

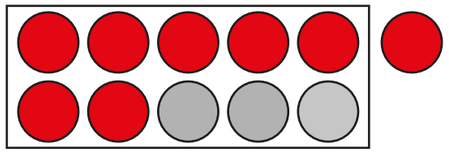
How shall I add?

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

I just knew it!

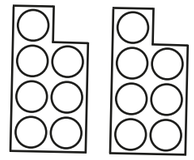
3 + 7
Use known addition facts

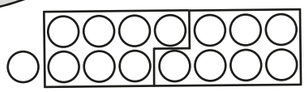
If I know 3 + 7 = 10
then I know
3 + 8 = 11
because it is 1 more



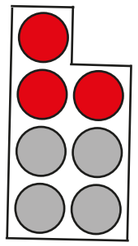
7 + 8
Use near doubles

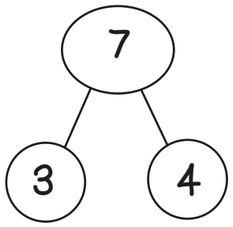
If I know 7 + 7 = 14
then I know
7 + 8 = 15
because it is 1 more

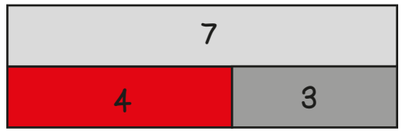




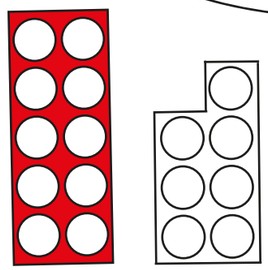
7 = 3 + 4
Secure addition bonds of
single digits and ten

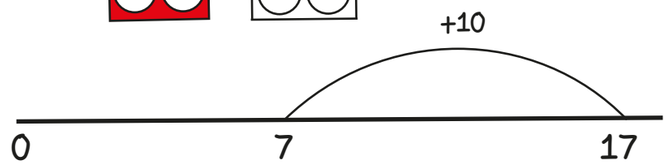




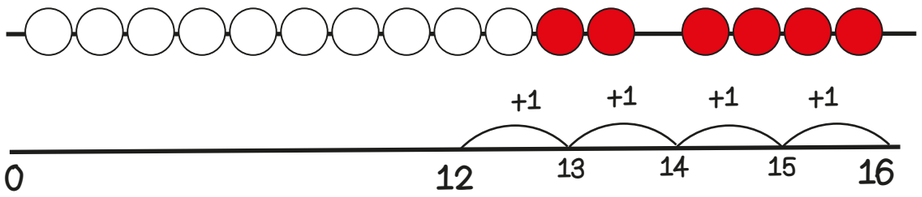


7 + 10
Add ten





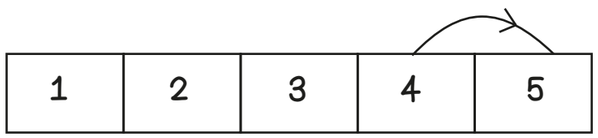
12 + 4
Counting on in 1s

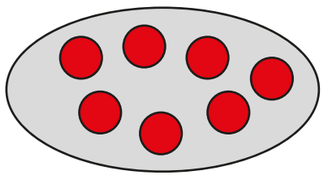


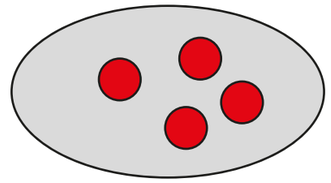
Notice the relationships

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

1

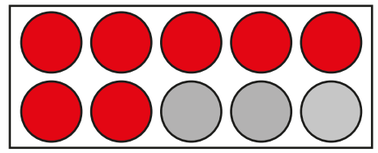
How shall I subtract?

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

I just knew it!

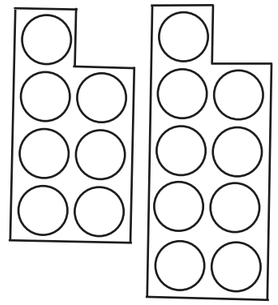
3 + 7
Use known addition facts to derive subtraction facts

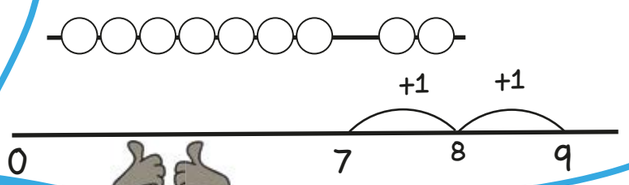
If I know 3 + 7 = 10
then I know
10 - 3 = 7



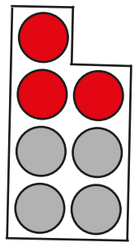
9 - 7
Find the difference between two numbers

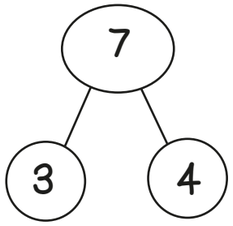
9 is 2 more than 7
7 is 2 less than 9 so
the difference
between 7 and 9 is 2



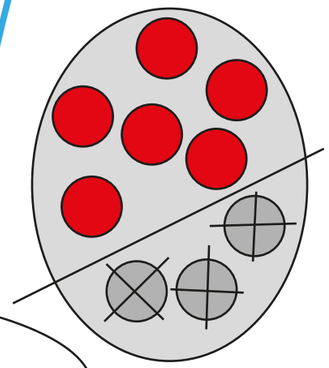


7 - 3 = 4
Secure subtraction facts of single digits and ten



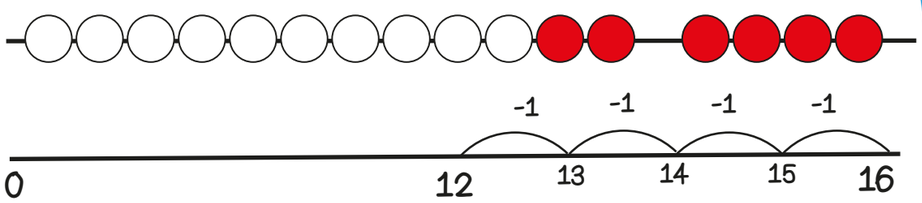


7	
4	3



9 - 3
Take away

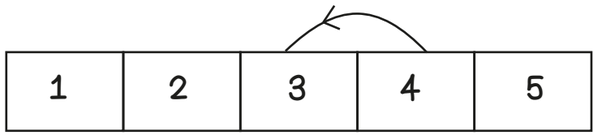
16 - 4
Counting back in 1s



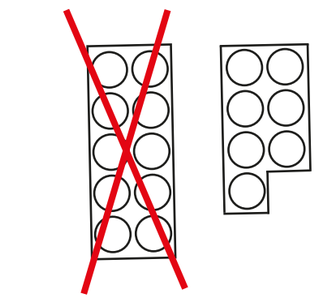
Notice the relationships

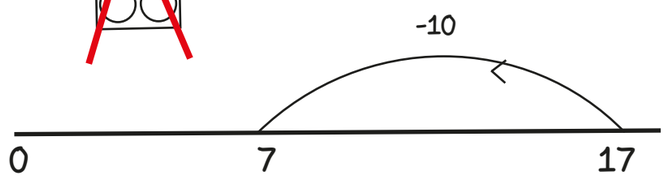
23 - 1
Find one less

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



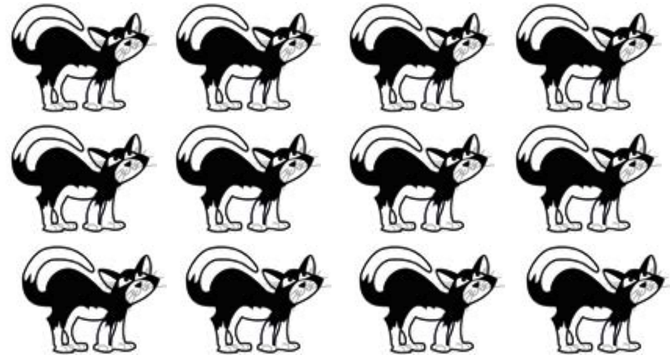
17 - 10
Take away ten





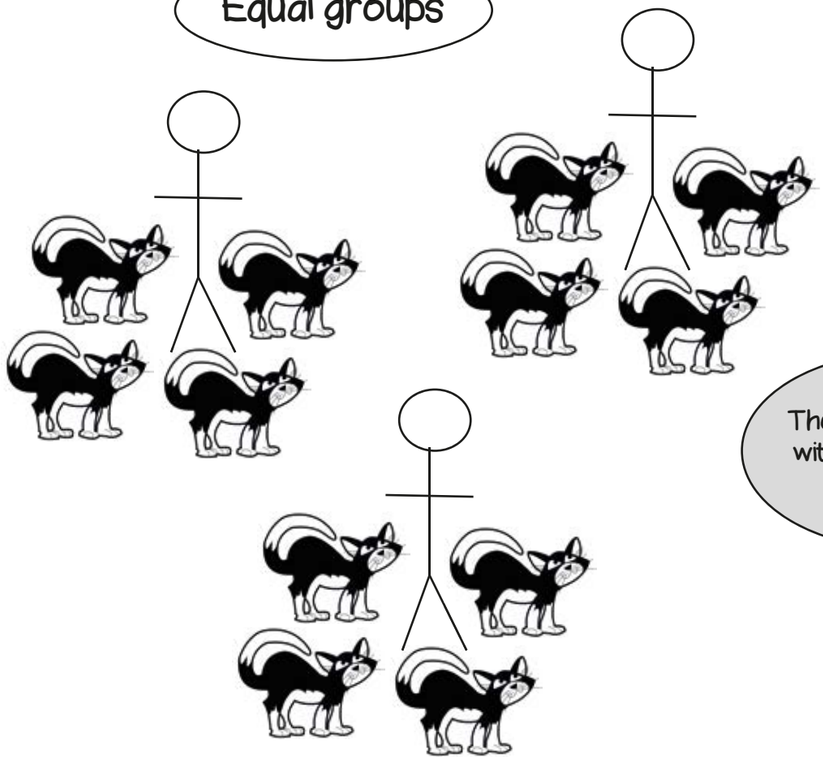
1

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



How shall I multiply?

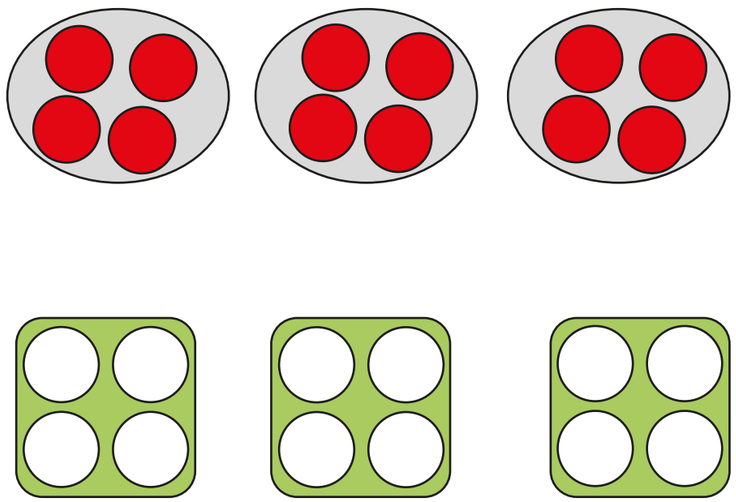
Equal groups



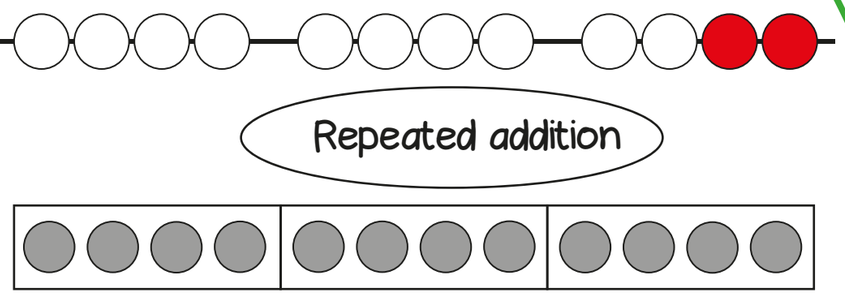
There are 3 groups with 4 cats in each group

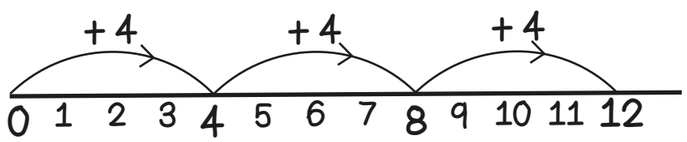
Count in ones

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



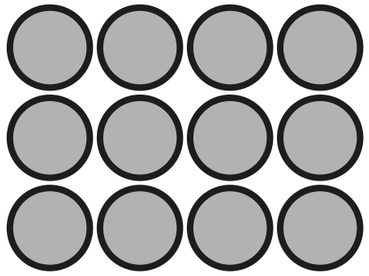
Repeated addition

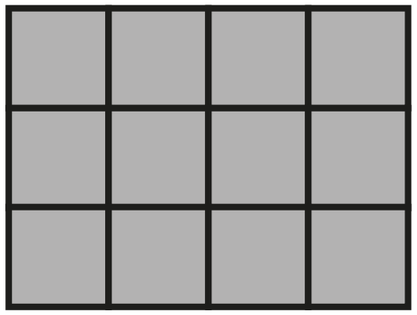




4 + 4 + 4 = 12

Arrays





1

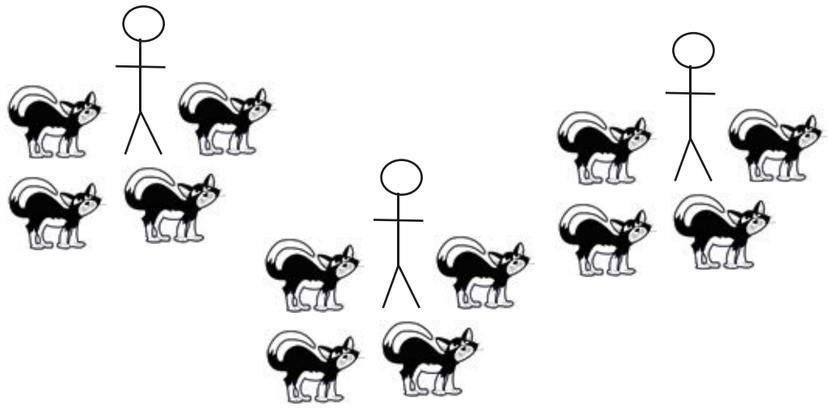
How shall I divide?

$12 \div 3 = 4$

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?

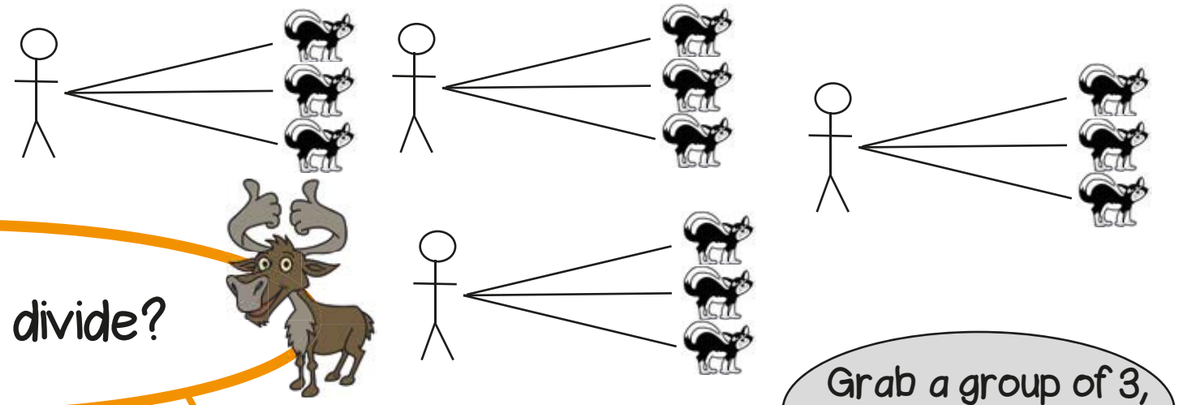


1 for you, 1 for you, 1 for you...

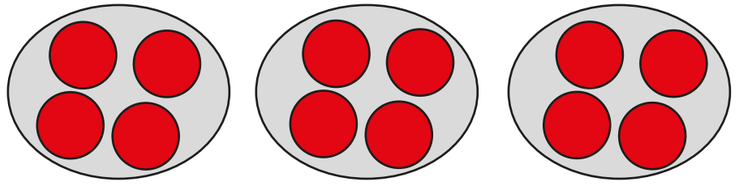
Grouping

How many groups of 3 are there in 12?

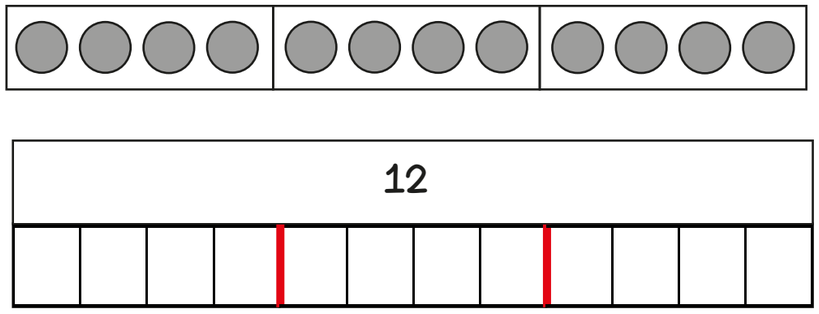
There are 12 cats.
Each person owns 3 cats.
How many people are there?



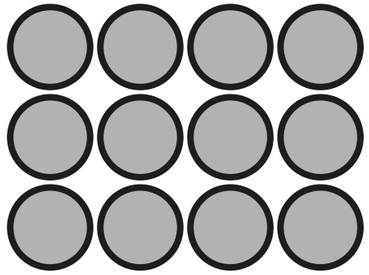
Grab a group of 3, grab a group of 3...

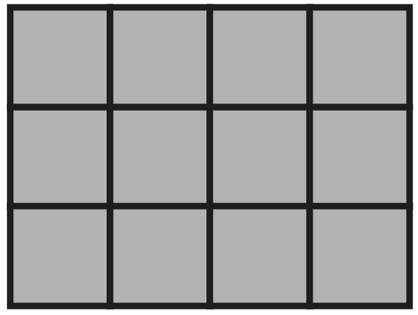


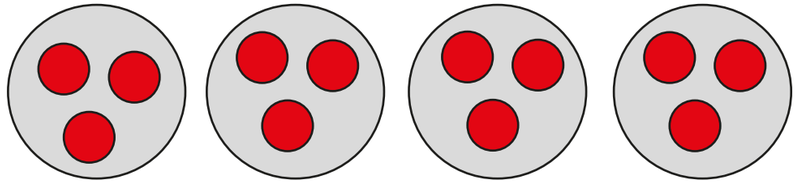
Bar model

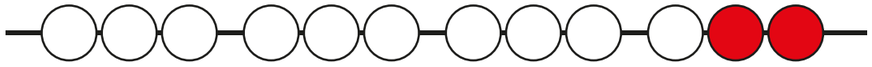


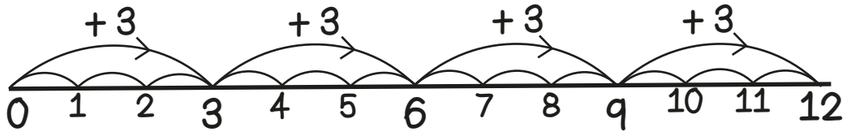
12 can be described as
3 columns of 4
or 4 rows of three











How shall I add?

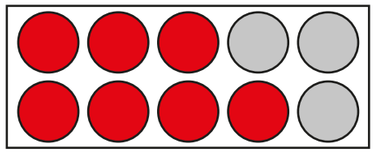
8 + 7, 9 + 9, 14 + 3
Number facts
Single digit numbers
Doubles
Teens and single digits

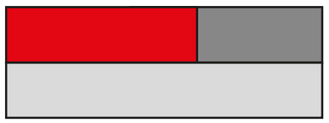
I just knew it!

13 + 17
Use known facts
30 + 70

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

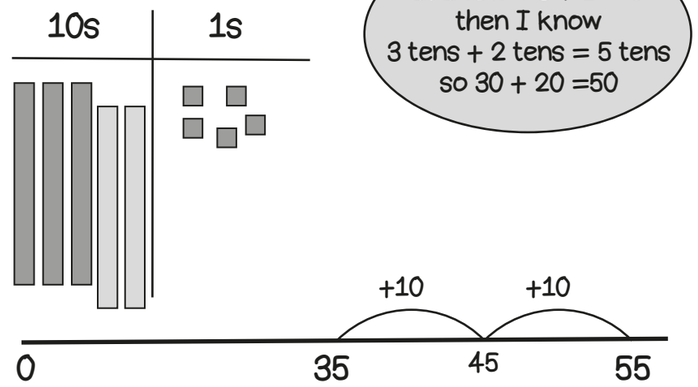
If I know 3 + 7 = 10
then I know
13 + 17 is 2 tens more



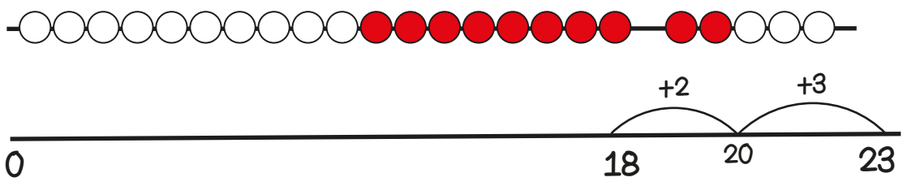


35 + 20
Add multiples of ten

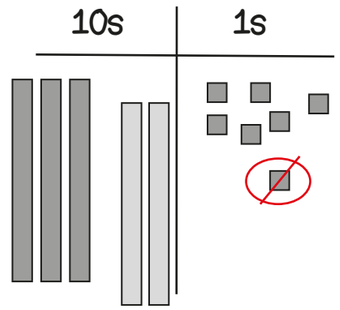
If I know 3 + 2 = 5
then I know
3 tens + 2 tens = 5 tens
so 30 + 20 =50



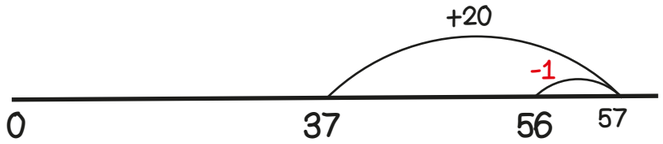
5 + 18
Greatest number first
then bridge



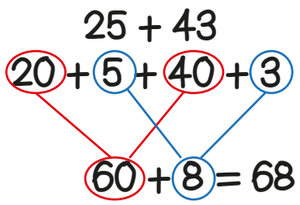
37 + 19
Round then adjust

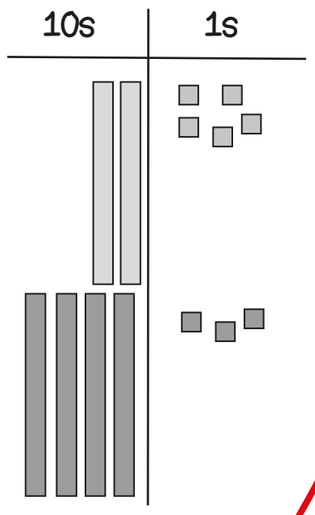


Add 20 then subtract 1

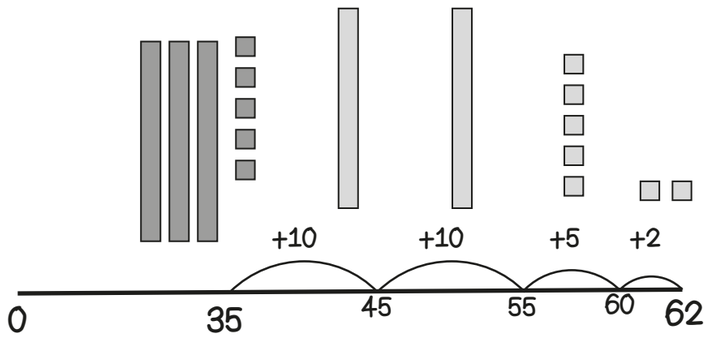


25 + 43
Partition and recombine





35 + 27
Count on in tens then ones



2

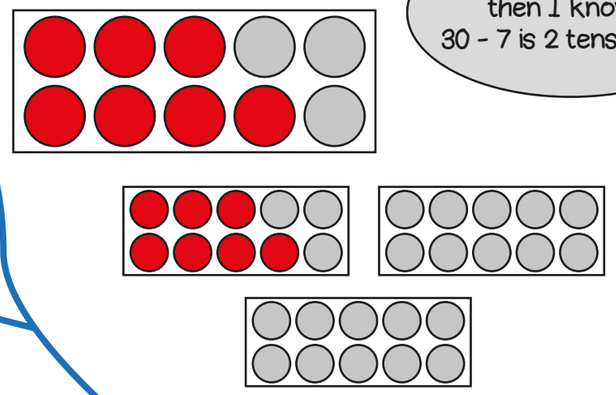
How shall I subtract?

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

I just knew it!

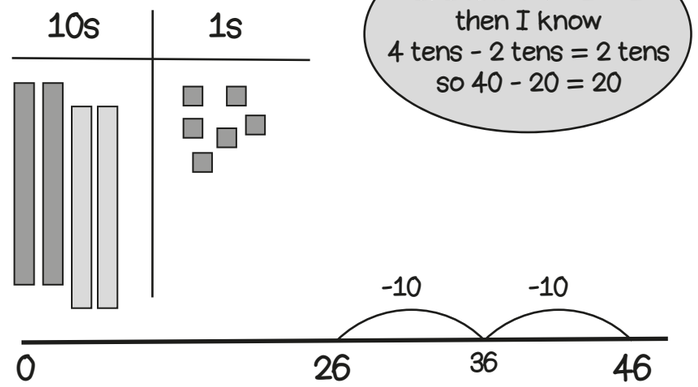
30 - 7
Use known facts
100 - 70

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

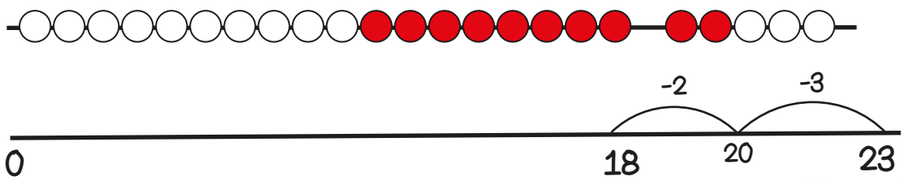


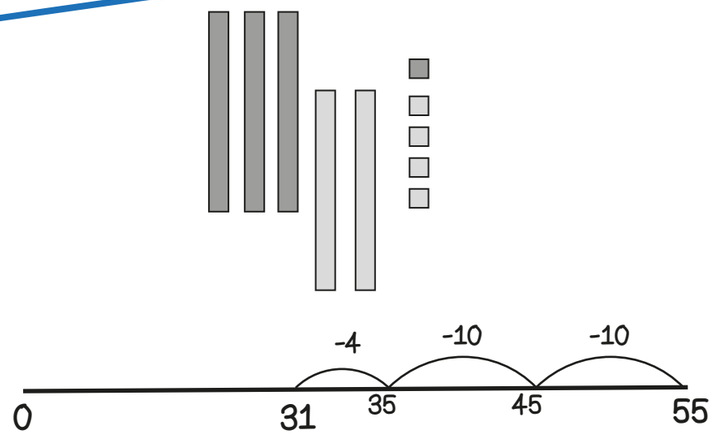
46 - 20
Count back: multiples of ten

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

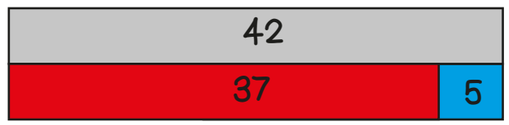


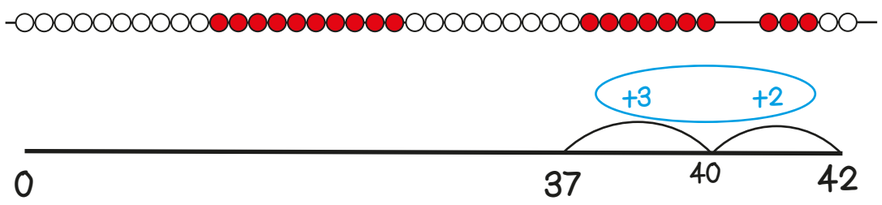


55 - 24
Count back in tens then ones

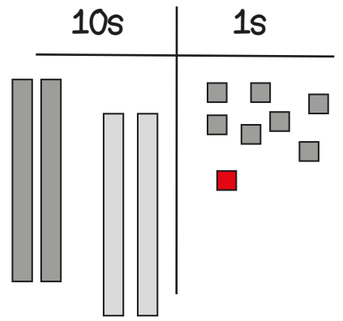
42 is 5 more than 37,
37 is 5 less than 42 so
the difference between
37 and 42 is 5

42 - 37
Find the difference between
two numbers

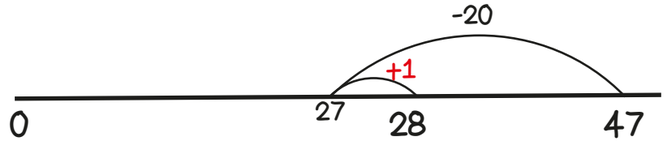




47 - 19
Round then adjust



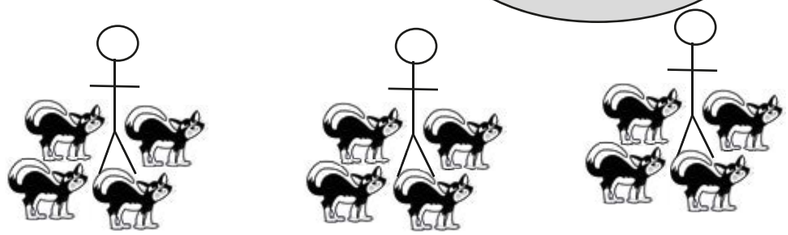
Take away 20 then add 1



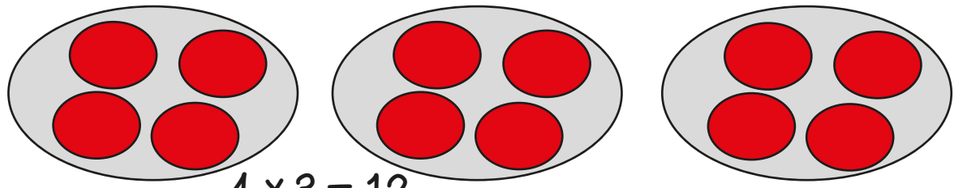
3 people each have 4 cats. How many cats are there in total?

Equal groups

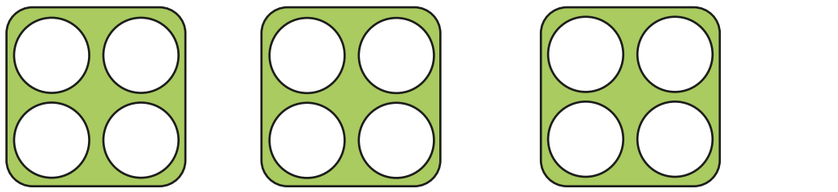
There are 3 groups with 4 cats in each group

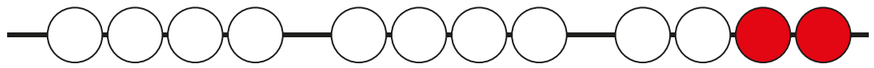


Four cats, multiplied by 3

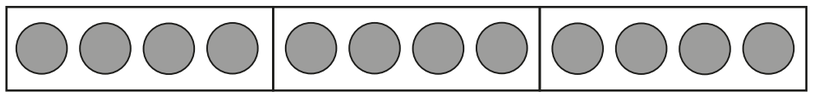


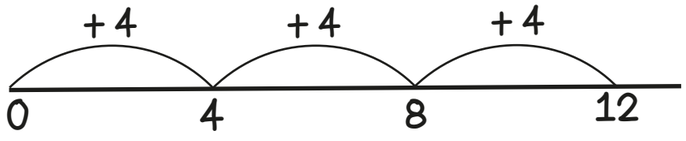
4 x 3 = 12





Repeated addition





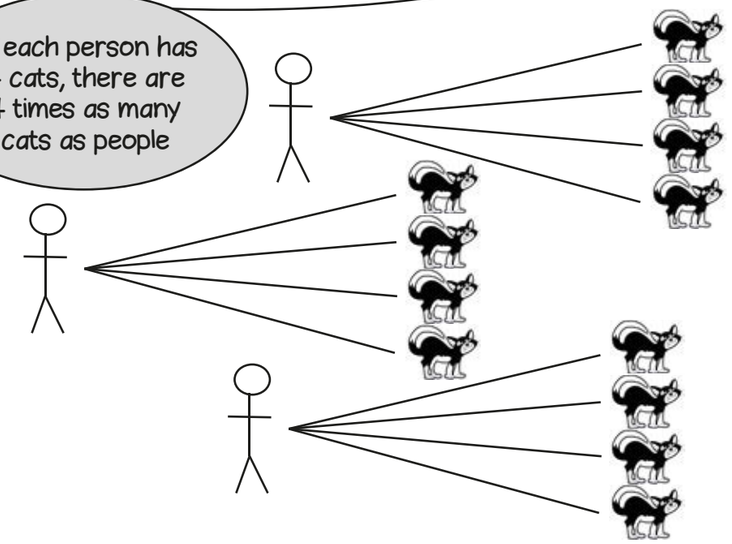
4 + 4 + 4 = 12

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

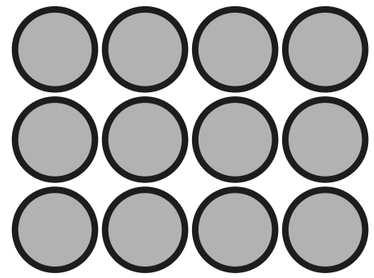
Count in twos

2, 4, 6, 8, 10,12

Use a known fact

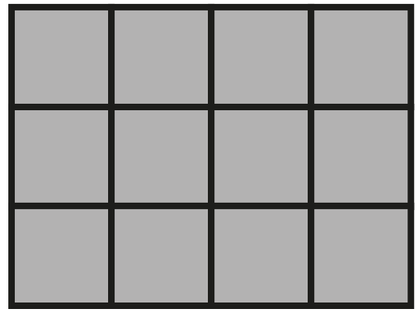
If 2 x 3 is 6, then
4 x 3 is double 6.

Arrays



4 x 3 = 12

3 x 4 = 4 x 3



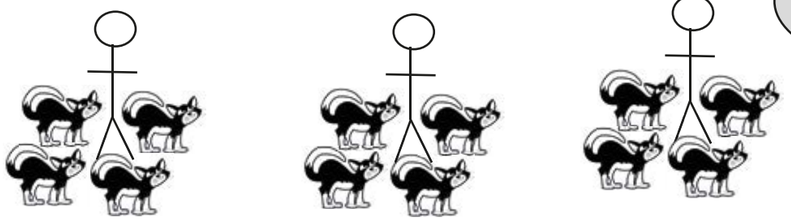
12 ÷ 3 = 4

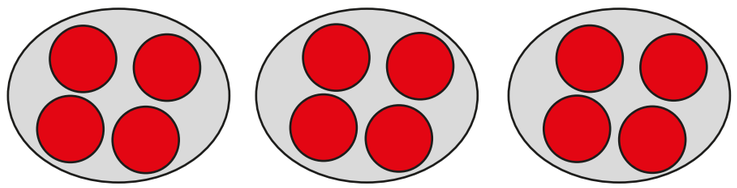
Recall and use 2x, 5x and 10x tables

Sharing

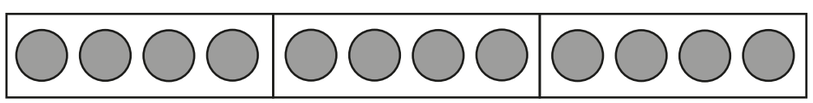
12 shared into 3 equal groups

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





Bar model



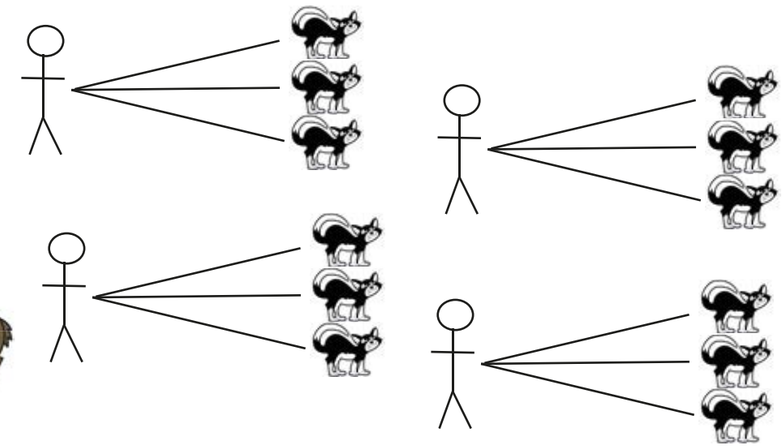
12		
4	4	4

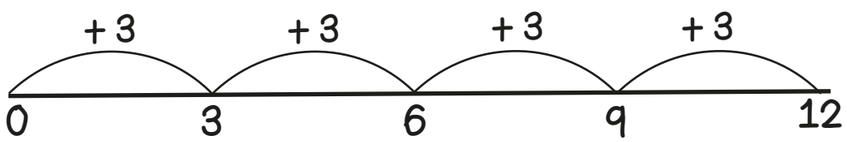
Link to fractions.
One third of 12 is 4

Grouping

How many groups of 3 are there in 12?

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





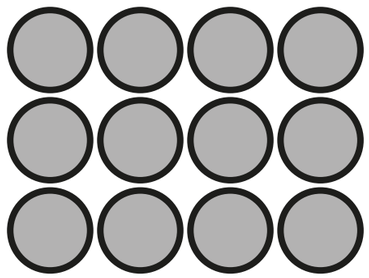
If I know 3 x 4 = 12
then I know 12 ÷ 3 = 4

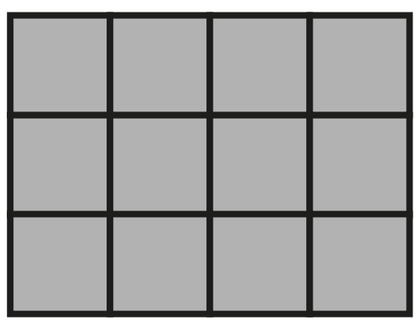
1 for you, 1 for you, 1 for you...

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





3

How shall I add?

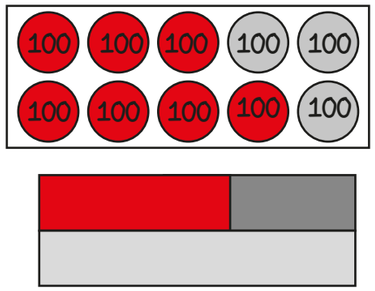
8 + 7, 9 + 9, 14 + 3
Number facts
Single digit numbers
Doubles
Tens to make 100

I just knew it!

243 + 7
Use known facts
300 + 700

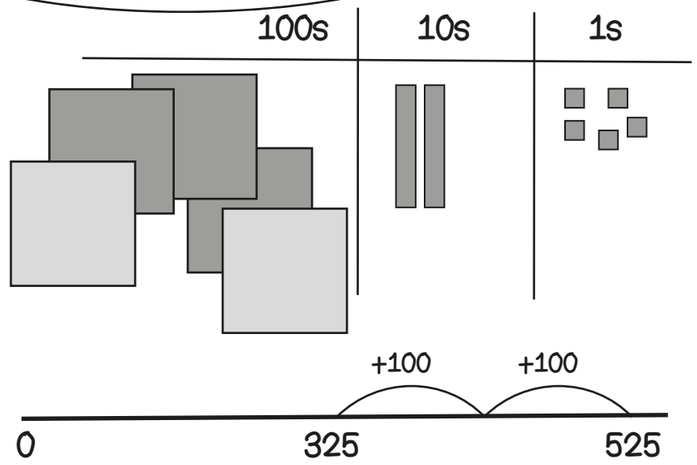
If I know 3 + 7 = 10
then I know
3 hundreds + 7 hundreds
= 10 hundreds

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

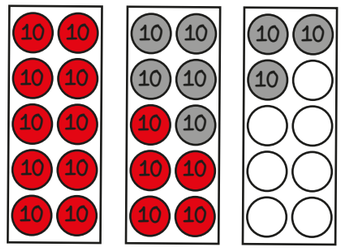


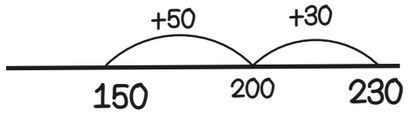
325 + 200
Add multiples of ten and hundred

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

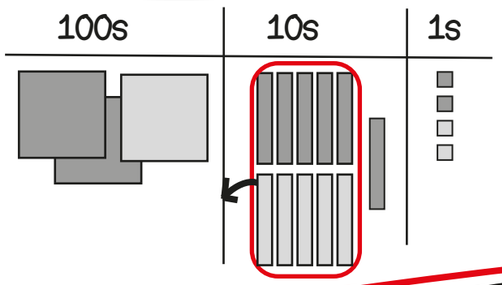


150 + 80
Bridging boundaries





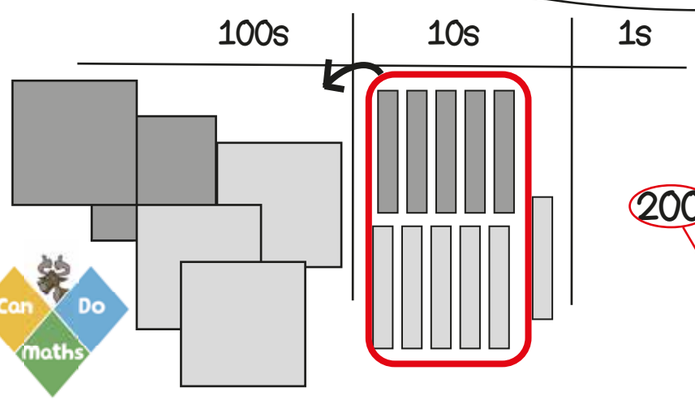
262 + 152
Formal written method



6 tens add 5 tens
= 11 tens or 110

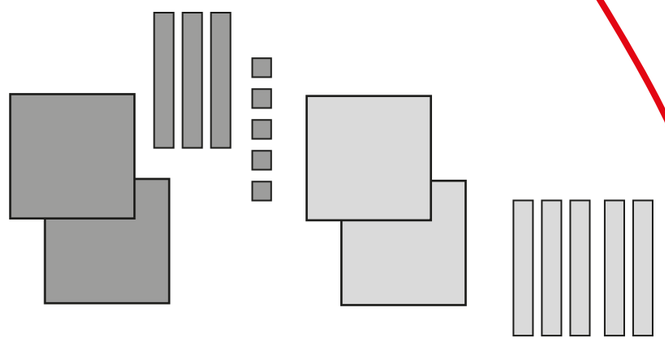
$$\begin{array}{r} 262 \\ +\,152 \\ \hline 414 \\ \hline 1 \end{array}$$

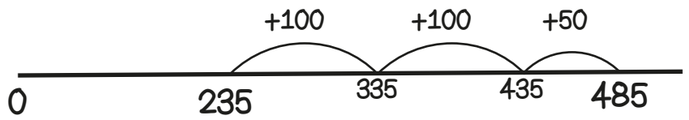
250 + 360
Partition and recombine



200 + 50 + 300 + 60

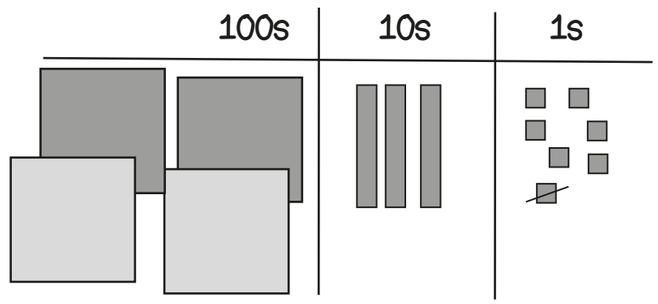
500 + 110 = 610





235 + 250
Count on in hundreds then tens

237 + 199
Round then adjust



Add 200 then subtract 1

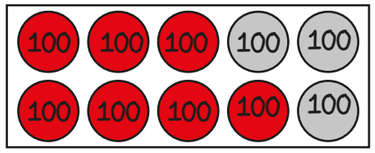
How shall I subtract?

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

I just knew it!

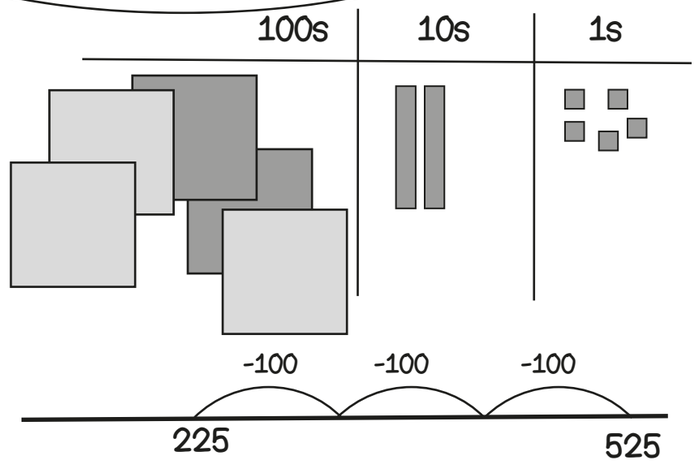
240 - 7
Use known facts
1000 - 700

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

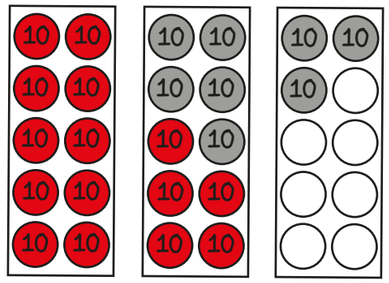


525 - 300
Take away multiples of ten and a hundred

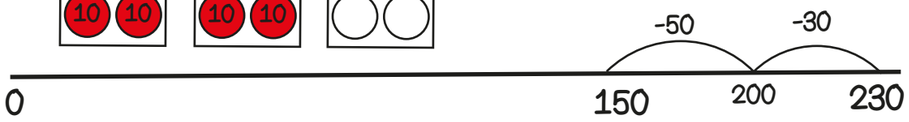
If I know 5 - 3 = 2
then I know
5 hundreds - 3 hundreds
= 2 hundreds



230 - 80
Bridging boundaries
by counting back in efficient steps



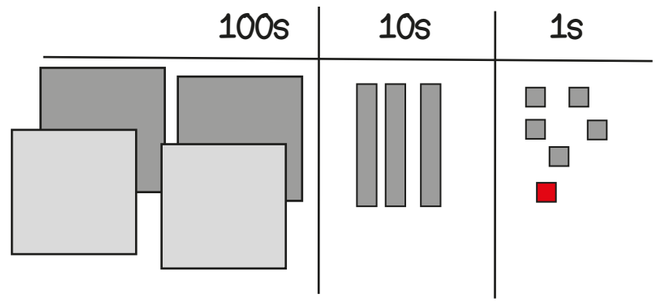
230 - 30 - 50 = 150



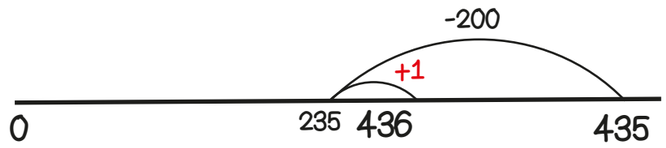
0 - 7 = 3

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

435 - 199
Round then adjust



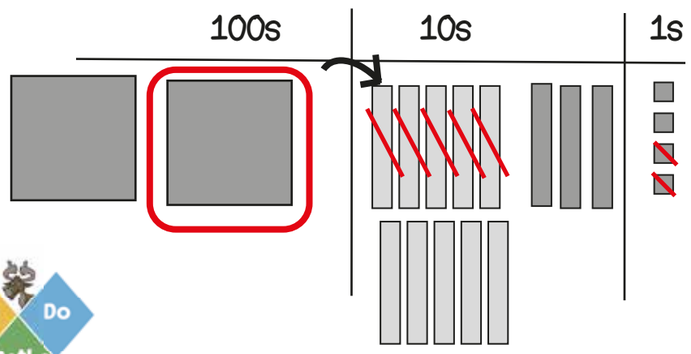
Take away 200 then add 1

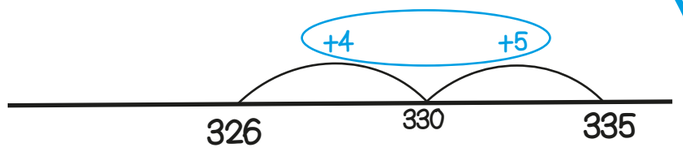


234 - 152
Formal written method

$$\begin{array}{r} {}^{1}\cancel{2}{}^{1}34 \\ -\,152 \\ \hline 182 \end{array}$$

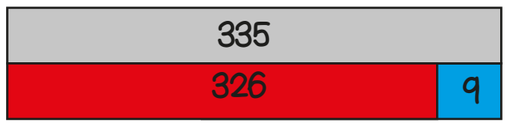
234 = 100 + 130 + 4





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



How shall I multiply?

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

Multiply by 10

100s	10s	1s	
		▪ ▪	2
	▮ ▮		20
■			200

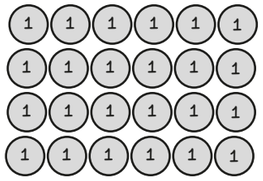
x10 x10

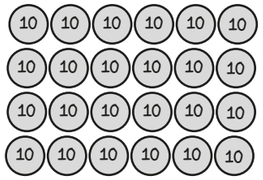
6 x 4 Use known facts and place value

40 is ten times greater than 4

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

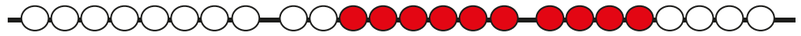
6 x 10 x 4
= 24 x 10

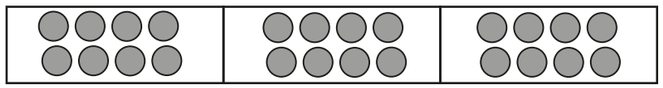




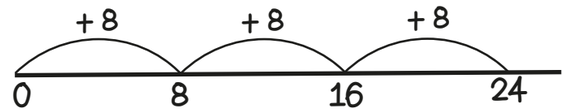
8 x 3 Repeated addition

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



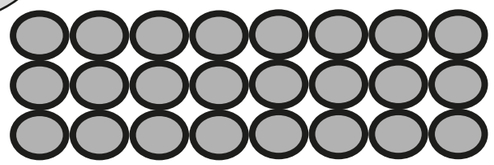


8	8	8



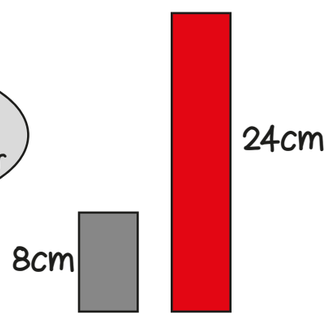
Arrays

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



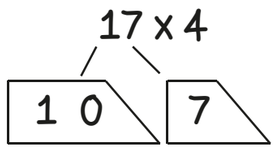
Scaling

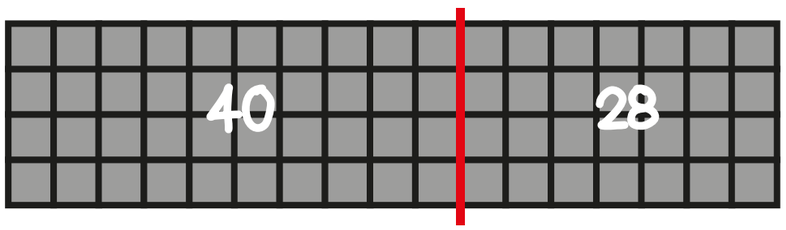
The red tower is 3 times taller than the grey tower



17 x 4 Partition and recombine

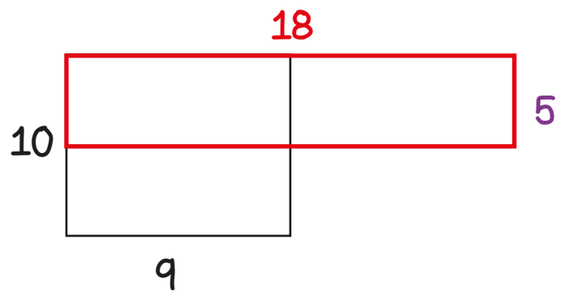
10 x 4 + 7 x 4
40 + 28 = 68





5 x 18 Double and halve

5 x 18
= 5 x 2 x 18 ÷ 2
= 10 x 9
= 90



17 x 4 Formal written method

	10	7
4	40	28

17
x 4
68
2

How shall I divide?

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

24 ÷ 4
Use known facts and place value

240 is ten times greater than 24

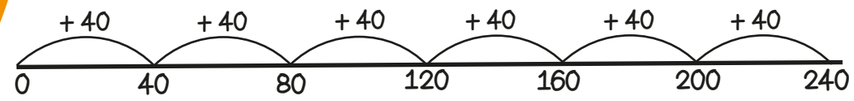
24 ÷ 4 = 6
240 ÷ 40 = 6
240 ÷ 4 = 60

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 ÷ 40
Repeated addition

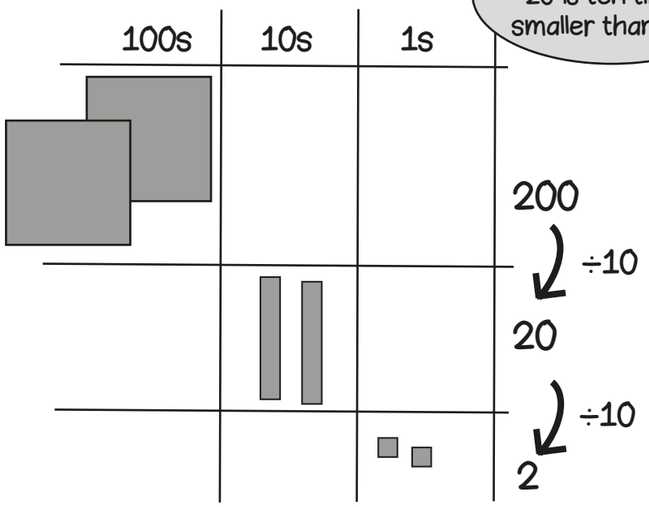
How many 40s are there in 240?

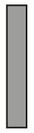
240 ÷ 40 = 6
How many steps of 40 make 240?



200 ÷ 10
Divide by 10

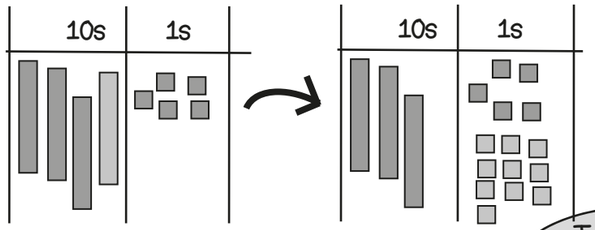
200 ÷ 10 = 20 so 20 is ten times smaller than 200



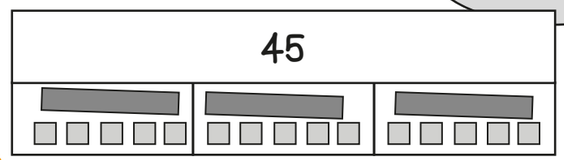
A tenth of  is 

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

45 ÷ 3
Sharing equally



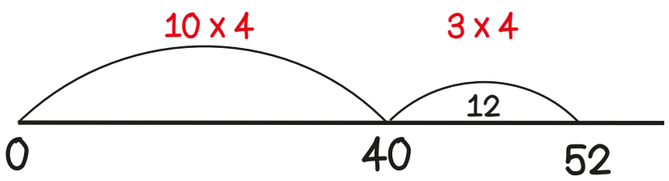
Ten for you,
ten for you,
ten for you...



52 ÷ 4
Partition and recombine

ten lots and the rest

52 ÷ 4
40 12
÷4 ÷4
10 + 3 = 13



42 ÷ 6
Double and halve

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

42 ÷ 6 = 21 ÷ 3

42					
7	7	7	7	7	7
21					
7	7	7			

Link to fractions

4

How shall I add?

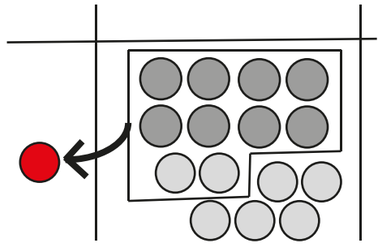
0.9 + 0.9, 74 + 26
Number facts
Single digit decimals
Doubles
Bonds of 100

I just knew it!

7 + 8
Use known facts

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

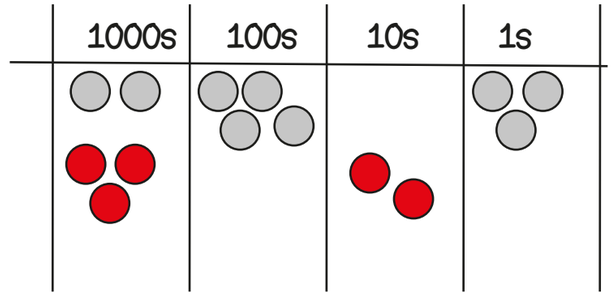
70 + 80 = 150
700 + 800 = 1,500



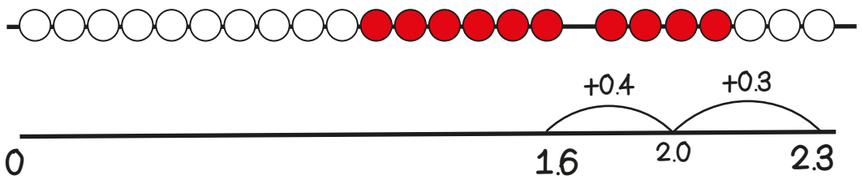
2,403 + 3,020
Use place value to add

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

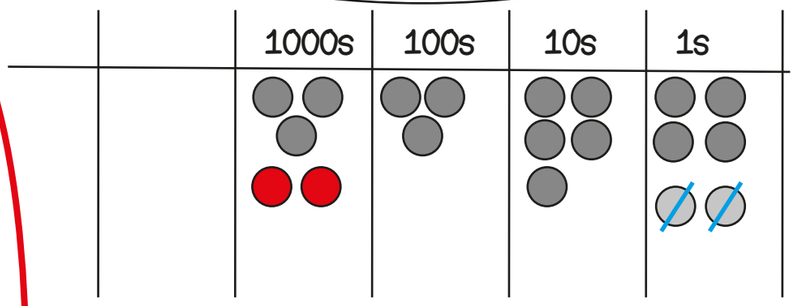
I have noticed, one number has no hundreds or ones, the other has no tens.



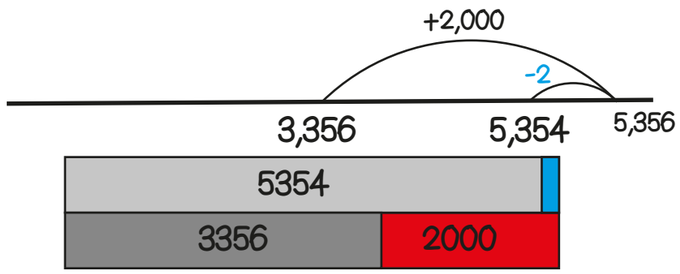
1.6 + 0.7
Bridge through boundaries
by counting in efficient steps



3,356 + 1,998
Round then adjust



Add 2,000 then take away 2



5,748 + 3,374
Formal written method

Exchange ten of these for one of those!

Regroup and rename

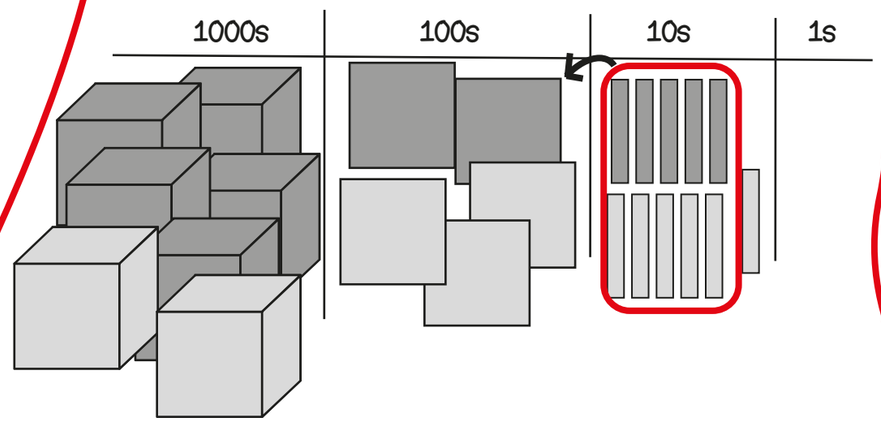
```
  5,748
+ 3,374
  9,122
  1 1 1
```

1000s	100s	10s	1s

5,250 + 2,360
Partition and recombine

5000 + 200 + 50 + 2000 + 300 + 60

7000 + 500 + 110 = 7610



4

How shall I subtract?

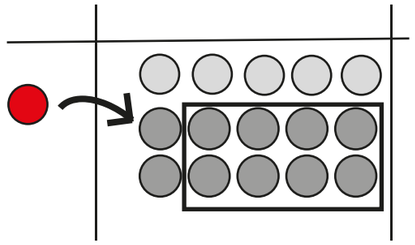
13 - 5, 1.8 - 0.8
Number facts
Single digit numbers
Halves
Wholes and tenths

I just knew it!

15 - 8 = 7
Use known facts

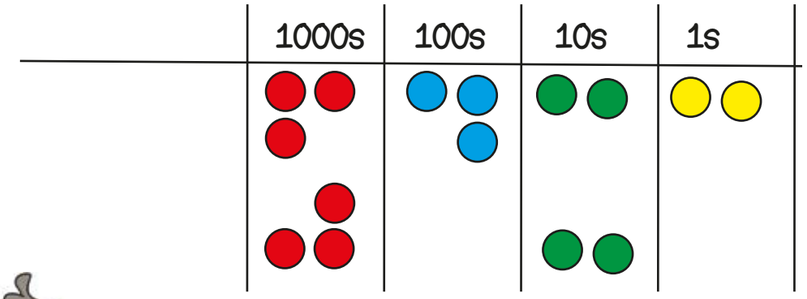
If I know 15 - 8 = 7
then I know
1.5 - 0.8 = 0.7

150 - 80 = 70
1500 - 800 = 700

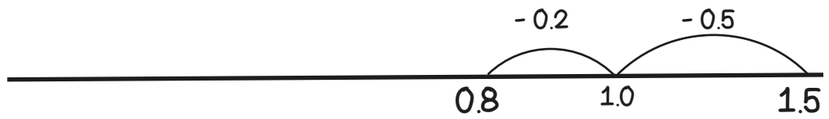


6,342 - 3,020
Use place value to subtract

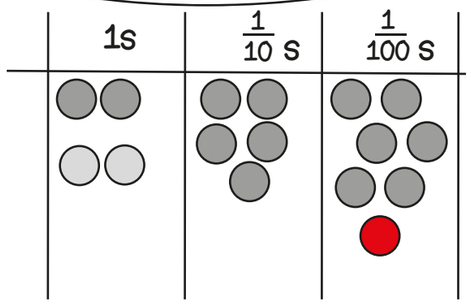
By using place value counters it is easy to see how to take away



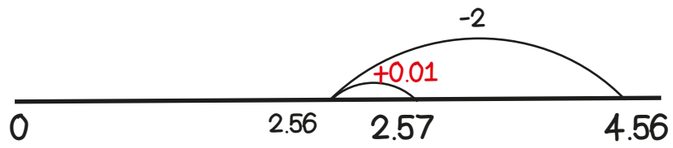
1.5 - 0.7
Bridge through boundaries
by counting in efficient steps



4.56 - 1.99
Round then adjust



Take away 2 then add one hundredth



5,352 - 2,136
Formal written method

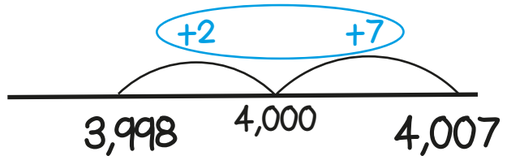
Exchange ten of these for one of those!

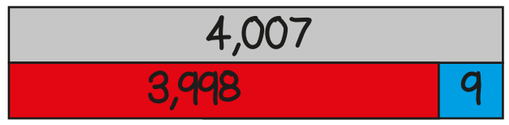
Regroup and rename

4 1 4 1
5,352
- 2,436
2,916

1000s	100s	10s	1s

4007- 3998
Find the difference between two numbers





How shall I multiply?

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

2.34 x 100
Multiply by 10, 100

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

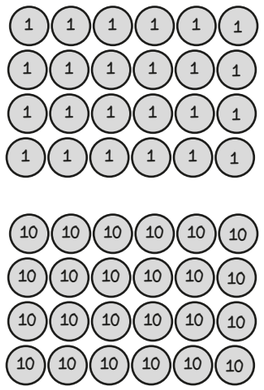
2.34 → (x10) 23.4 → (x10) 234 (x100)

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

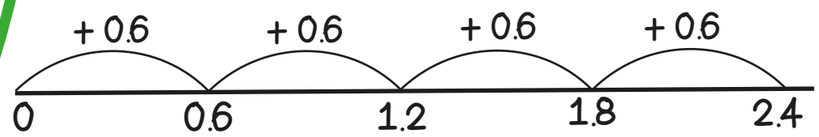
6 x 10 x 4 x 10
= 24 x 100



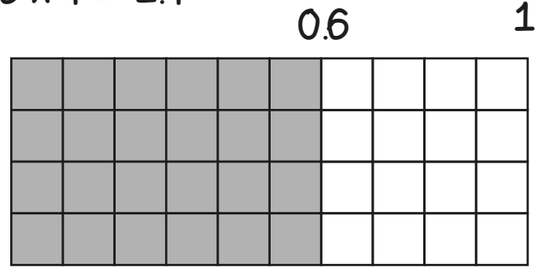
0.6 is ten times smaller than 6

6 x 4
Use known facts and place value

0.6 x 4 = 2.4
4 jumps of 0.6



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	
	30	6
7	210	42

236 x 7

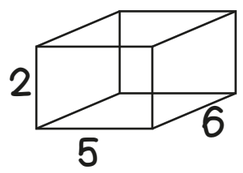
200	30	6
x7	x7	x7

1400 + 210 + 42 = 1652

36 x 7
Formal written method

	30	6
7	210	42

36 x 7 = 252 (4)



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

45 x 6
Use factors and commutativity

Write as factors then re-order

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

4

How shall I divide?

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

24 ÷ 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?

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

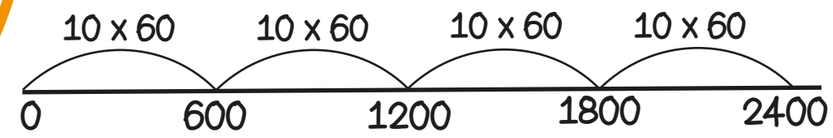
$$\frac{24}{4} = 6$$

2400 ÷ 60
Use known facts and place value

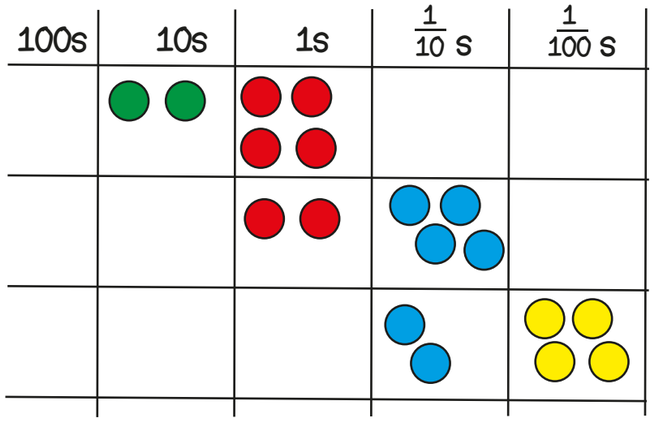
60 is ten times greater than 6

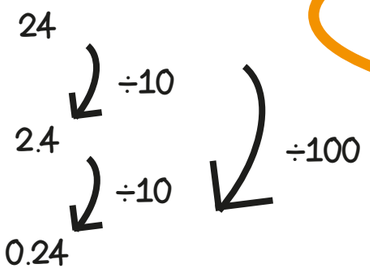
$2400 \div 60 = 40$

How many steps of 60 make 2400?

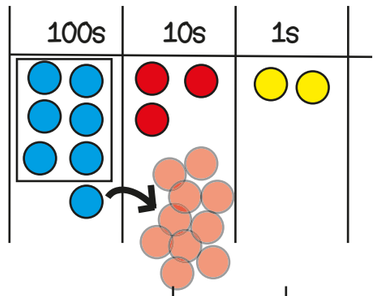


24 ÷ 100
Divide by 10, 100



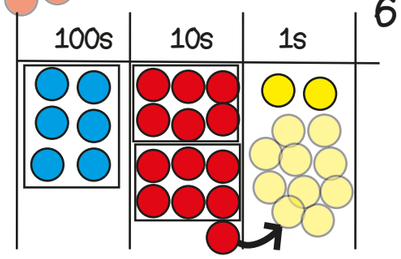


732 ÷ 6
Formal written method



$$6 \overline{)7^{1}3\,2}\quad 1$$

$$6 \overline{)7^{1}3^{1}2}\quad 1\,2\,2$$

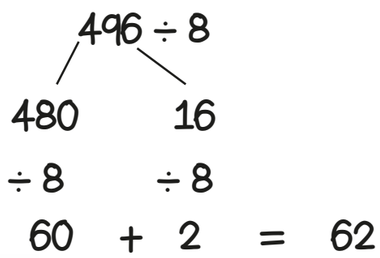


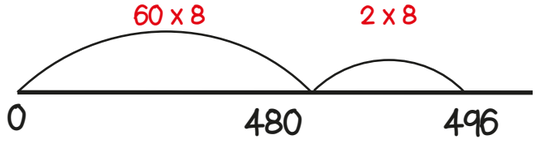
516 ÷ 12
Using factors

$516 \div 3 \div 4$

516		
172	172	172
43 43 43 43		

496 ÷ 8
Partition and recombine





5

How shall I add?

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

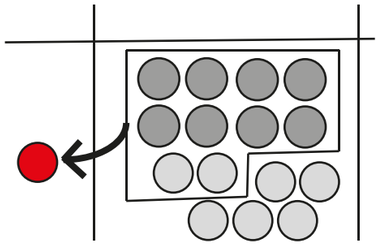
I just knew it!

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

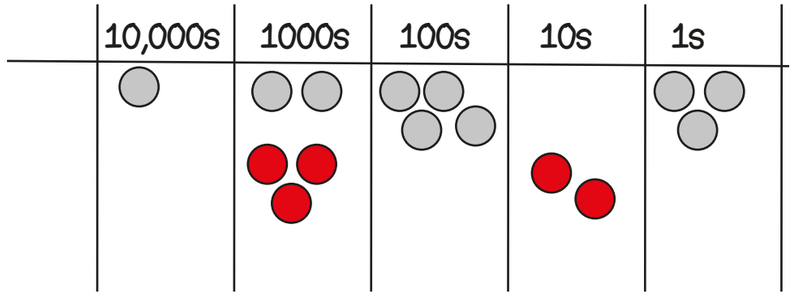
7,000 + 8,000 = 15,000
70,000 + 80,000 = 150,000
700,000 + 800,000 = 1,500,000



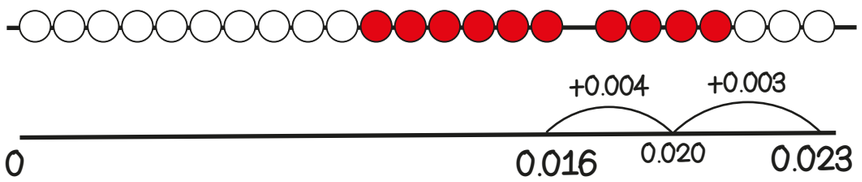
12,403 + 3,020
Use place value to add

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

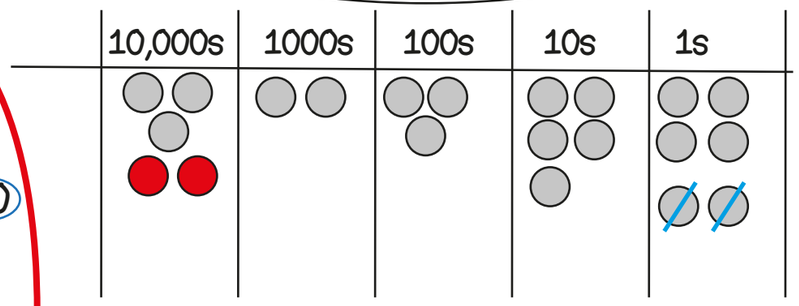
I have noticed,
one number has no
hundreds or ones, the
other has no tens.



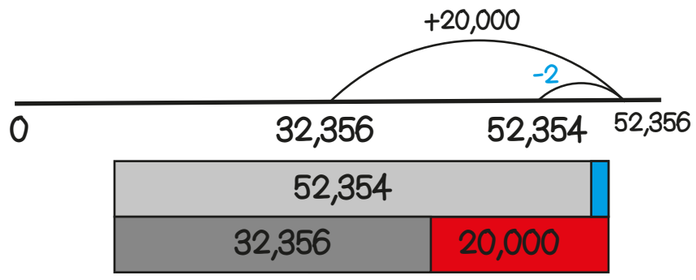
0.016 + 0.007
Bridge through boundaries
by counting in efficient steps



32,356 + 19,998
Round then adjust



Add 20,000 then subtract 2



25,748 + 46,374
Formal written method

Exchange ten of
these for one of
those!

Regroup and rename

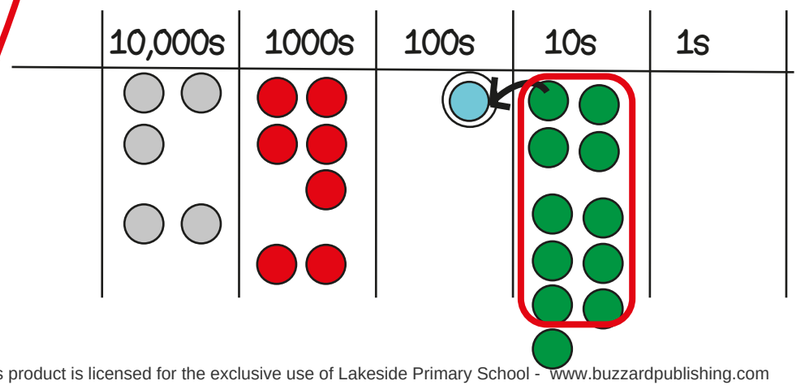
```
  25,748
+ 46,374
  72,122
  1 1 1 1
```

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

35,040 + 22,070
Partition and recombine

30,000 + 5,000 + 40 + 20,000 + 2,000 + 70

50,000 + 7,000 + 110 = 57,110



5

How shall I subtract?

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

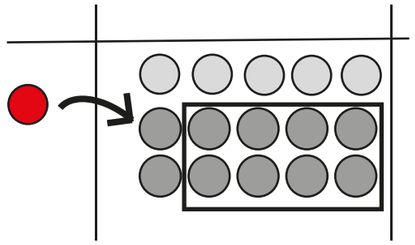
I just knew it!

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

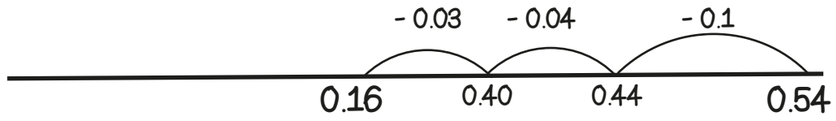
5 less than 12 is 7
Now it is easy to
take away 3000

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

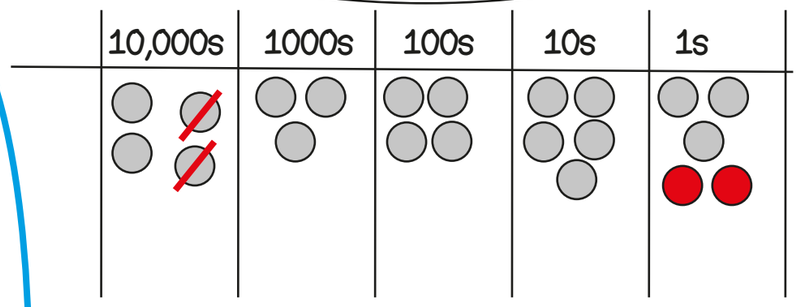
40,000 = 4 tens of thousands or 40 thousands
12 = 1 ten and 2 ones or 12 ones

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

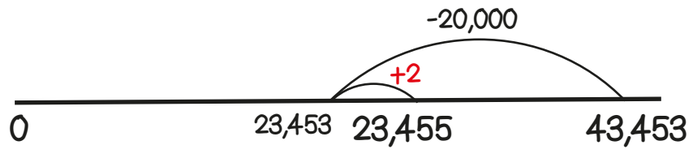
0.54 - 0.17
Bridge through boundaries
by counting in efficient steps



43,453 - 19,998
Round then adjust



Take away 20,000 then add 2



45,748 - 26,374
Formal written method

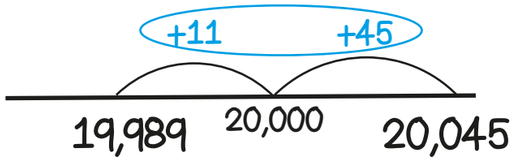
Exchange ten of these for one of those!

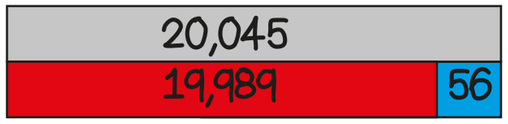
Regroup and rename

$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{1}5,{}^{1}\cancel{7}4{}^{1}8 \\ -\ 26,374 \\ \hline 19,374 \end{array}$$

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

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





5

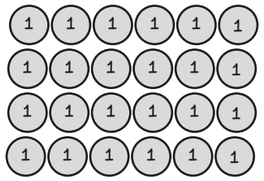
How shall I multiply?

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

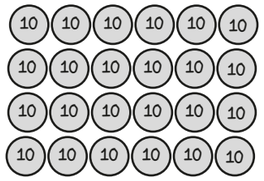
6 x 4
Use known facts and place value

40 is ten times greater than 4

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



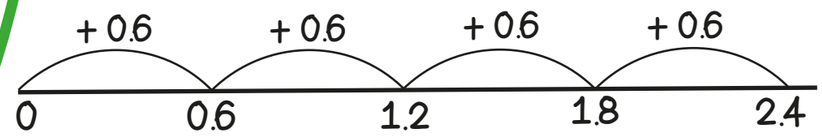
6 x 10 x 4 x 10
= 24 x 100



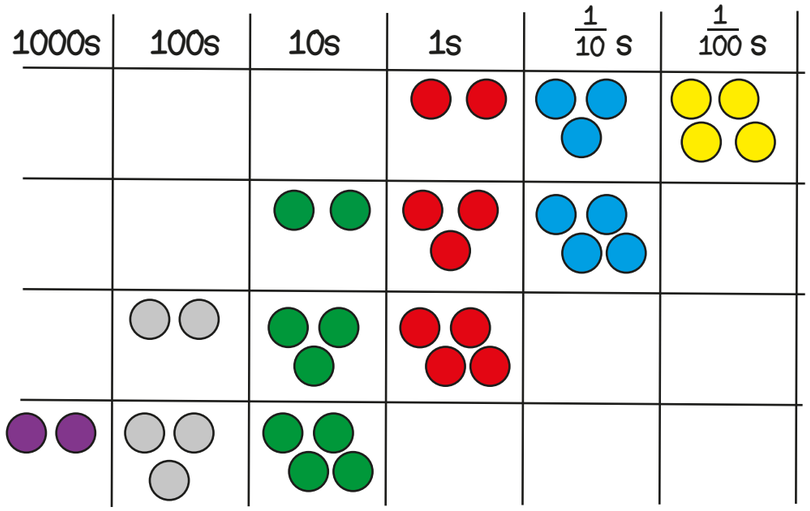
0.6 is ten times smaller than 6

6 x 4
Use known facts and place value

0.6 x 4 = 2.4
4 jumps of 0.6

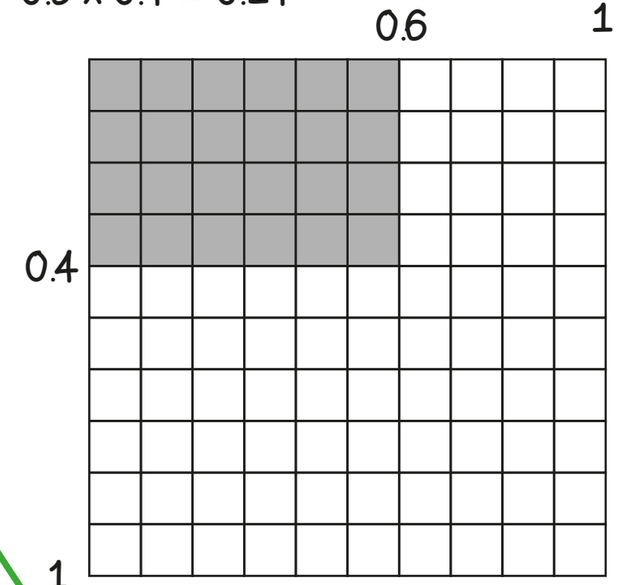


2.34 x 1000
Multiply by 10, 100, 1000



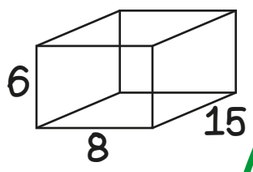
2.34
x10
23.4
x10
234
x10
2340
x100

0.6 x 0.4 = 24 hundredths
0.6 x 0.4 = 0.24

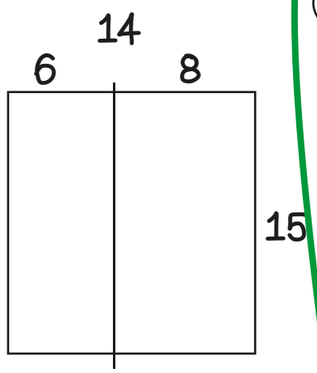


15 x 42
Using factors and distributive law

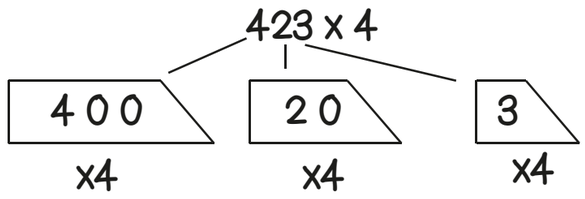
15 x 48
Factor pair
= 15 x 6 x 8
= 90 x 8
= 720



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



423 x 4
Partition and recombine



1600 + 80 + 12 = 1692

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

5

How shall I divide?

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

Include calcuations where remainders occur

24 ÷ 4
Use known facts and place value

24,000 is a thousand times greater than 24

$24 \div 4 = 6$
$240 \div 40 = 6$
$2400 \div 400 = 6$
$24{,}000 \div 4000 = 6$

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?

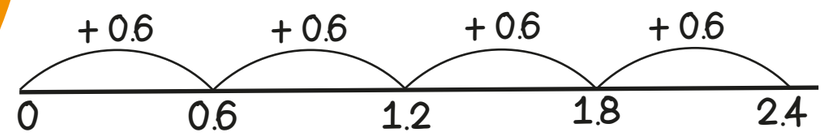
$$24{,}000 \div 400 = \frac{24 \times 1000}{4 \times 100}$$

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

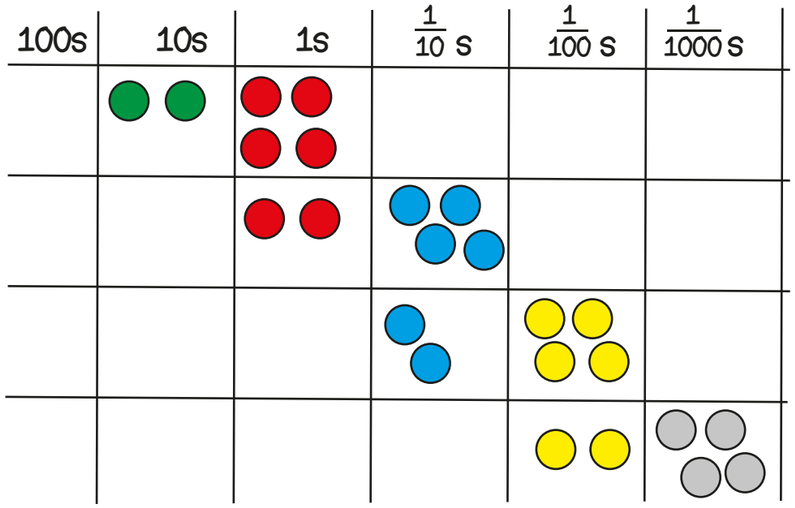
0.6 is ten times smaller than 6

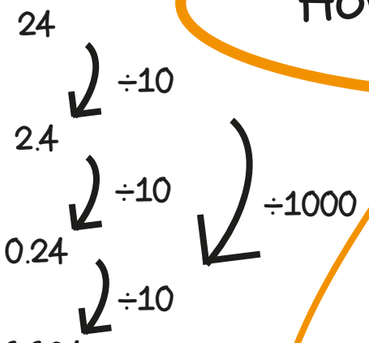
2.4 ÷ 0.6
Use known facts and place value

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

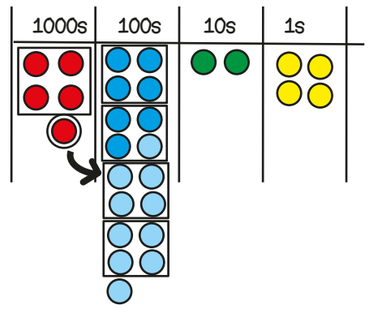


24 ÷ 1000
Divide by 10, 100, 1000

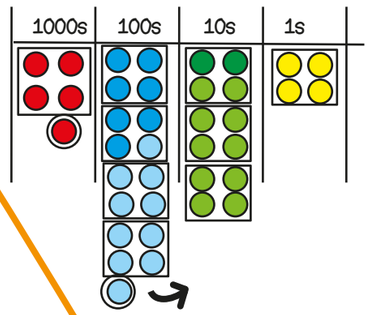




5724 ÷ 4
Formal written method

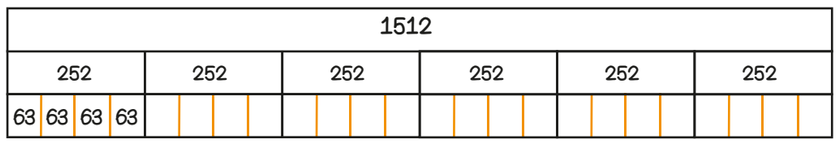


$$4 \overline{)5^{1}7^{1}2\,4} \quad 1\,4\,3\,1$$

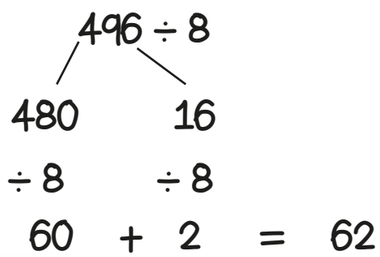


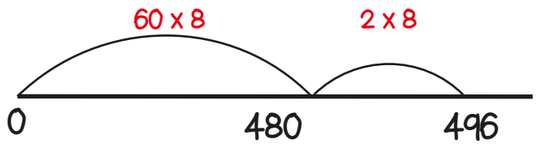
1512 ÷ 24
Using factors

$1512 \div 6 \div 4$



496 ÷ 8
Partition and recombine





How shall I add?

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

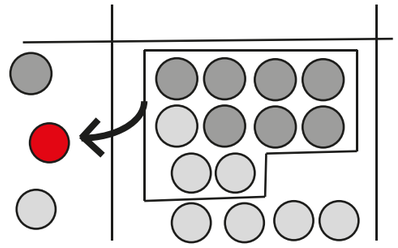
I just knew it!

Rapid fluency of
2 digit add 2 digit numbers

17 + 17
Use known facts

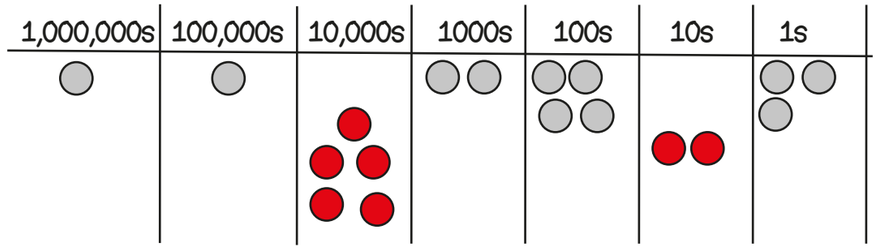
If I know 17 + 17 = 34
then I know
1.7 + 1.7 = 3.4

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

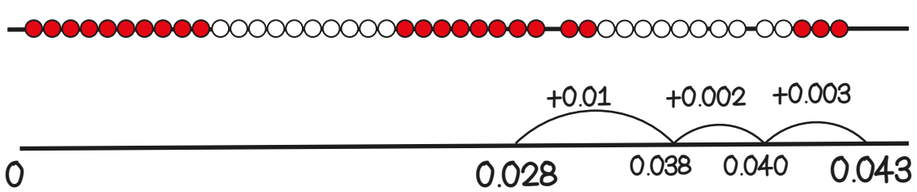


1,102,403 + 50,020
Use place value to add

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



325,748 + 246,374
Formal written method

Exchange ten of these for one of those!

Regroup and rename

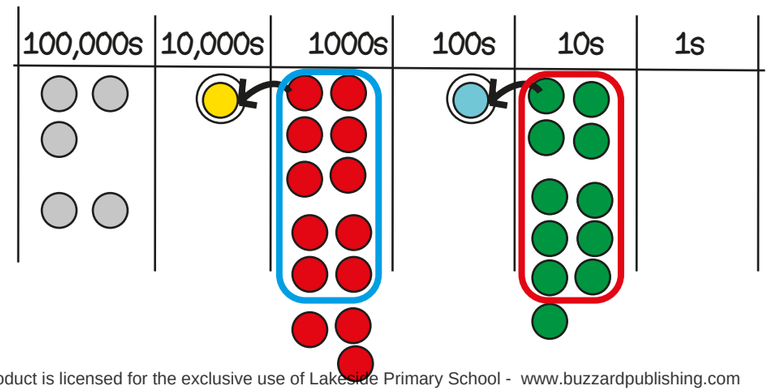
$$\begin{array}{r} 325{,}748 \\ +\ 246{,}374 \\ \hline 572{,}122 \\ \hline 1\ 1\ 1\ 1 \end{array}$$

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

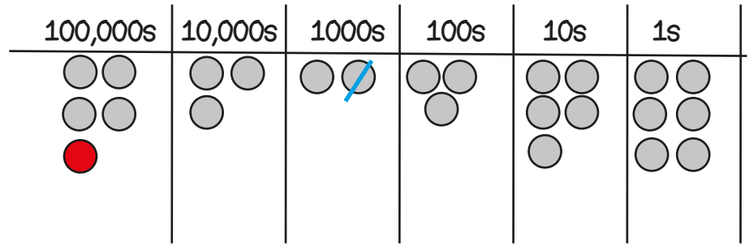
307,040 + 206,070
Partition and recombine

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

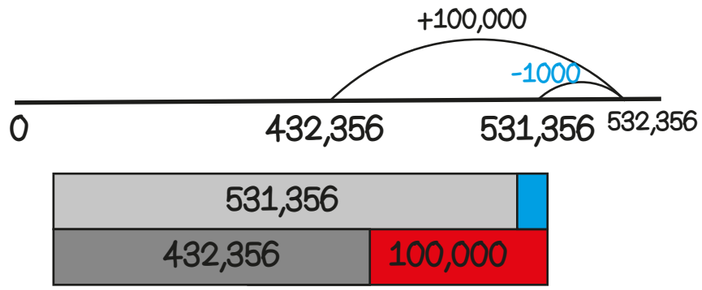
500,000 + 13,000 + 110 = 513,110



432,356 + 99,000
Round then adjust



Add 100,000 then take away 1,000



How shall I subtract?

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

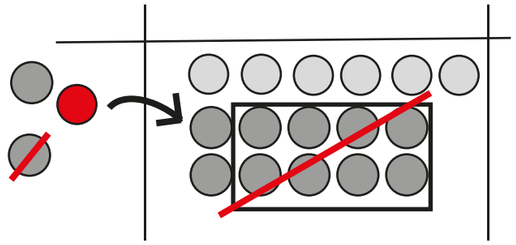
I just knew it!

Rapid fluency of
2 digit subtract
2 digit numbers

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



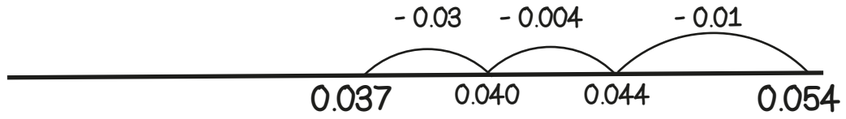
400,032 - 30,005
Use place value to subtract

5 less than 32 is 27

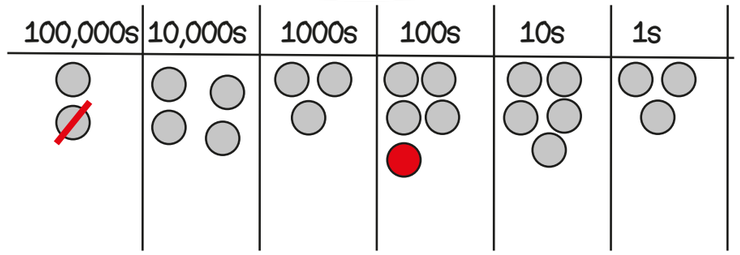
400,000 = 4 hundreds of thousands
or 400 thousands
400 - 30 = 370 so 400,000 - 3,000 = 370,000

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

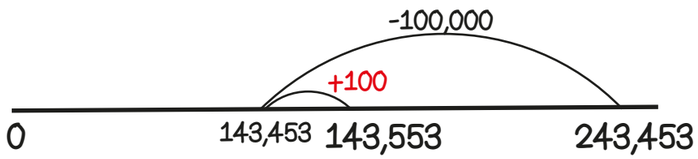
0.054 - 0.017
Bridge through boundaries
by counting in efficient steps



243,453 - 99,900
Round then adjust



Take away 100,000 then add 100



445,748 - 126,374
Formal written method

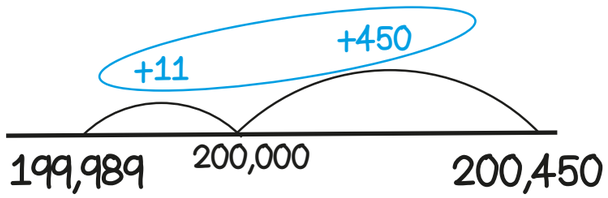
Exchange ten of these for one of those!

Regroup and rename

$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{1}5,{}^{1}\cancel{7}48 \\ +\ 126,374 \\ \hline 319,374 \end{array}$$

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

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



How shall I multiply?

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

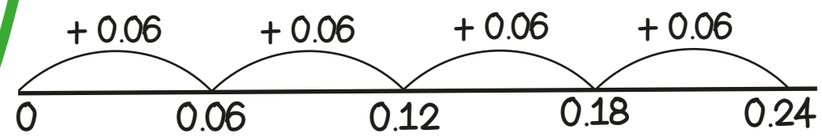
60 x 40 = 2400
600 x 400 = 240,000
6000 x 4000 = 24,000,000

6 x 10 x 4 x 10
= 24 x 100

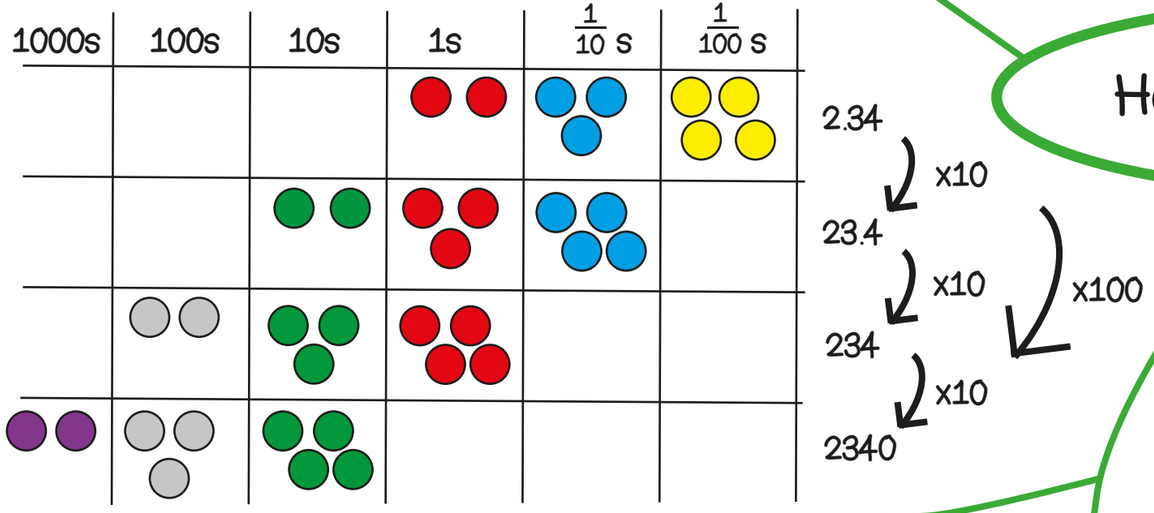
0.6 is ten times smaller than 6

6 x 4
Use known facts and place value

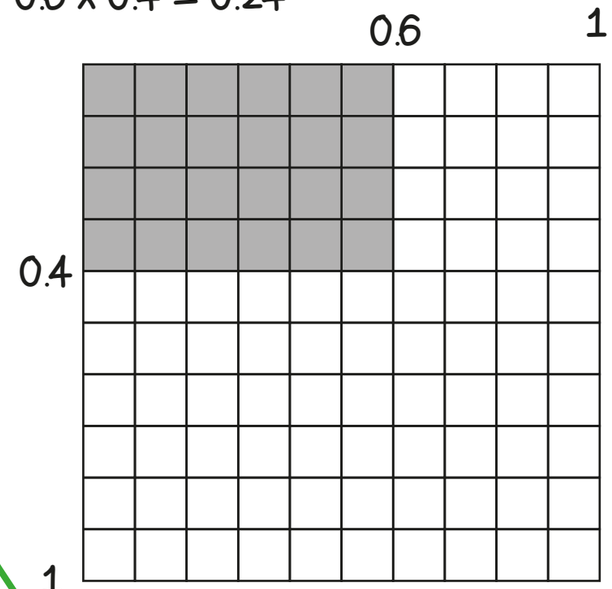
0.06 x 4 = 0.24
4 jumps of 0.06



2.34 x 1000
Multiply by 10, 100, 1000

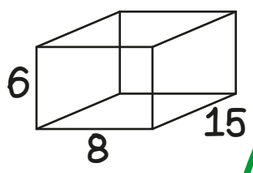


0.6 x 0.4 = 24 hundredths
0.6 x 0.4 = 0.24



15 x 42
Using factors and distributive law

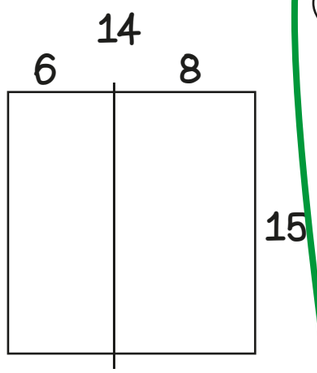
15 x 48
Factor pair
= 15 x 6 x 8
= 90 x 8
= 720



4203 x 4
Partition and recombine

4203 x 4
4000 x4
200 x4
3 x4
16,000 + 800 + 12 = 16,812

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



2427 x 38
Formal written method

```
 2427
x  38
-----
19416
72810
-----
92226
-----
```

6

How shall I divide?

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

Include calcuations where remainders occur

24 ÷ 4
Use known facts and place value

240 is ten times greater than 24

240 ÷ 40 = 6
2400 ÷ 400 = 6
24,000 ÷ 4000 = 6
240,000 ÷ 40,000 = 6
2,400,000 ÷ 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?

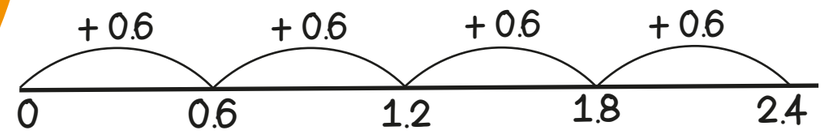
$$240{,}000 \div 400 = \frac{24 \times 10{,}000}{4 \times 100}$$

$$\frac{2400}{4} = 600$$

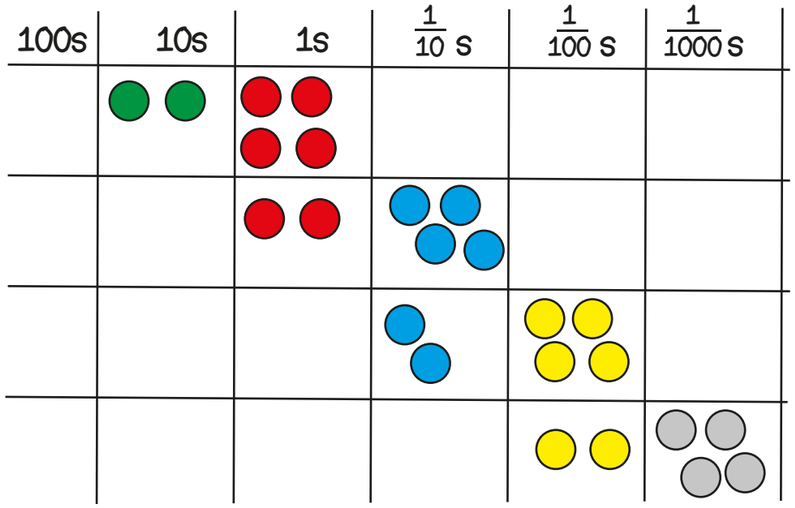
2.4 ÷ 0.6
Use known facts and place value

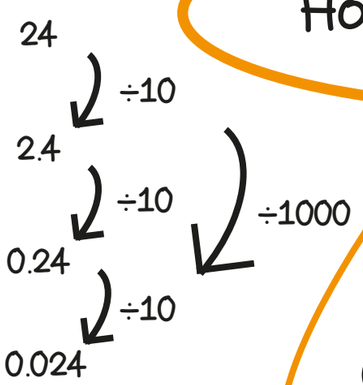
0.6 is ten times smaller than 6

2.4 ÷ 0.6 = 4
How many steps of 0.6 make 2.4?

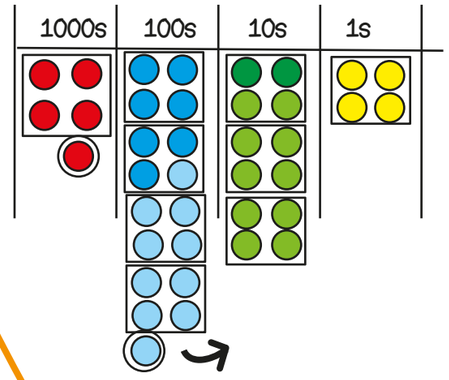


24 ÷ 1000
Divide by 10, 100, 1000





7182 ÷ 21
Formal written method



$$\begin{array}{r} 1431 \\ 4\overline{)5^{1}7^{1}24} \end{array}$$

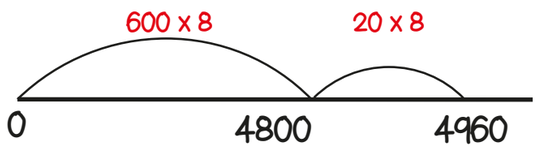
1512 ÷ 24
Using factors

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

4960 ÷ 8
Partition and recombine

4960 ÷ 8

4800 ÷ 8 = 600 + 160 ÷ 8 = 20 = 620



1512 ÷ 6 ÷ 4