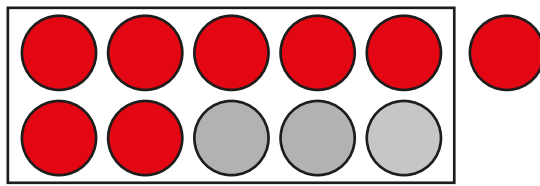


4 + 1, 6 + 3, 10 + 4
Number facts
Single digit numbers
Doubles
Ten and single digits

I just knew it!

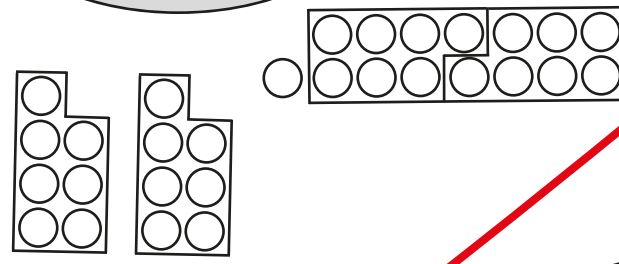
3 + 7
Use known addition facts

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

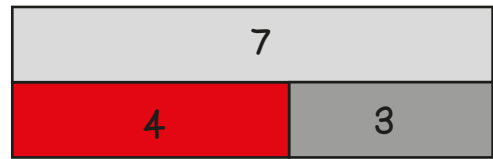
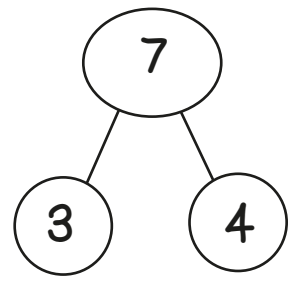
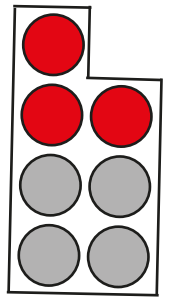


7 + 8
Use near doubles

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

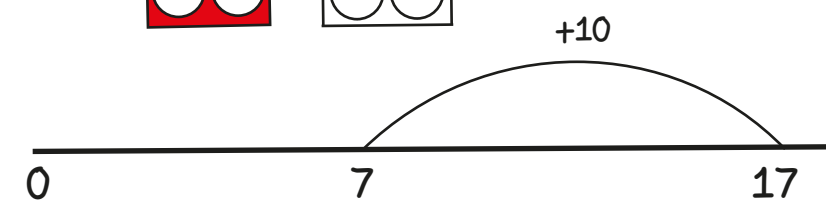
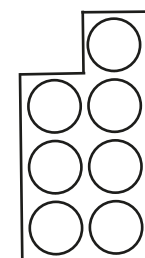
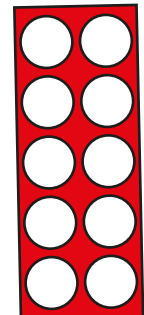


7 = 3 + 4
Secure addition bonds of
single digits and ten

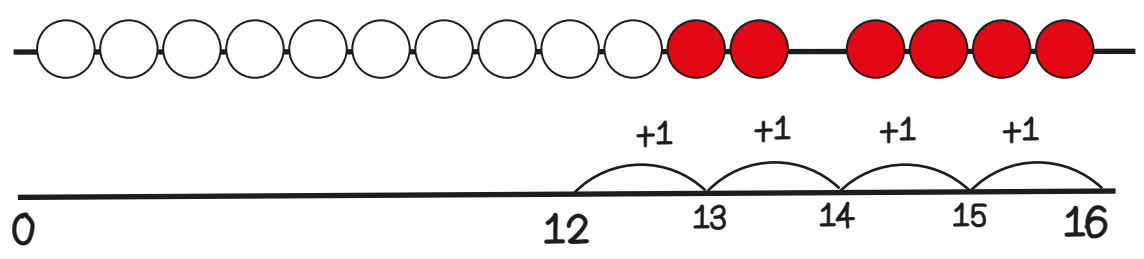


How shall I add?

7 + 10
Add ten



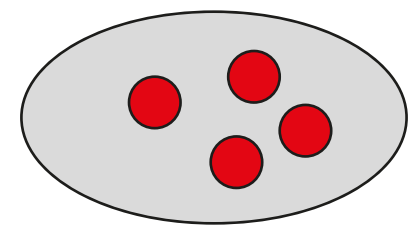
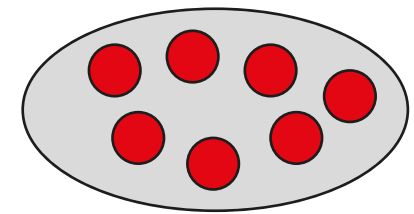
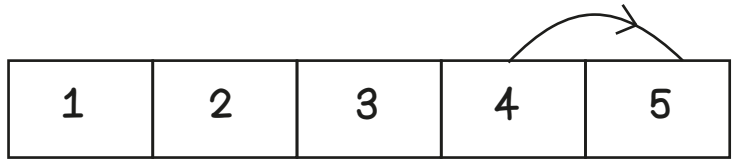
12 + 4
Counting on in 1s



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



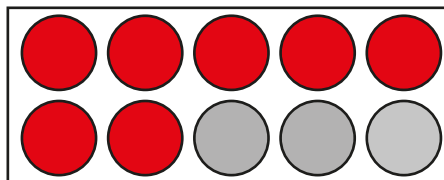
7 + 4
Count all

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

I just knew it!

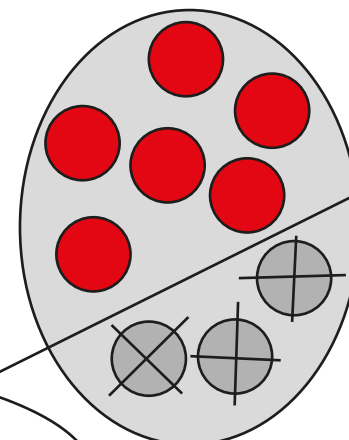
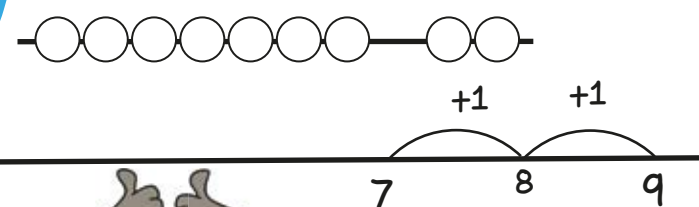
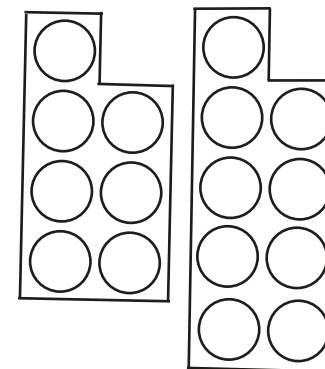
3 + 7
Use known addition facts
to derive subtraction facts

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

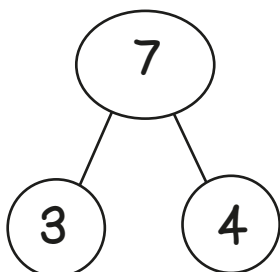
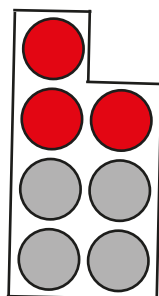


9 - 7
Find the difference between
two numbers

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?



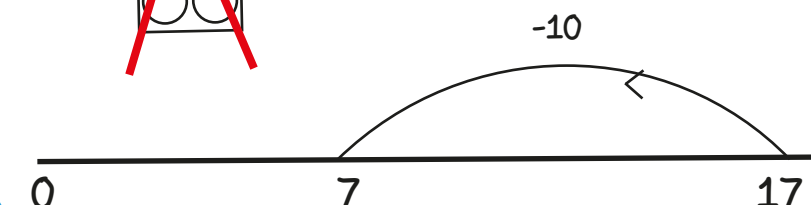
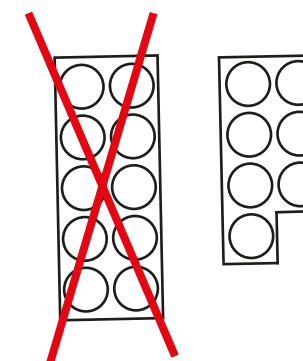
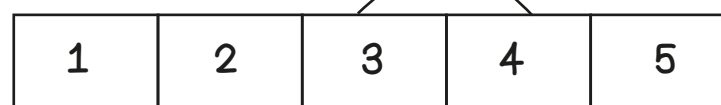
9 - 3
Take away

17 - 10
Take away ten

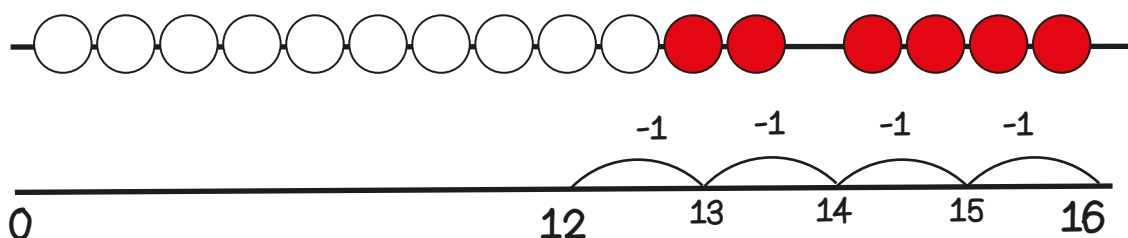
Notice the relationships

23 - 1
Find one less

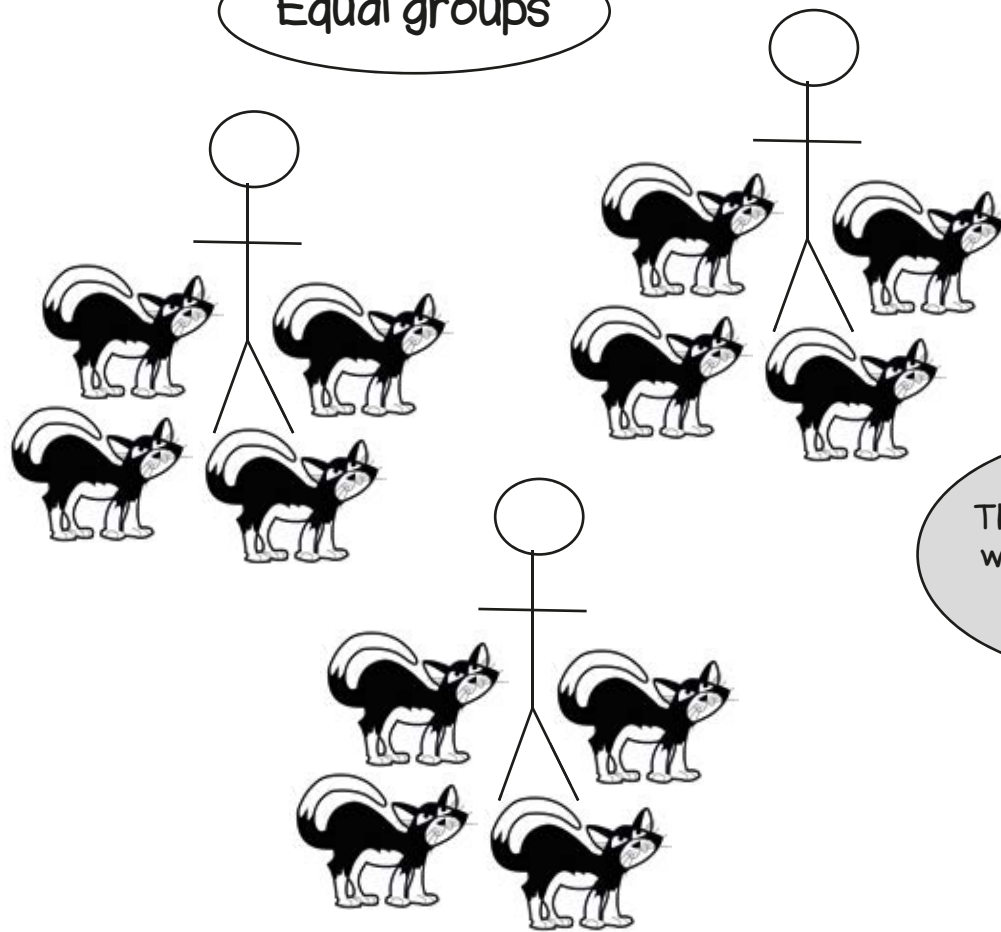
1 less than 4 is 3
1 less than 14 is 13
1 less than 24 is 23



16 - 4
Counting back in 1s

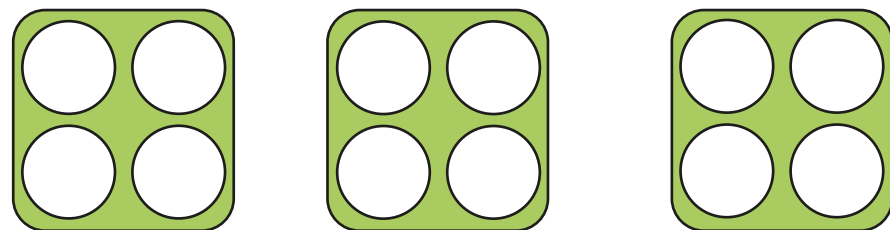
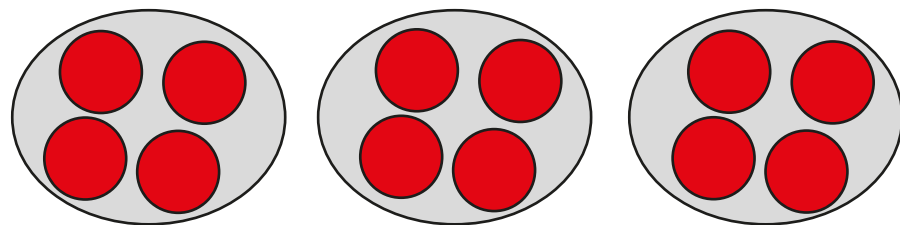


Equal groups



Count in ones

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



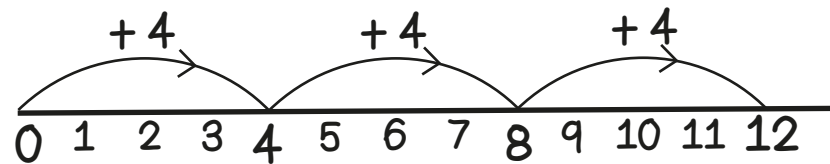
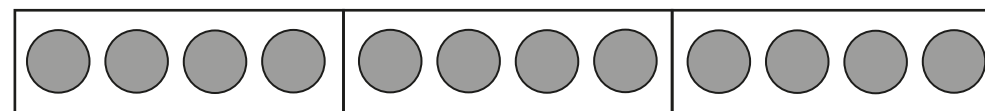
3 people each have 4 cats.
How many cats are there in total?

There are 3 groups
with 4 cats in each
group

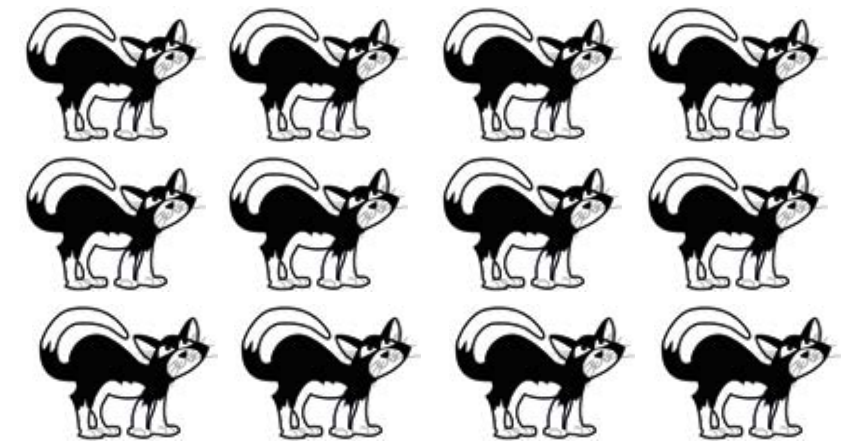
How shall I multiply?



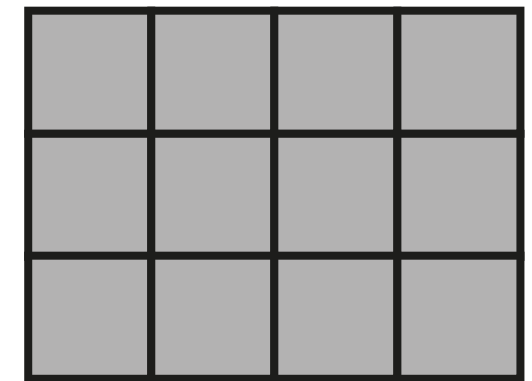
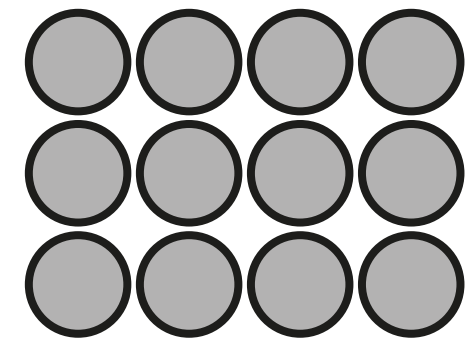
Repeated addition



$$4 + 4 + 4 = 12$$



Arrays



Sharing

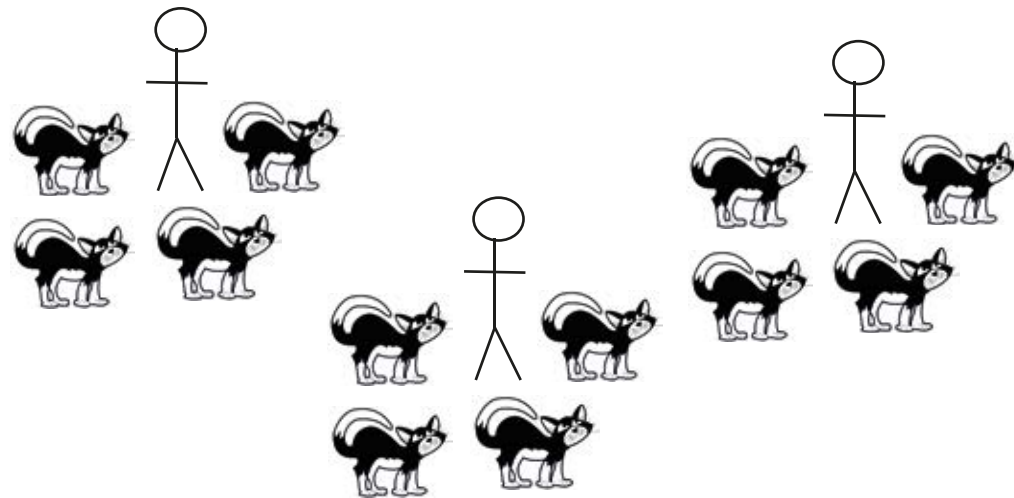
12 shared into
3 equal groups

$$12 \div 3 = 4$$

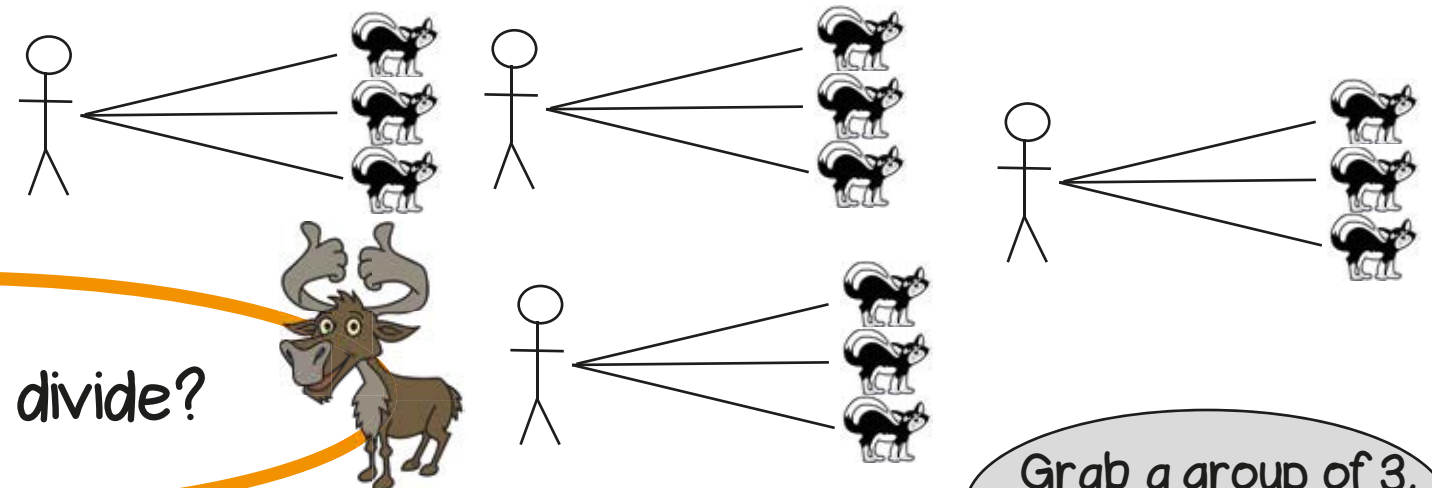
Grouping

How many groups
of 3 are there in 12?

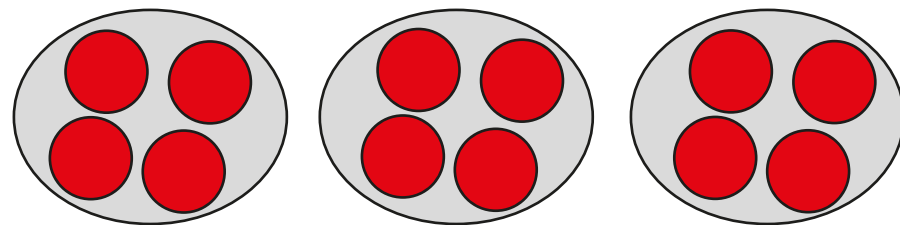
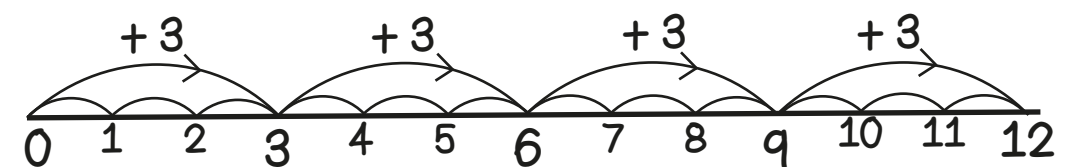
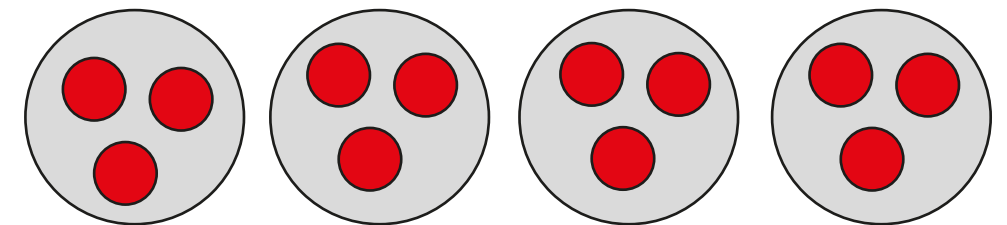
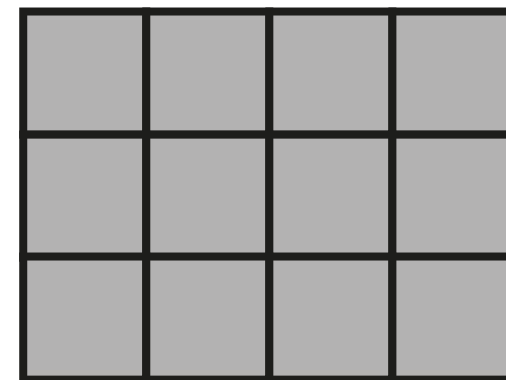
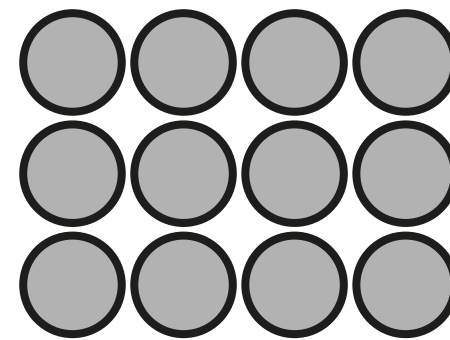
There are 12 cats.
Three people each have the same number of cats.
How many do they have each?

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

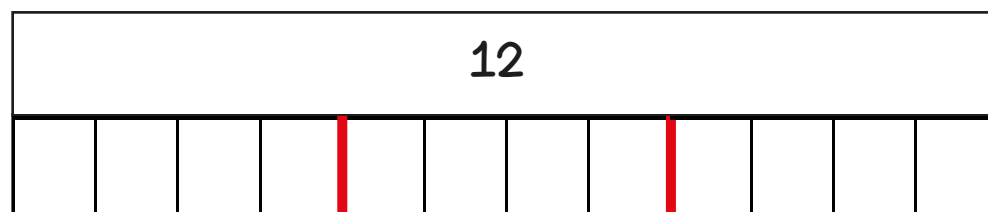
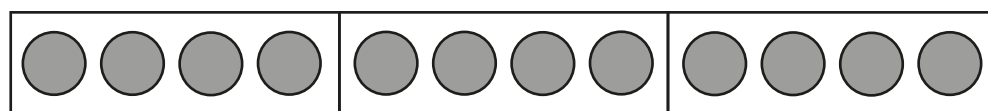
There are 12 cats.
Each person owns 3 cats.
How many people are there?

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



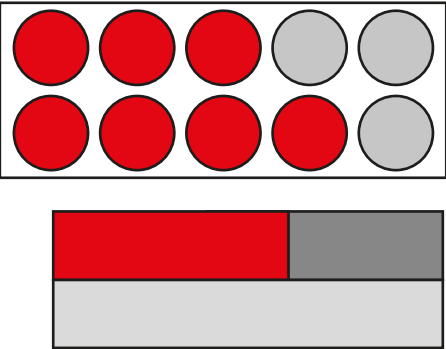
$8 + 7, 9 + 9, 14 + 3$
Number facts
Single digit numbers
Doubles
Teens and single digits

I just knew it!

$13 + 17$
Use known facts
 $30 + 70$

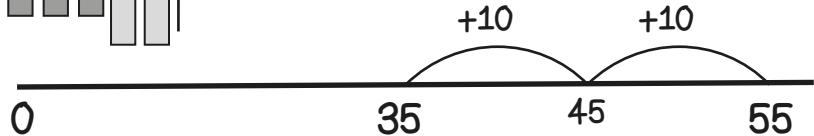
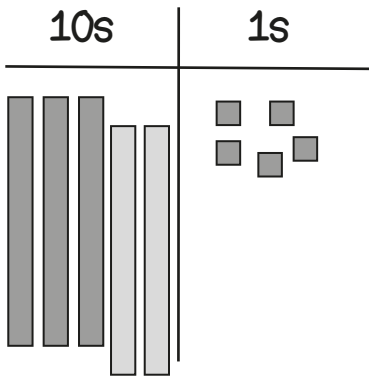
If I know $3 + 7 = 10$
then I know
 $3 \text{ tens} + 7 \text{ tens} = 10 \text{ tens}$

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

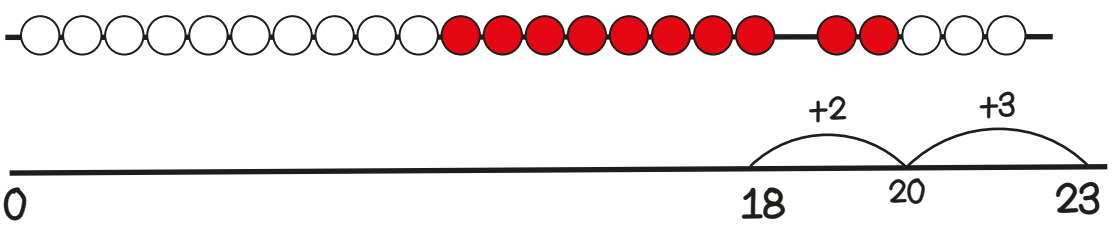


$35 + 20$
Add multiples of ten

If I know $3 + 2 = 5$
then I know
 $3 \text{ tens} + 2 \text{ tens} = 5 \text{ tens}$
so $30 + 20 = 50$



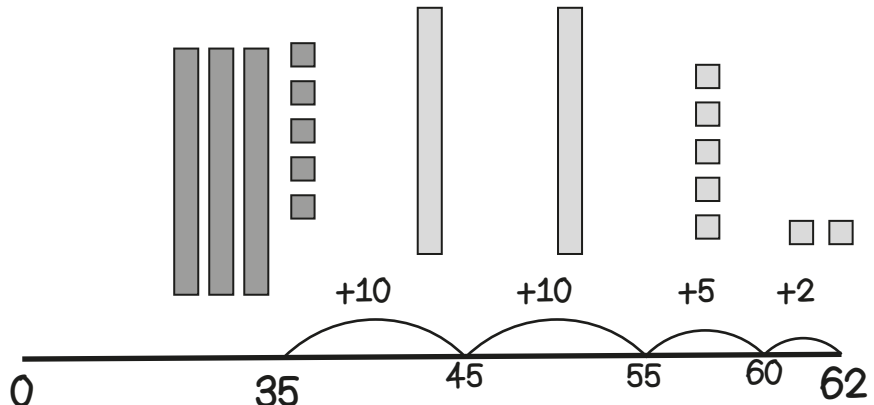
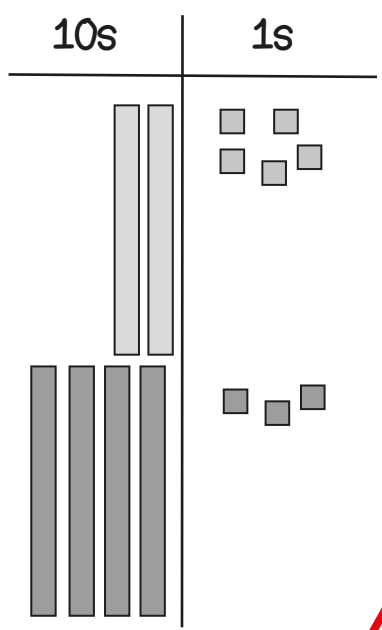
$5 + 18$
Greatest number first
then bridge



How shall I add?

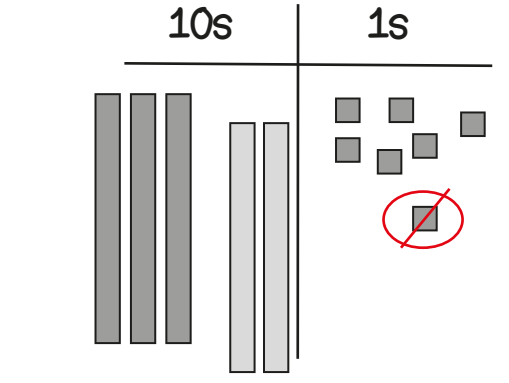
$25 + 43$
Partition and recombine

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

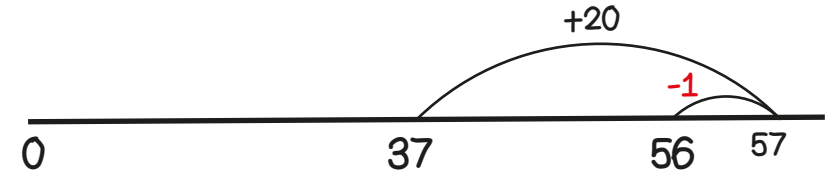


$35 + 27$
Count on in tens then ones

$37 + 19$
Round then adjust



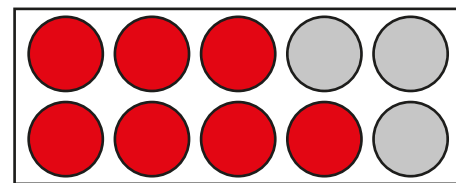
Add 20 then subtract 1



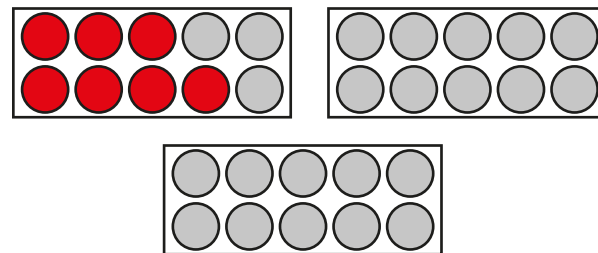
9 - 4, 13 - 5, 18 - 9
Number facts
Single digit numbers
Halves
Teens and single digits

I just knew it!

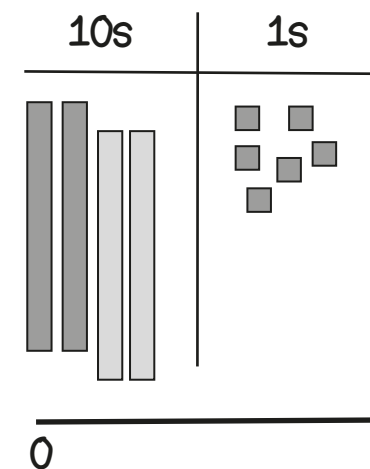
30 - 7
Use known facts
100 - 70



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

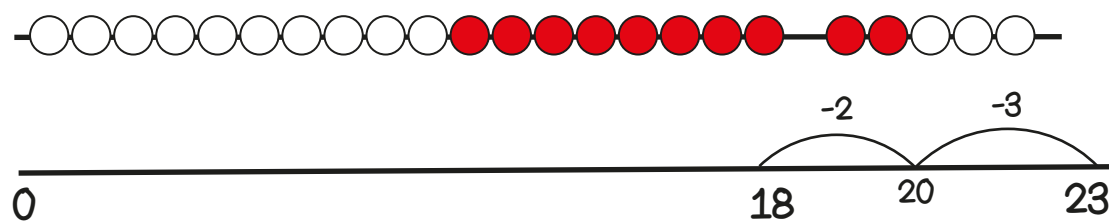


46 - 20
Count back: multiples of ten



If I know $4 - 2 = 2$
then I know
 $4 \text{ tens} - 2 \text{ tens} = 2 \text{ tens}$
so $40 - 20 = 20$

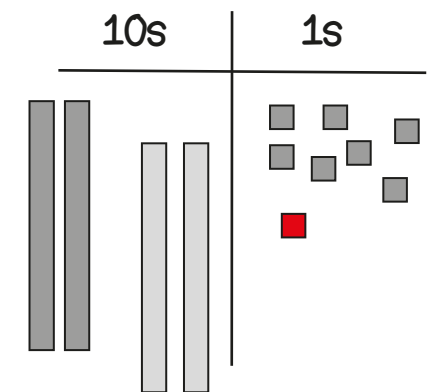
23 - 5
Count back: bridge through
a multiple of ten



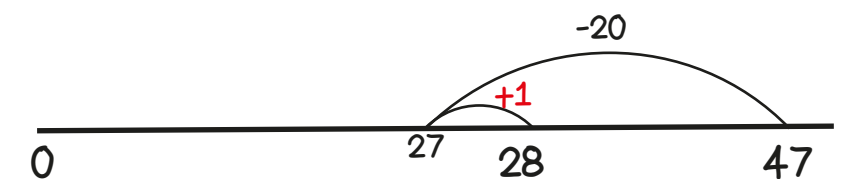
How shall I subtract?



47 - 19
Round then adjust

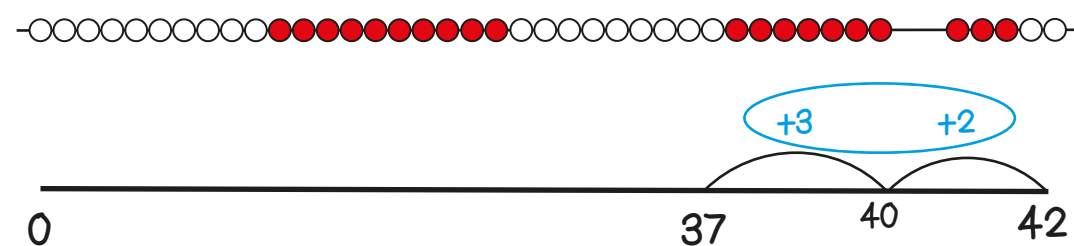
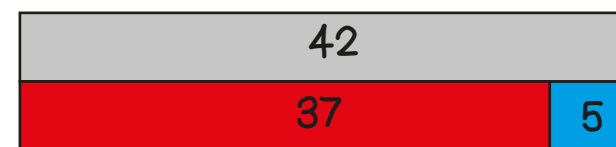


Take away 20 then **add 1**

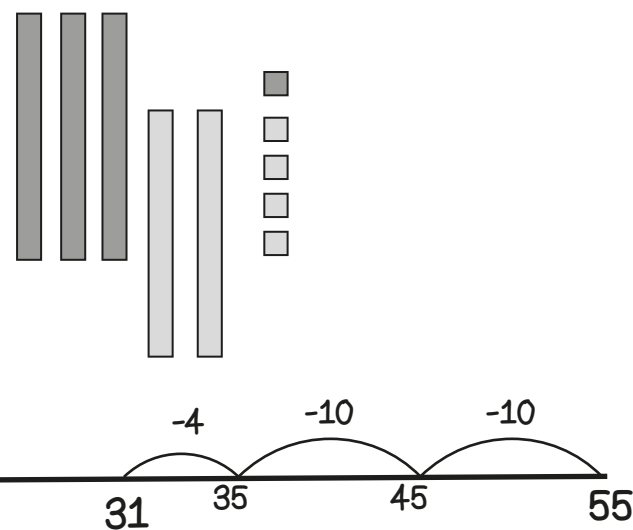


42 is 5 more than 37,
37 is 5 less than 42 so
the difference between
37 and 42 is 5

42 - 37
Find the difference between
two numbers

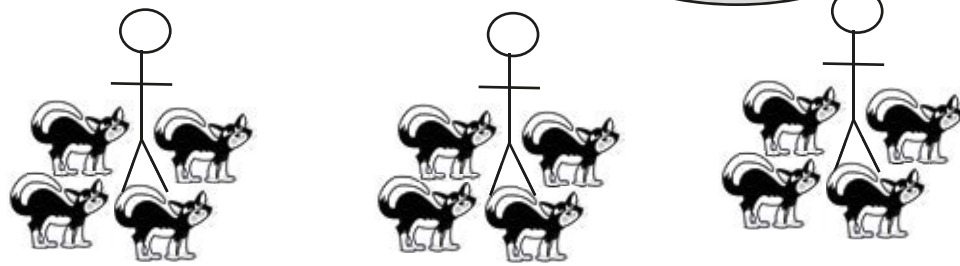


55 - 24
Count back in tens then ones

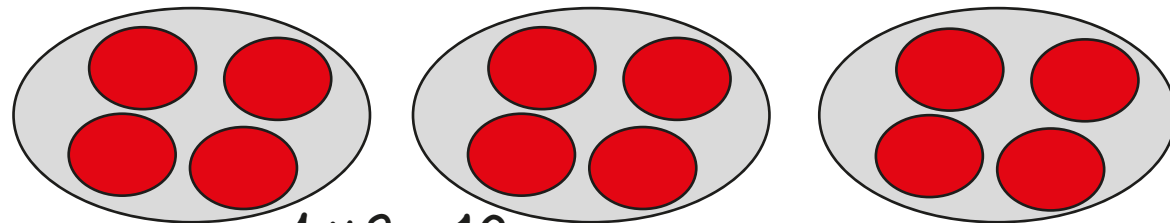


Equal groups

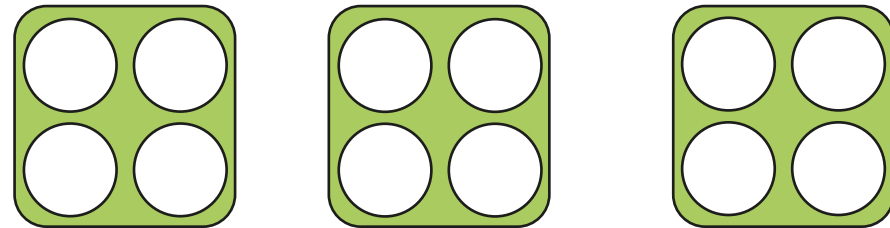
There are 3 groups with 4 cats in each group



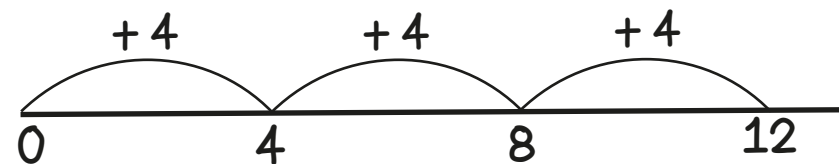
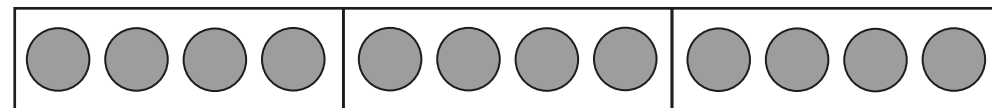
Four cats, multiplied by 3



$$4 \times 3 = 12$$



Repeated addition



$$4 + 4 + 4 = 12$$

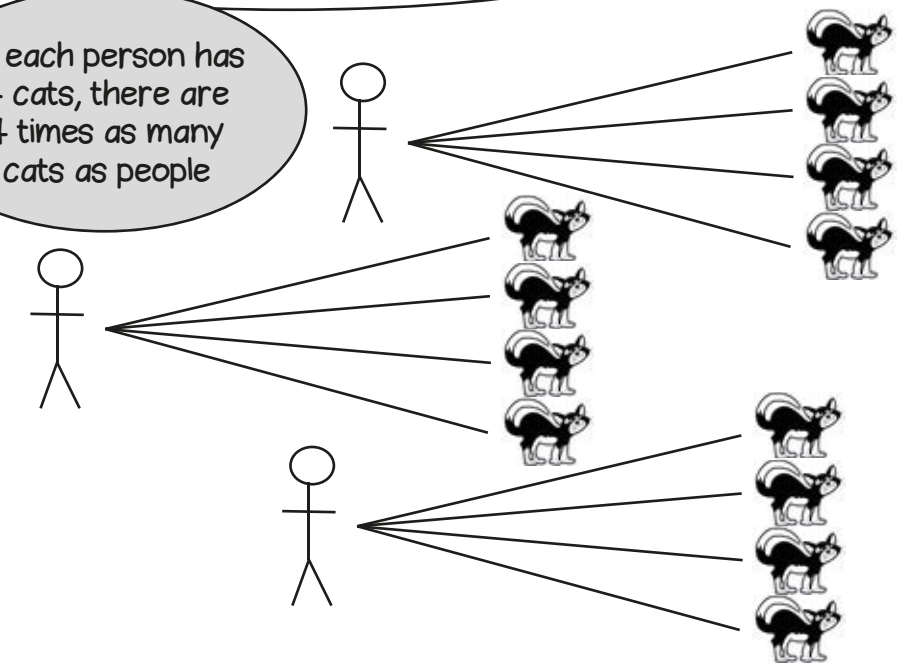
3 people each have 4 cats.
How many cats are there in total?

Recall of 2x, 5x and 10x tables

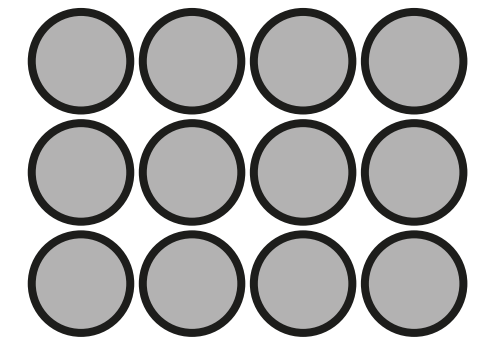
People	Cats
1	4
2	8
3	12

One to many correspondence

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

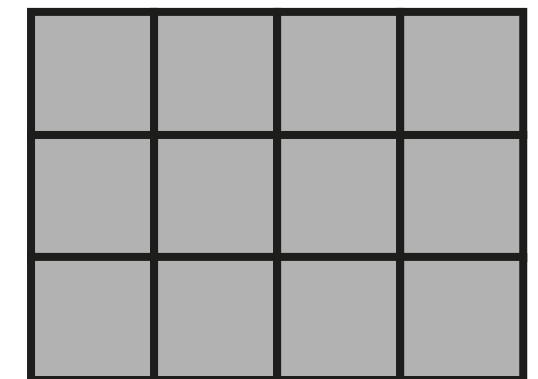


Arrays



$$4 \times 3 = 12$$

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



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

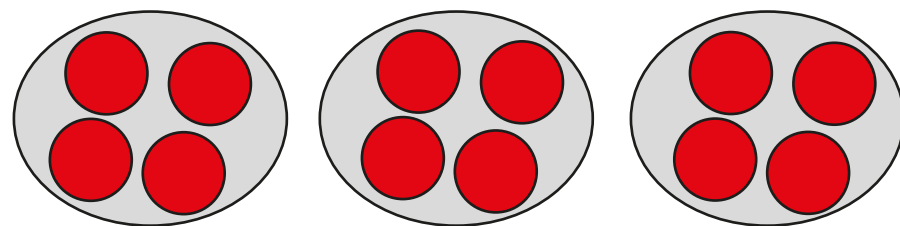
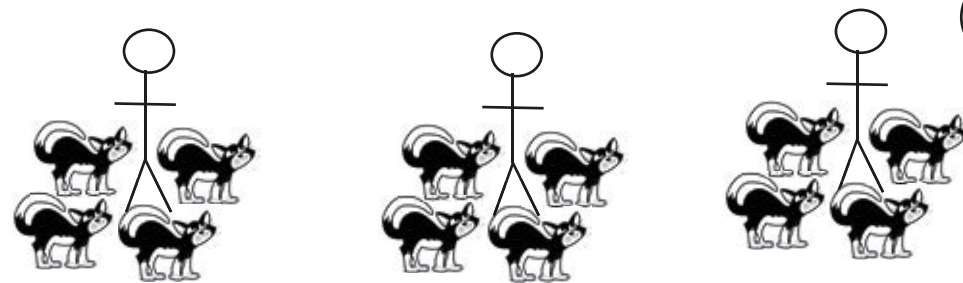
Use a known fact

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

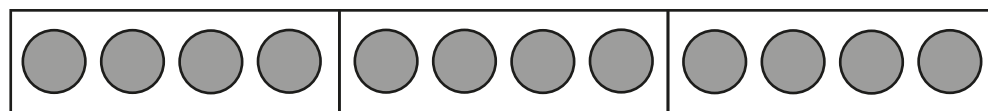
Sharing

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

$$12 \div 3 = 4$$

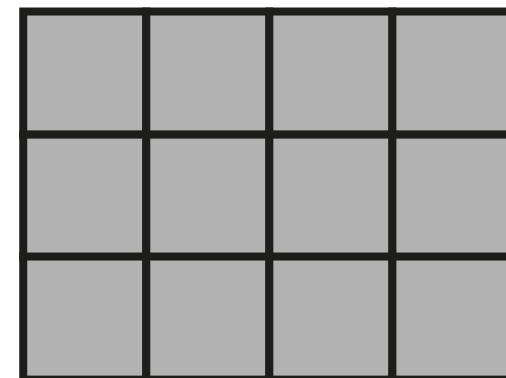
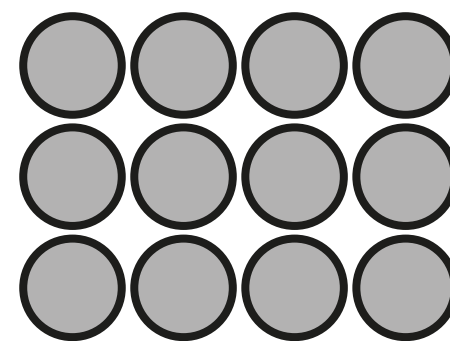
Recall and use 2x, 5x and 10x tables

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

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

How shall I divide?

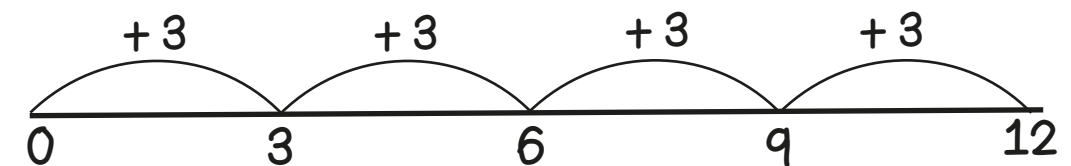
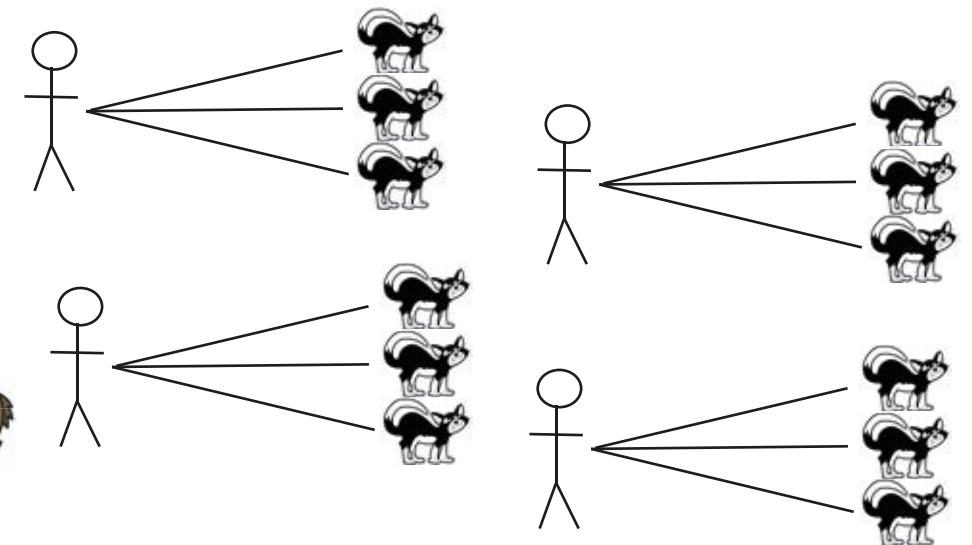
12 can be described as
3 columns of 4
or 4 rows of three



Grouping

How many groups of 3 are there in 12?

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

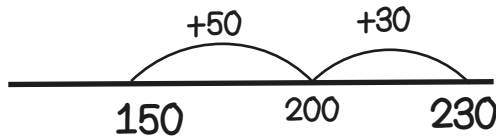
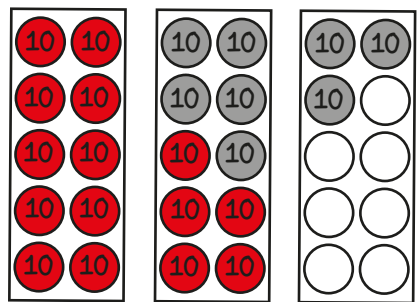


If I know $3 \times 4 = 12$
then I know $12 \div 3 = 4$

$8 + 7, 9 + 9, 14 + 3$
Number facts
Single digit numbers
Doubles
Tens to make 10

I just knew it!

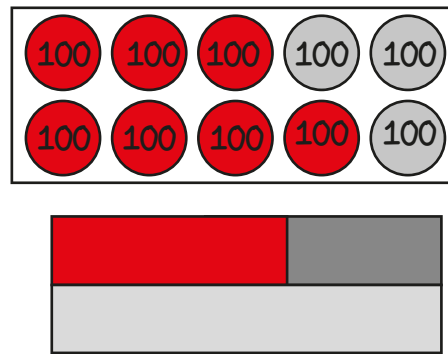
$150 + 80$
Bridging boundaries



$243 + 7$
Use known facts
 $300 + 700$

If I know $3 + 7 = 10$ then I know
 $3 \text{ hundreds} + 7 \text{ hundreds} = 10 \text{ hundreds}$

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

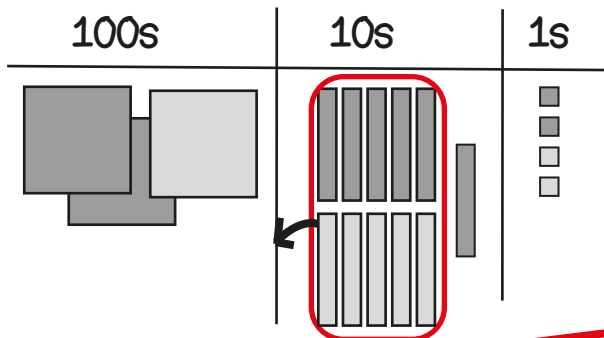


$325 + 200$
Add multiples of ten and hundred

If I know $3 + 2 = 5$ then I know
 $3 \text{ hundreds} + 2 \text{ hundreds} = 5 \text{ hundreds}$

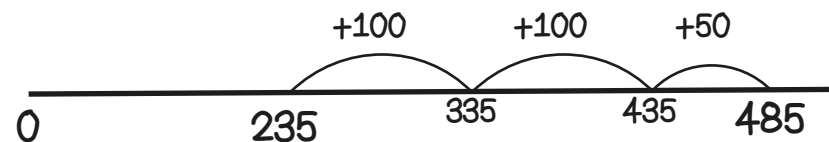
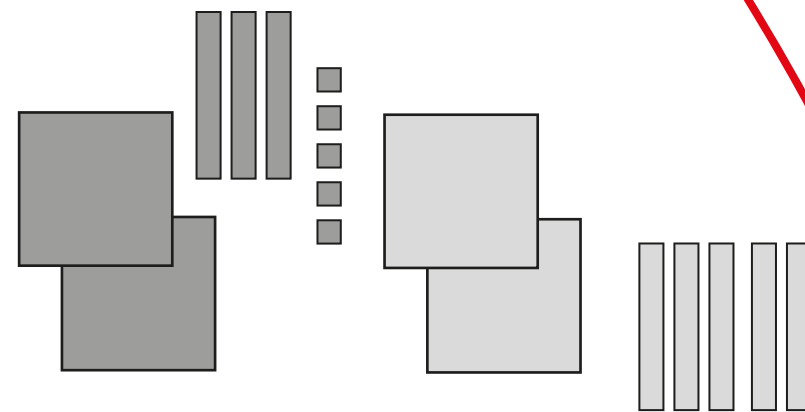
How shall I add?

$262 + 152$
Formal written method

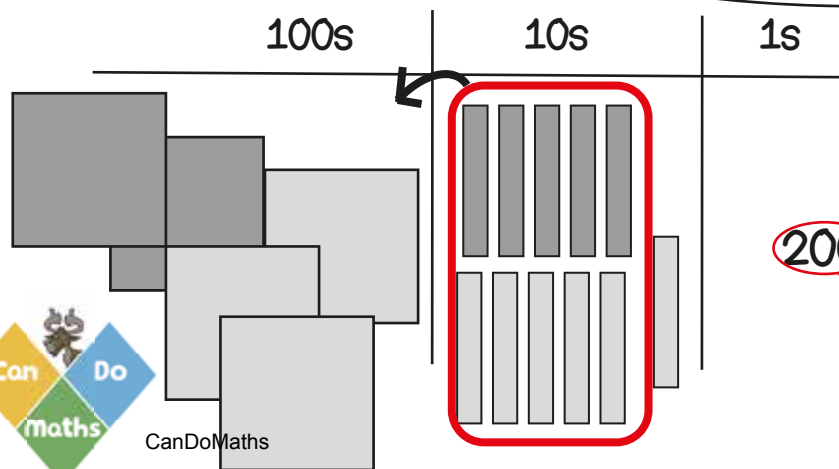


6 tens add 5 tens
= 11 tens or 110

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



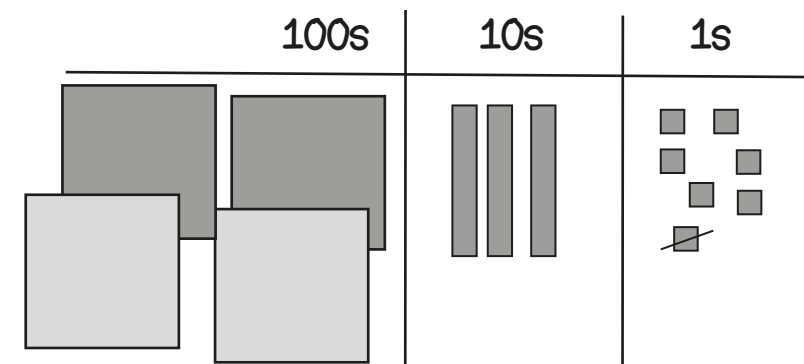
$250 + 360$
Partition and recombine



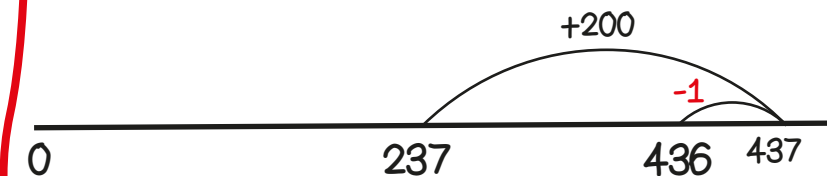
$$\begin{array}{l} 200 + 50 + 300 + 60 \\ 500 + 110 = 610 \end{array}$$

$235 + 250$
Count on in hundreds then tens

$237 + 199$
Round then adjust



Add 200 then subtract 1

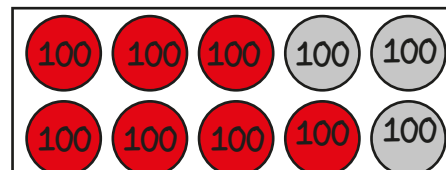


15 - 8, 18 - 5
Number facts
Single digit numbers
Teens and single digits

I just knew it!

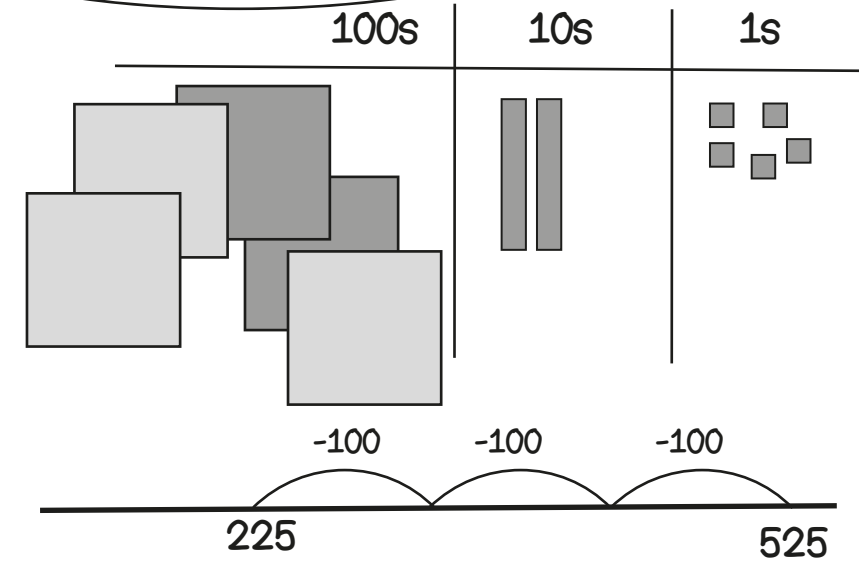
240 - 7
Use known facts
1000 - 700

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

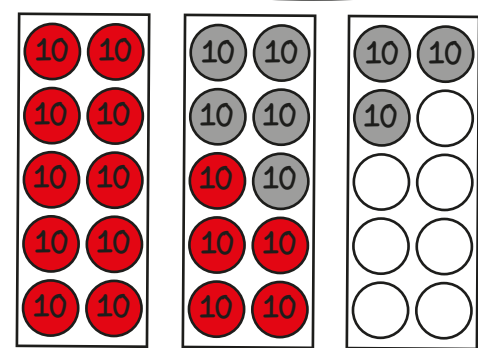


525 - 300
Take away multiples of ten
and a hundred

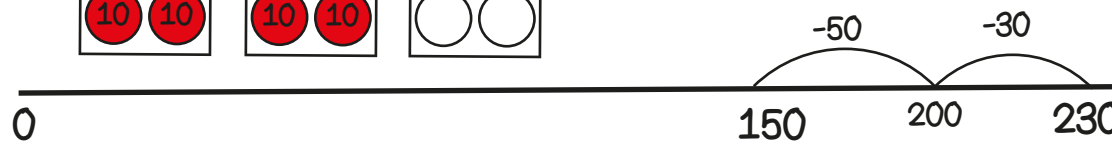
If I know 5 - 3 = 2
then I know
5 hundreds - 3 hundreds
= 2 hundreds



230 - 80
Bridging boundaries
by counting back in efficient steps



230 - 30 - 50 = 150



10 - 7 = 3

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

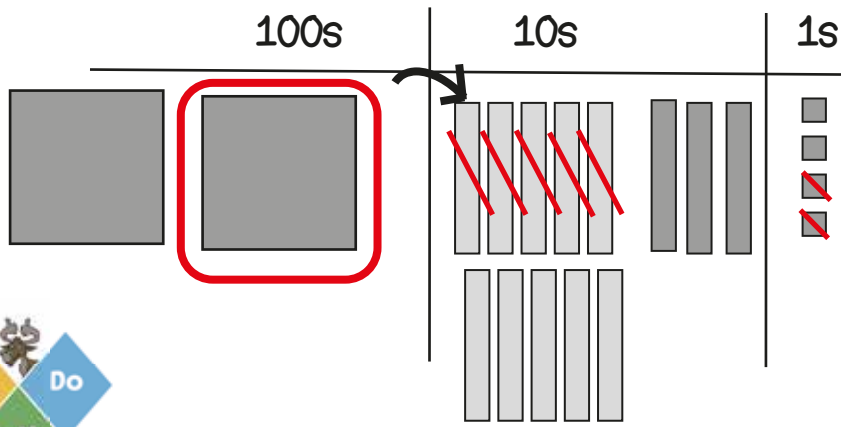


How shall I subtract?

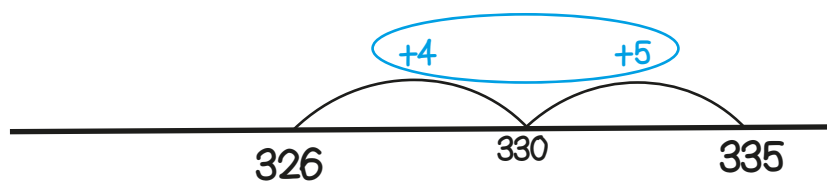
234 - 152
Formal written method

$$\begin{array}{r} 234 \\ - 152 \\ \hline 82 \end{array}$$

234 = 100 + 130 + 4

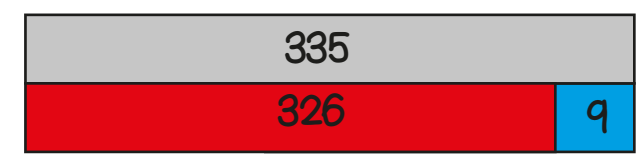


335 - 326

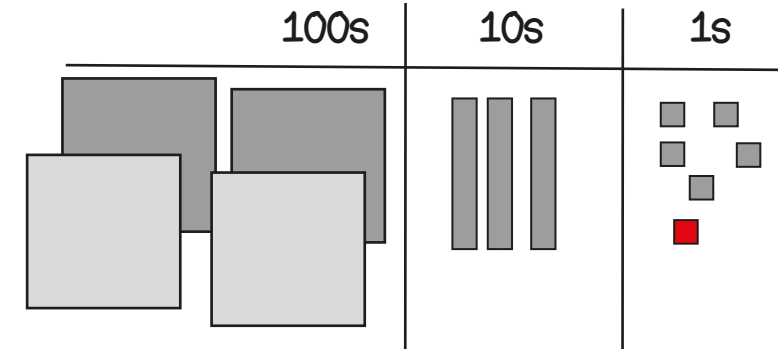


335 - 326
Find the difference
between two numbers

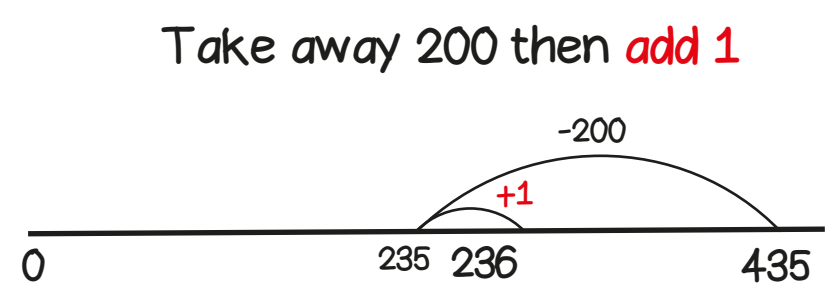
335 is 9 more than 326
326 is 9 less than 335
so the difference between
them is 9



435 - 199
Round then adjust

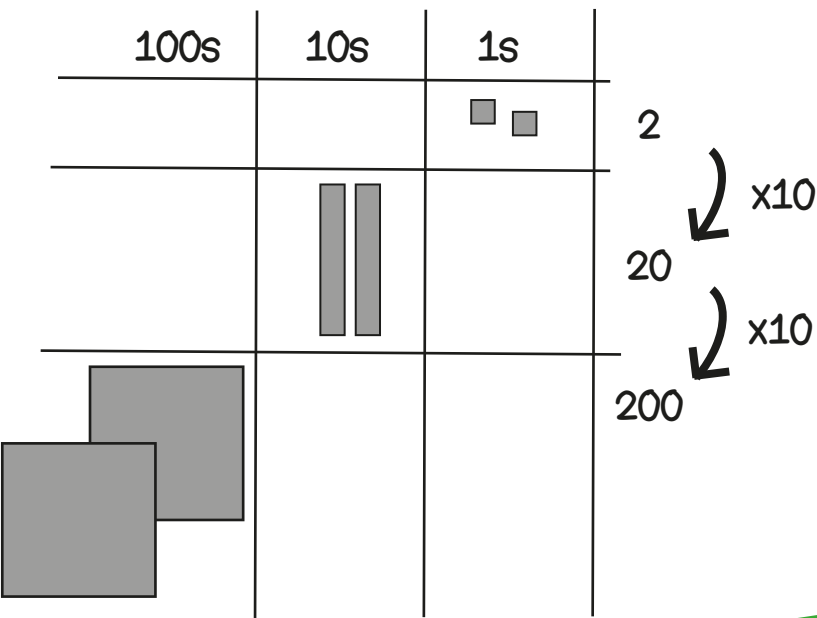


Take away 200 then add 1



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

Multiply by 10

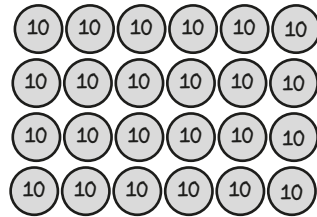
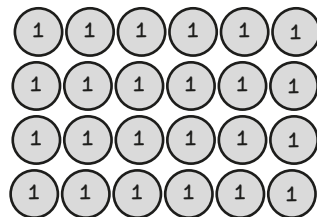


6 x 4
Use known facts
and place value

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

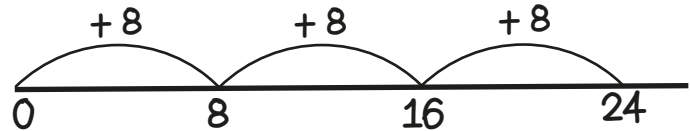
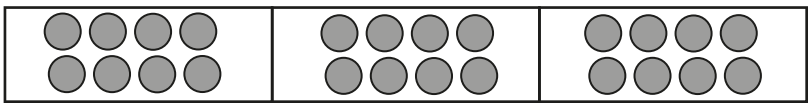
$6 \times 10 \times 4$
 $= 24 \times 10$

40 is ten times
greater than 4



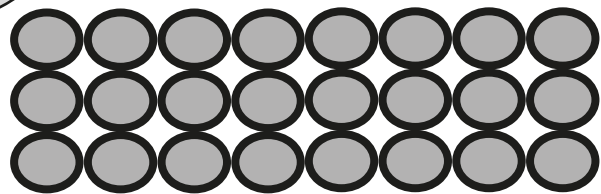
$8 + 8 + 8 =$
 $3 + 3 + 3 + 3 + 3 + 3 + 3 + 3$

8 x 3
Repeated addition



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

Arrays

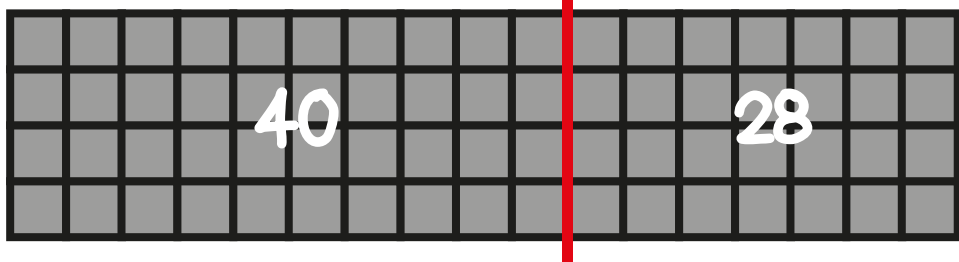
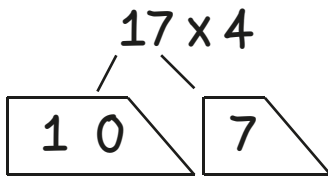


How shall I multiply?



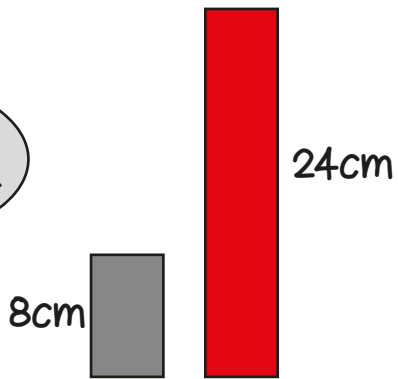
17 x 4
Partition and recombine

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



Scaling

The red tower is
3 times taller
than the grey tower



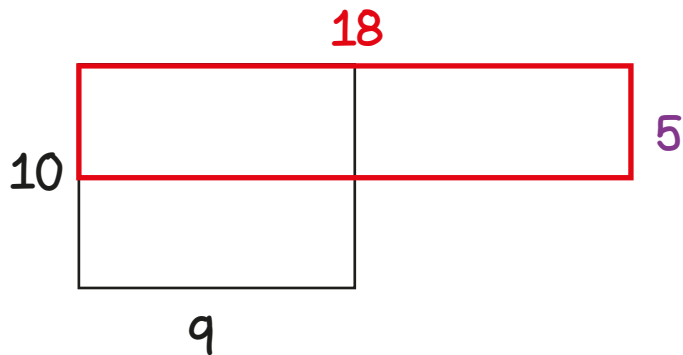
17 x 4
Formal written method

	10	7
4	40	28

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

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

5 x 18
Double and halve



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

$200 \div 10$
Divide by 10

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

A tenth of  is 

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

42 ÷ 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			

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

240 is ten times greater than 24

$$\begin{array}{l} 24 \div 4 = 6 \\ 240 \div 40 = 6 \\ 240 \div 4 = 60 \end{array}$$

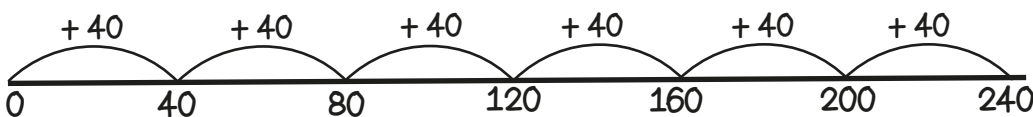
24 biscuits shared between
4 people means they will get
6 biscuits each.
If there are 10 times as many
people and 10 times as many
biscuits, how many biscuits
each now?

A diagram consisting of two overlapping ovals. The left oval is shaded grey and contains the text "How many 40s are there in 240?". The right oval is white and contains the text "240 ÷ 40" and "Repeated addition".

How many 40s are there in 240?

$$240 \div 40 = 6$$

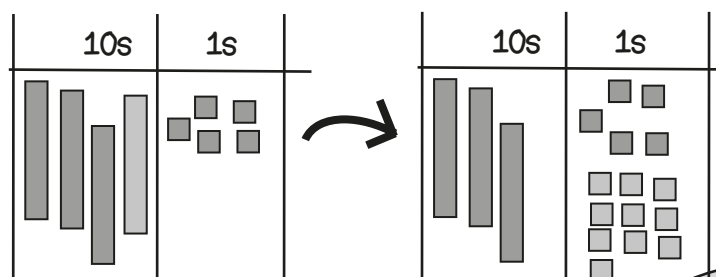
How many steps of 40 make 240?



How shall I divide?



$45 \div 3$
Sharing equally

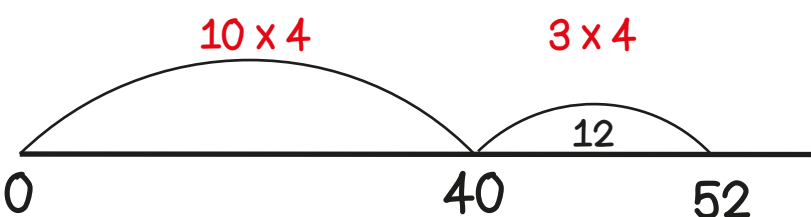


Ten for you,
ten for you,
ten for you...

$52 \div 4$
Partition and recombine

ten lots and the rest

$$\begin{array}{r} 52 \div 4 \\ \swarrow \quad \searrow \\ 40 \quad 12 \\ \div 4 \quad \div 4 \\ 10 \quad + \quad 3 = 13 \end{array}$$



Link to fractions

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

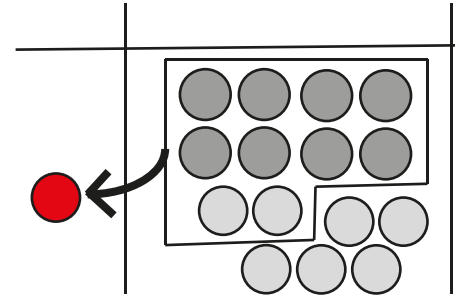
I just knew it!

$7 + 8$
Use known facts

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

$$70 + 80 = 150$$

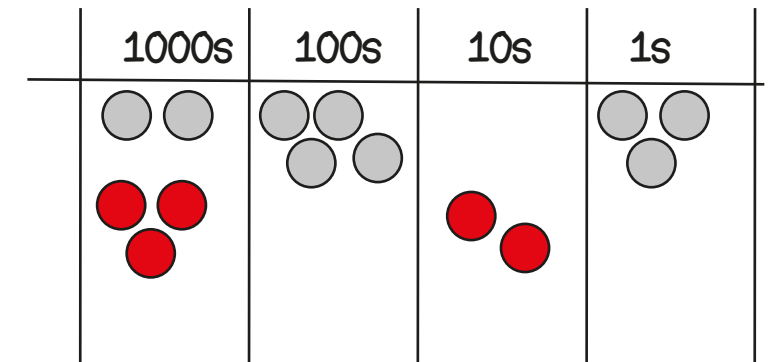
$$700 + 800 = 1,500$$



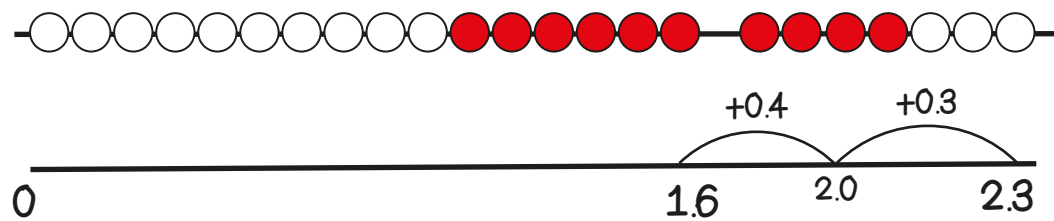
$2,403 + 3,020$
Use place value to add

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.



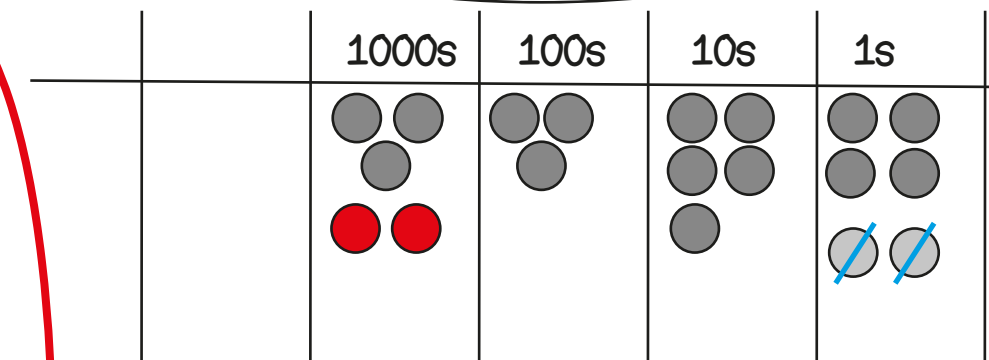
$1.6 + 0.7$
Bridge through boundaries
by counting in efficient steps



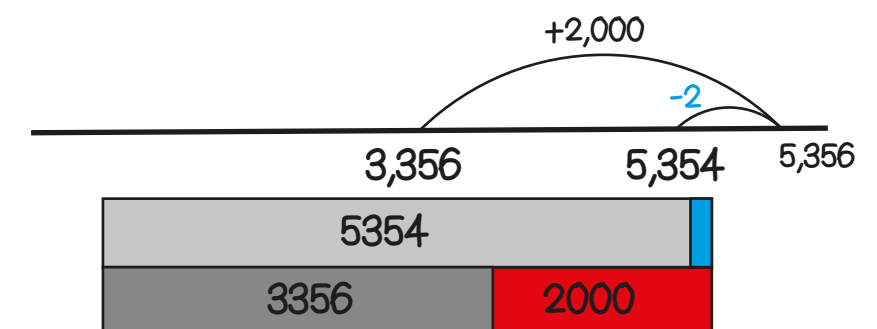
How shall I add?



$3,356 + 1,998$
Round then adjust



Add **2,000** then **take away 2**

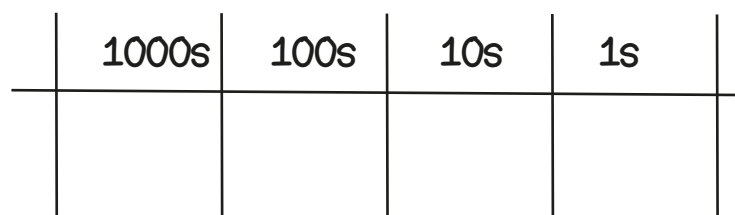


$5,748 + 3,374$
Formal written method

Exchange ten of
these for one of
those!

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

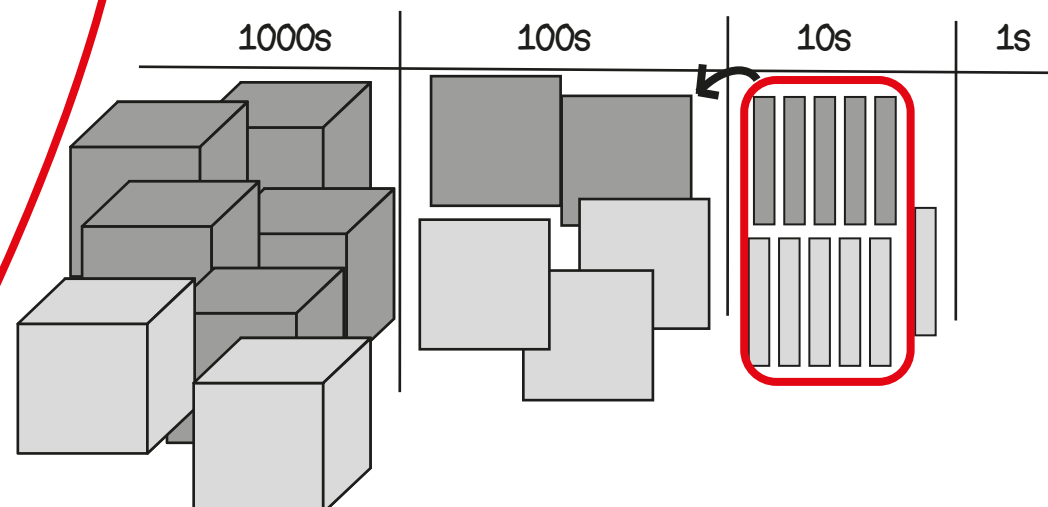
Regroup and rename



$5,250 + 2,360$
Partition and recombine

$$5000 + 200 + 50 + 2000 + 300 + 60$$

$$7000 + 500 + 110 = 7610$$



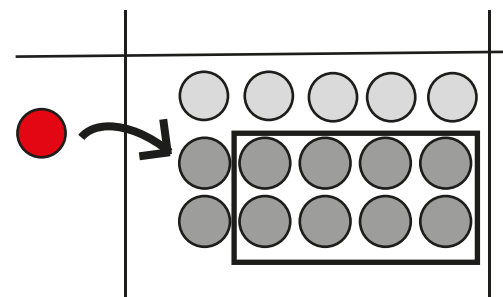
13 - 5, 1.8 - 0.8
Number facts
Single digit numbers
Halves
Wholes and tenths

I just knew it!

15 - 8 = 7
Use known facts

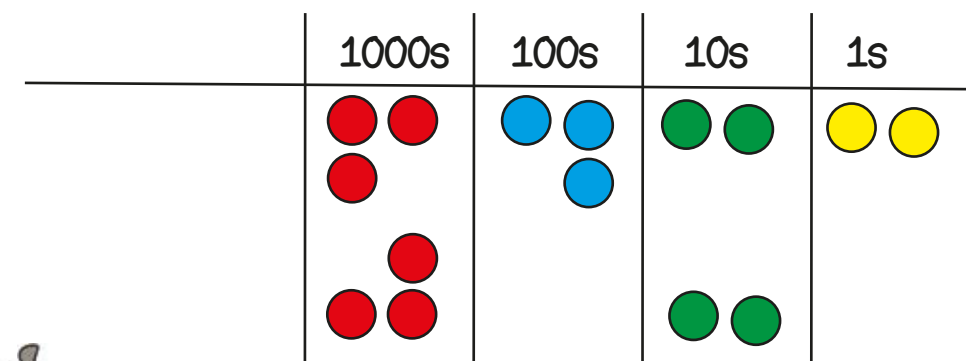
If I know 15 - 8 = 7
then I know
1.5 - 0.8 = 0.7

150 - 80 = 70
1500 - 800 = 700

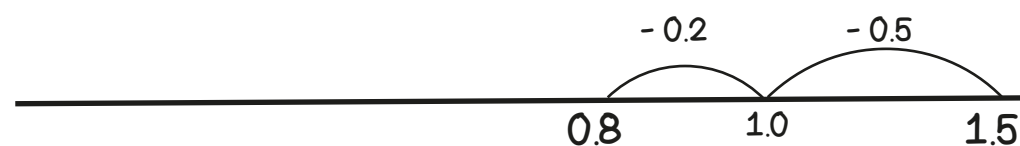


6,342 - 3,020
Use place value to subtract

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



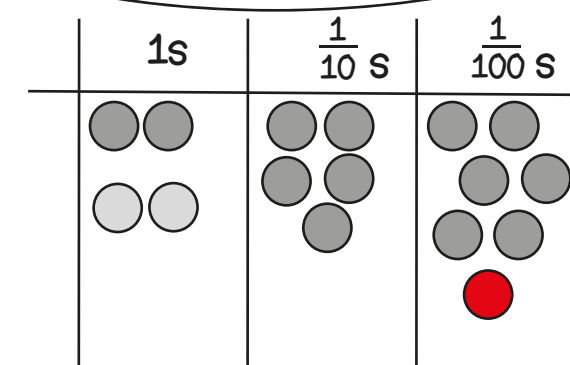
1.5 - 0.7
Bridge through boundaries
by counting in efficient steps



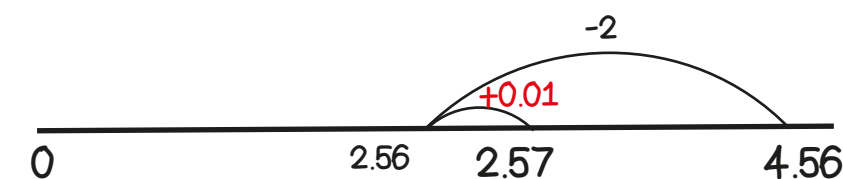
How shall I subtract?



4.56 - 1.99
Round then adjust



Take away 2 then add one hundredth



5,352 - 2,136
Formal written method

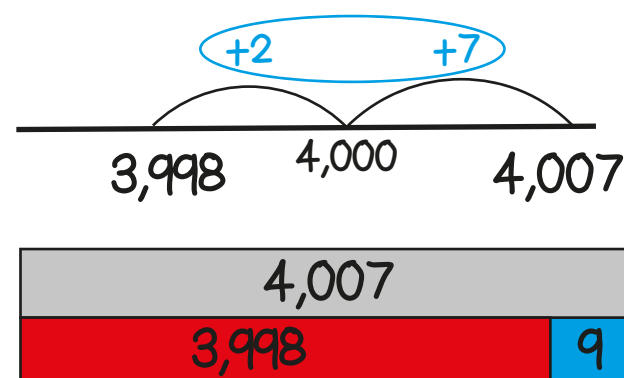
Exchange ten of
these for one of
those!

$$\begin{array}{r} 5,352 \\ - 2,436 \\ \hline 2,916 \end{array}$$

Regroup and rename

1000s	100s	10s	1s

4007 - 3998
Find the difference between
two numbers



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

2.34×100
Multiply by 10, 100

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

$$6 \times 4 = 24$$

$$60 \times 4 = 240$$

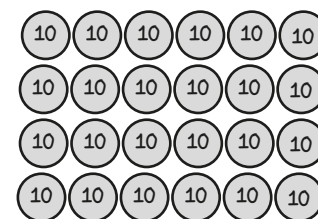
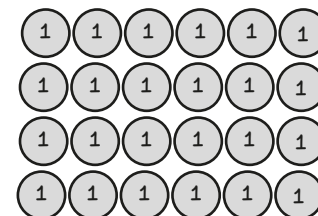
$$60 \times 40 = 2400$$

$$6 \times 10 \times 4 \times 10$$

$$= 24 \times 100$$

6×4
Use known facts
and place value

40 is ten times
greater than 4

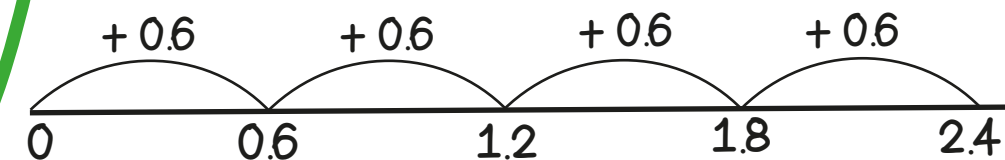


0.6 is ten times
smaller than 6

6×4
Use known facts
and place value

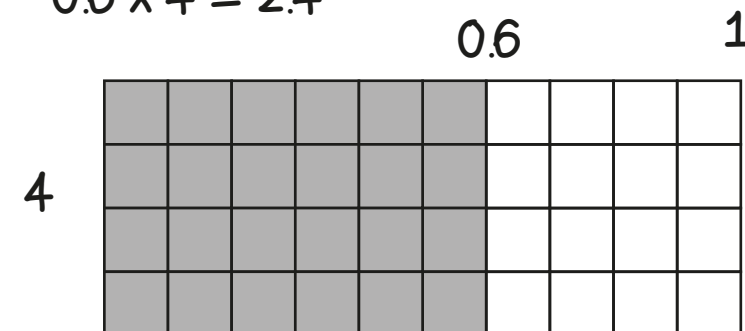
$$0.6 \times 4 = 2.4$$

4 jumps of 0.6



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

$$0.6 \times 4 = 2.4$$



How shall I multiply?



7×36
Use the
distributive law

$$7 \times 36$$

$$= 7 \times 30 + 7 \times 6$$

$$= 210 + 42$$

$$= 252$$

$$7 \begin{array}{r|l} 30 & 6 \\ \hline 210 & 42 \end{array}$$

36×7
Formal written method

	30	6	
7	210	42	

$$\begin{array}{r} 36 \\ \times 7 \\ \hline 252 \\ 4 \end{array}$$

45×6
Use factors and
commutativity

Write as factors
then re-order

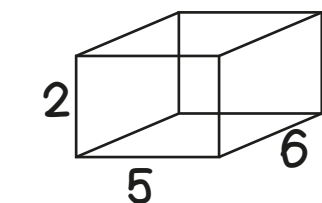
$$45 \times 6$$

$$= 5 \times 9 \times 6$$

$$= 5 \times 6 \times 9$$

$$= 30 \times 9$$

$$= 270$$



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

$$2 \times 30 = 10 \times 6$$

$$236 \times 7$$

200	30	6
$\times 7$	$\times 7$	$\times 7$
1400	210	42

$$1400 + 210 + 42 = 1652$$

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

$24 \div 100$
Divide by 10, 100

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

24
↓ $\div 10$
2.4
↓ $\div 10$
0.24

↓ $\div 100$

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

$$\begin{aligned} 24 \div 4 &= 6 \\ 240 \div 40 &= 6 \\ 2400 \div 400 &= 6 \end{aligned}$$

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

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

240 is ten times
greater than 24

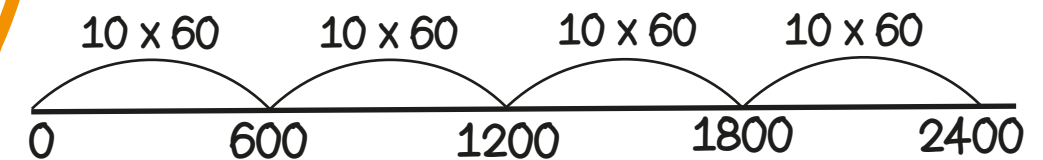
24 biscuits shared between
4 people means they will get
6 biscuits each.
If there are 100 times as many
people and 100 times as many
biscuits, how many biscuits
each now?

60 is ten times
greater than 6

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

$$2400 \div 60 = 40$$

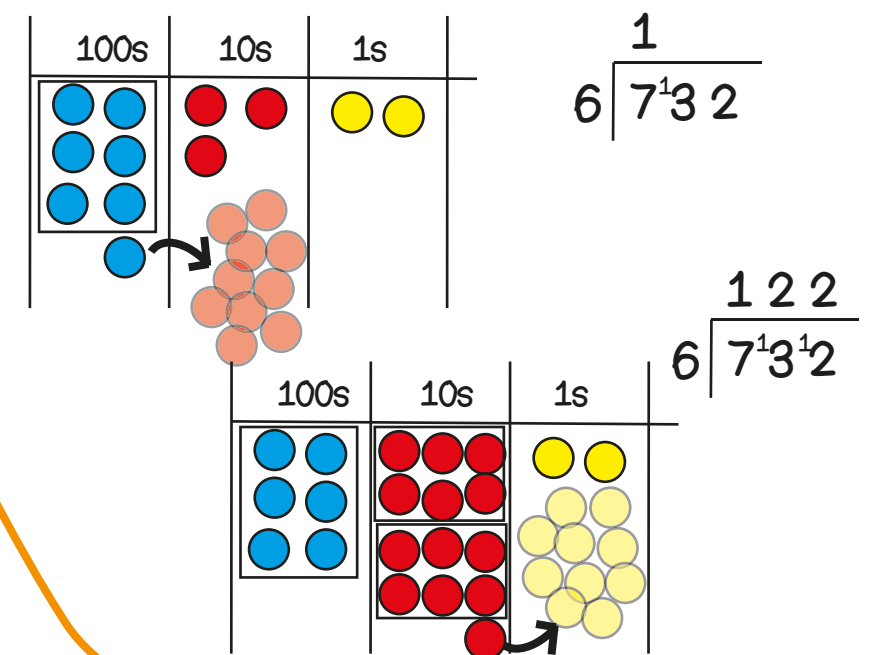
How many steps of 60 make 2400?



How shall I divide?



$732 \div 6$
Formal written method



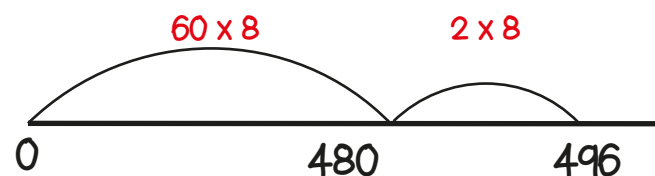
$516 \div 12$
Using factors

$$516 \div 3 \div 4$$

516											
172				172				172			
43	43	43	43								

$496 \div 8$
Partition and recombine

$$\begin{array}{r} 496 \div 8 \\ \hline 480 \quad 16 \\ \div 8 \quad \div 8 \\ \hline 60 \quad + \quad 2 = 62 \end{array}$$



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.

10,000s	1000s	100s	10s	1s
1	2	4	0	3
	3	0	2	0

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!

Regroup and rename

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

1 1 1 1

35,040 + 22,070
 Partition and recombine

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

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

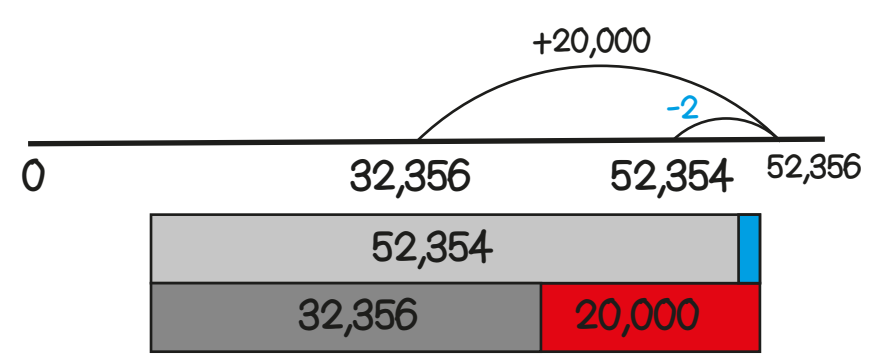
32,356 + 19,998
 Round then adjust

10,000s	1000s	100s	10s	1s
3	2	3	5	6
	2	0	9	9

Add 20,000 then subtract 2

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

10,000s	1000s	100s	10s	1s
3	2	0	5	6
	2	0	9	9

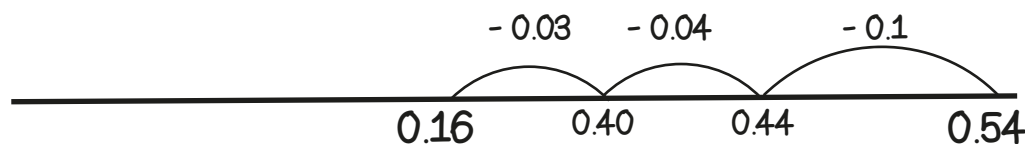


9 - 4, 13 - 5, 18 - 9
Number facts
Single digit decimals
Halves
Subtract from 1 and 100

I just knew it!

Rapid fluency of
2 digit subtract
2 digit numbers

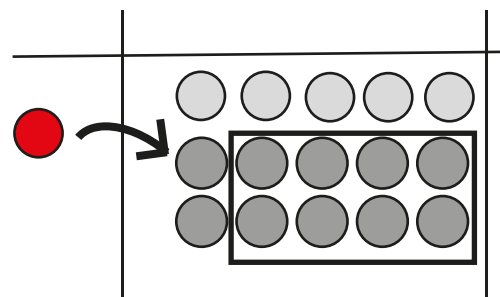
0.54 - 0.17
Bridge through boundaries
by counting in efficient steps



15 - 8 = 7
Use known facts

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

$$\begin{aligned} 15,000 - 8,000 &= 7,000 \\ 150,000 - 80,000 &= 70,000 \\ 1,500,000 - 800,000 &= 700,000 \end{aligned}$$



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.



How shall I subtract?

45,748 - 26,374
Formal written method

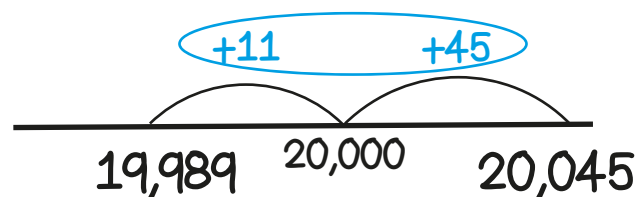
Exchange ten of
these for one of
those!

$$\begin{array}{r} \overset{3}{4} \overset{1}{5}, \overset{6}{7} \overset{1}{4} 8 \\ - 26,374 \\ \hline 19,374 \end{array}$$

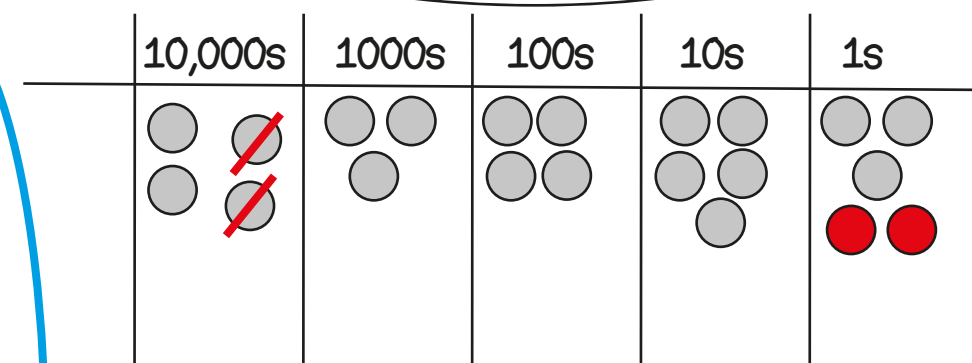
Regroup and rename

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

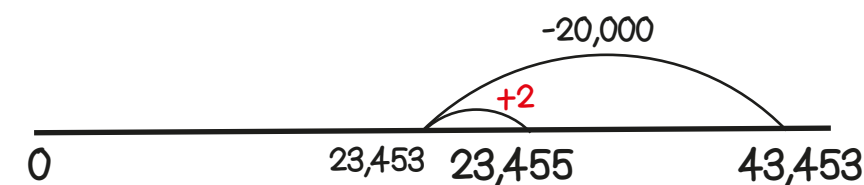
20,045 - 19,989
Find the difference between
two numbers



43,453 - 19,998
Round then adjust



Take away 20,000 then add 2



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

2.34×1000
Multiply by 10, 100, 1000

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

423×4
Partition and recombine

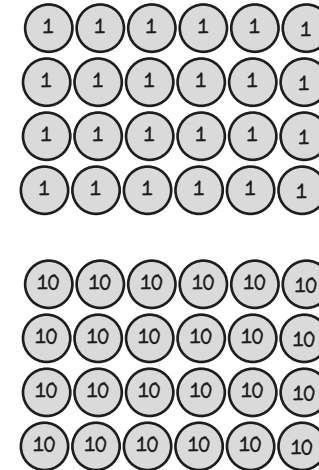
$$\begin{array}{r}
 423 \times 4 \\
 \hline
 400 \times 4 = 1600 \\
 20 \times 4 = 80 \\
 3 \times 4 = 12 \\
 \hline
 1600 + 80 + 12 = 1692
 \end{array}$$

6×4
Use known facts
and place value

$$\begin{aligned}
 6 \times 4 &= 24 \\
 60 \times 4 &= 240 \\
 60 \times 40 &= 2400
 \end{aligned}$$

$$6 \times 10 \times 4 \times 10 = 24 \times 100$$

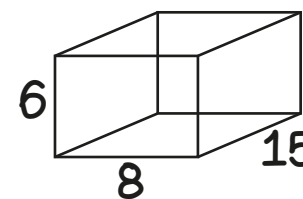
40 is ten times
greater than 4



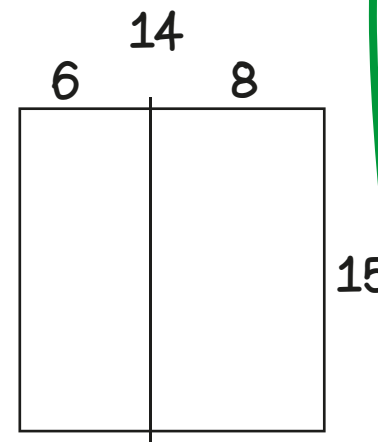
How shall I multiply?

15×42
Using factors and
distributive law

$$\begin{aligned}
 15 \times 48 &= 15 \times 6 \times 8 \\
 &= 90 \times 8 \\
 &= 720
 \end{aligned}$$



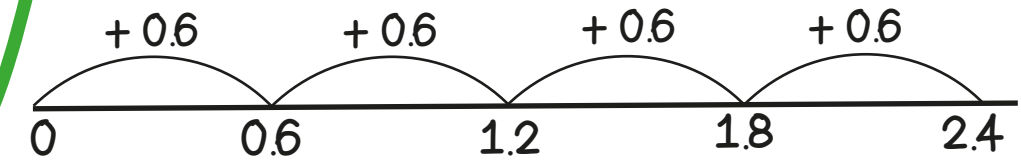
$$\begin{aligned}
 15 \times 14 &= 15 \times 6 + 15 \times 8 \\
 &= 90 + 120 \\
 &= 210
 \end{aligned}$$



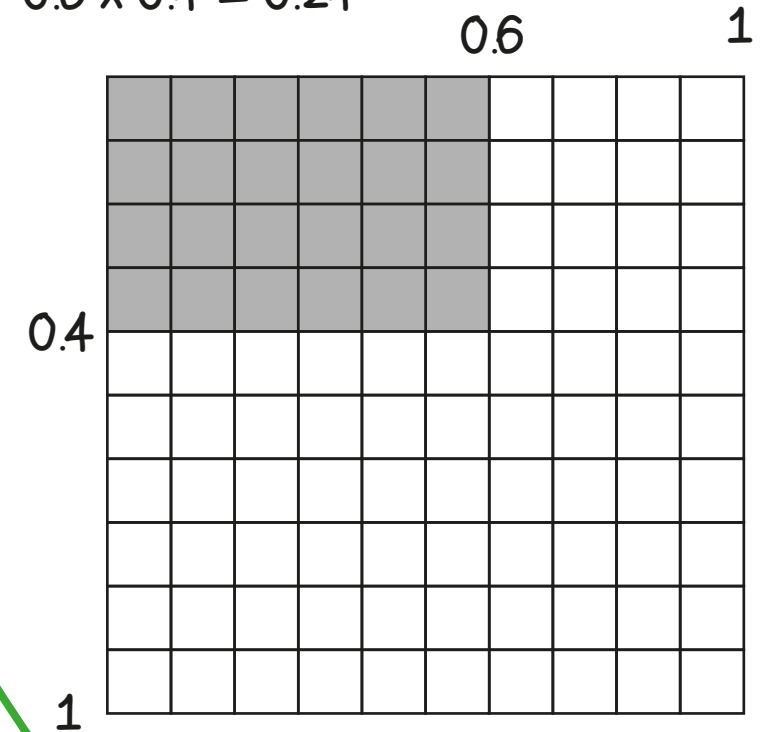
0.6 is ten times
smaller than 6

6×4
Use known facts
and place value

$$\begin{aligned}
 0.6 \times 4 &= 2.4 \\
 4 \text{ jumps of } 0.6
 \end{aligned}$$



$$\begin{aligned}
 0.6 \times 0.4 &= 24 \text{ hundredths} \\
 0.6 \times 0.4 &= 0.24
 \end{aligned}$$



427×38
Formal written method

	400	20	7	
30	12,000	600	210	
8	3,200	160	56	
				$ \begin{array}{r} 427 \\ \times 38 \\ \hline 3416 \\ 12810 \\ \hline 16226 \end{array} $

Include calculations where remainders occur

24,000 is a thousand times greater than 24

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

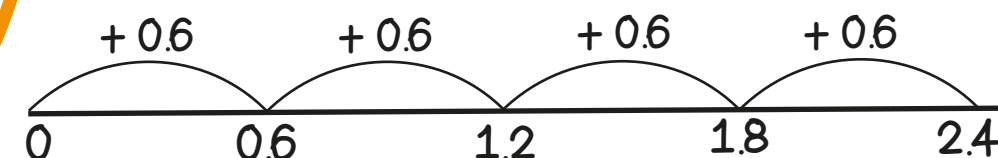
If there are 1000 times as many people and 1000 times as many biscuits, how many biscuits each now?

$$24,000 \div 400 = \frac{24 \times 1000}{4 \times 100}$$
$$\frac{240}{4} = 60$$

0.6 is ten times smaller than 6

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

How many steps of 0.6 make 2.4?



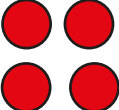
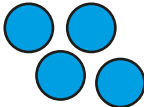
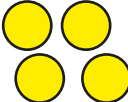
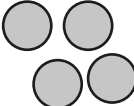
100s	10s	1s	$\frac{1}{10}$ s	$\frac{1}{100}$ s	$\frac{1}{1000}$ s
					
					
					
					

Diagram illustrating the relationship between 24, 2.4, 0.24, and 0.024:

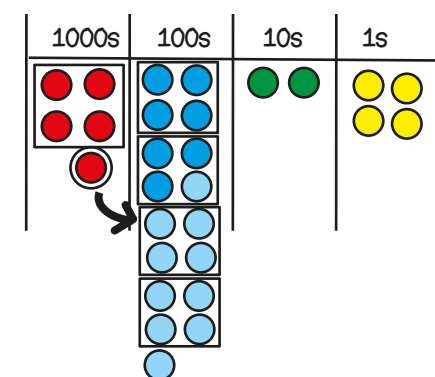
- 24 $\div 10$ 2.4
- 2.4 $\div 10$ 0.24
- 0.24 $\div 10$ 0.024
- 24 $\div 1000$ 0.024

How shall I divide?



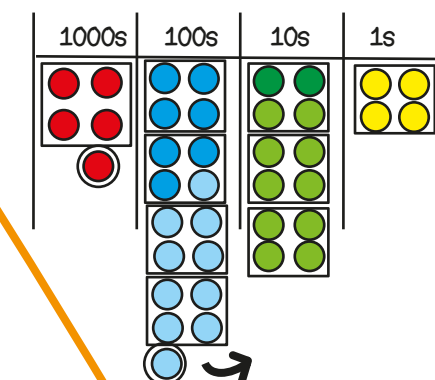
5724 ÷ 4

Formal written method



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

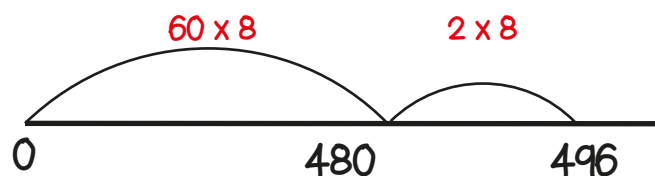
1512 $\div$ 24
Using factors



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

496 ÷ 8

Partition and recombine



$$\begin{array}{r} 496 \div 8 \\ \swarrow \quad \searrow \\ 480 \quad 16 \\ \div 8 \quad \div 8 \\ 60 \quad + \quad 2 = 62 \end{array}$$

$$1512 \div 6 \div 4$$

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

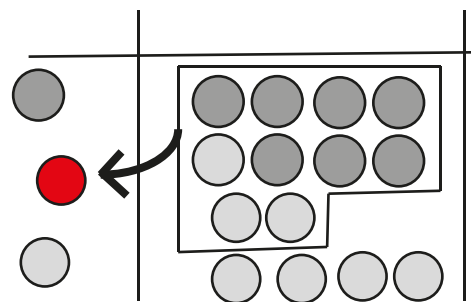
I just knew it!

Rapid fluency of
2 digit add 2 digit numbers

$17 + 17$
Use known facts

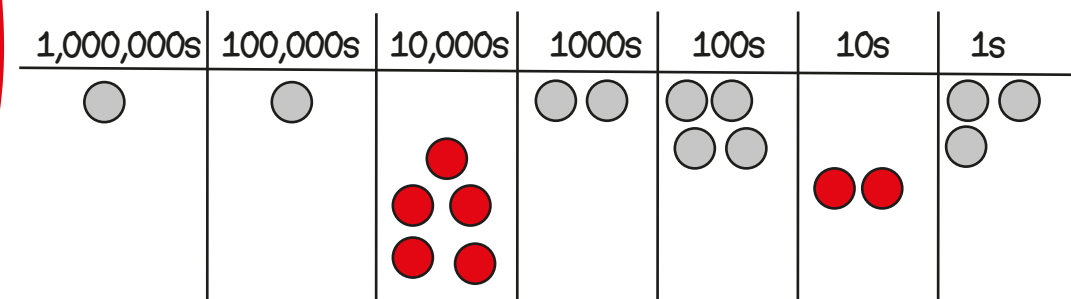
If I know $17 + 17 = 34$
then I know
 $1.7 + 1.7 = 3.4$

$$\begin{aligned} 17,000 + 17,000 &= 34,000 \\ 170,000 + 170,000 &= 340,000 \\ 1,700,000 + 1,700,000 &= 3,400,000 \end{aligned}$$

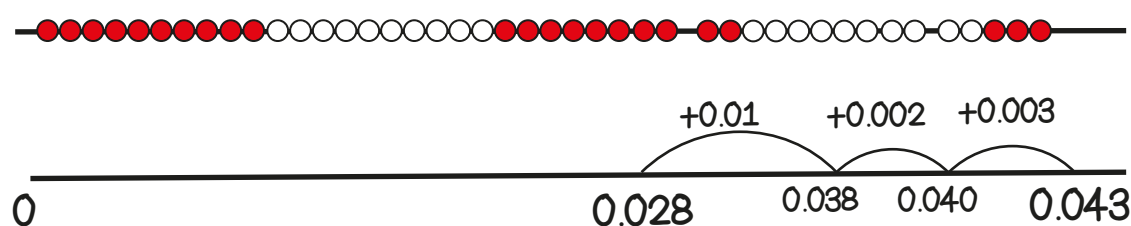


$1,102,403 + 50,020$
Use place value to add

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



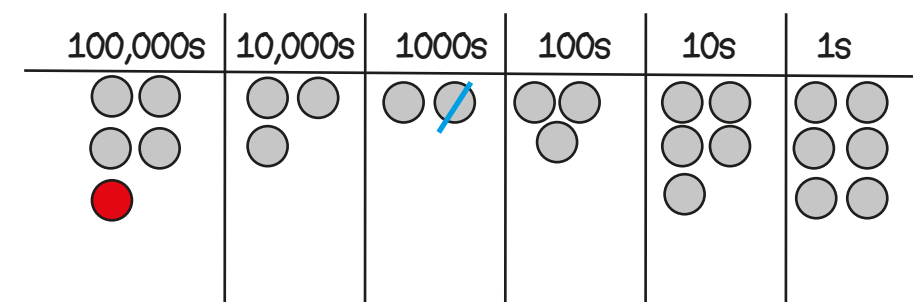
$0.028 + 0.015$
Bridge through boundaries
by counting in efficient steps



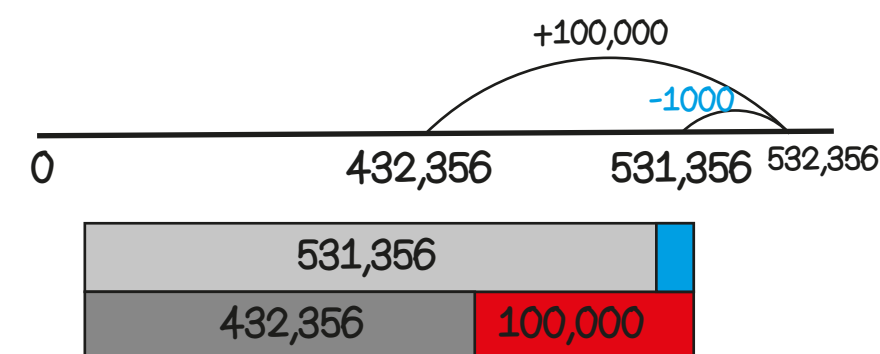
How shall I add?



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



Add **100,000** then **take away 1,000**



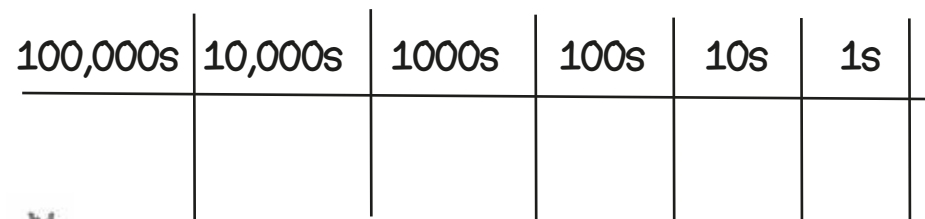
$325,748 + 246,374$
Formal written method

Exchange ten of
these for one of
those!

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

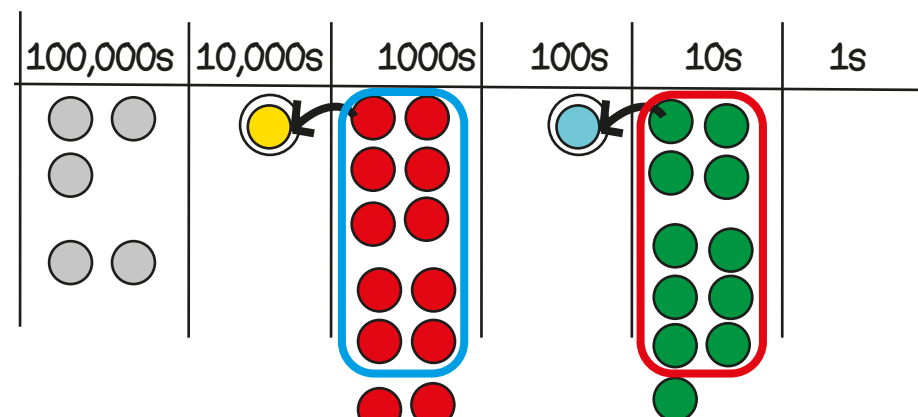
1 1 1 1

Regroup and rename



$307,040 + 206,070$
Partition and recombine

$$\begin{aligned} &300,000 + 7,000 + 40 + 200,000 + 6,000 + 70 \\ &500,000 + 13,000 + 110 = 513,110 \end{aligned}$$

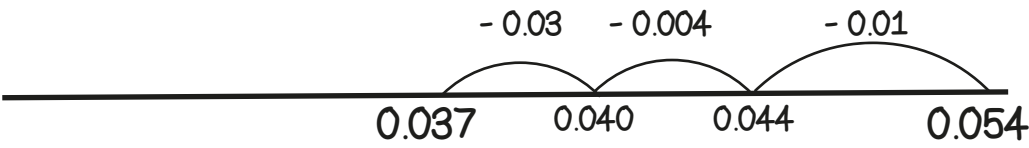


0.9 - 0.4, 100 - 65
Number facts
Single digit decimals
Halves
Bonds of 1 and 100

I just knew it!

Rapid fluency of
2 digit subtract
2 digit numbers

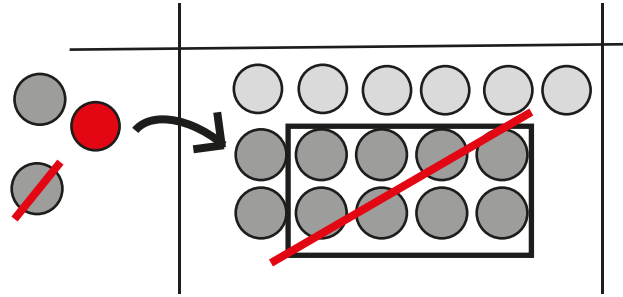
0.054 - 0.017
Bridge through boundaries
by counting in efficient steps



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

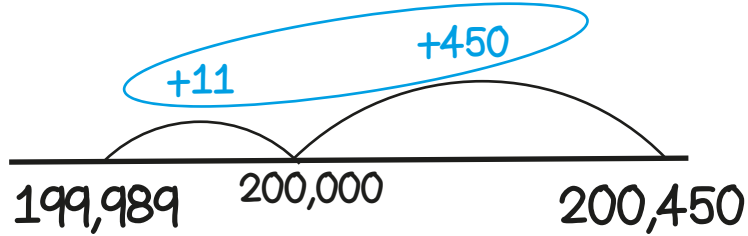
Exchange ten of these for one of those!

Regroup and rename

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

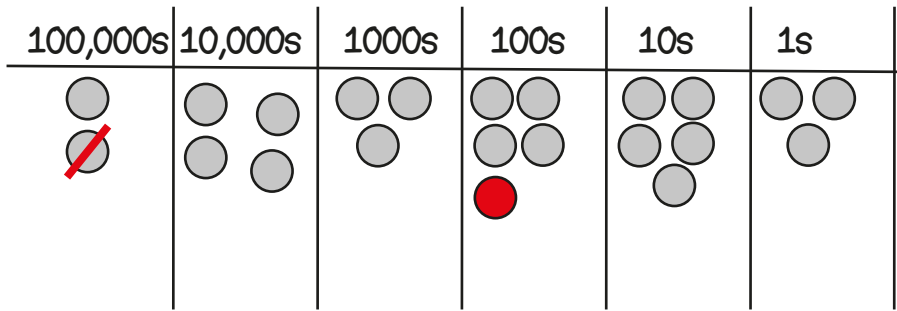
100,000s	10,000s	1000s	100s	10s	1s

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

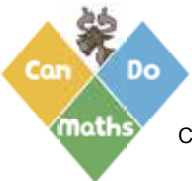
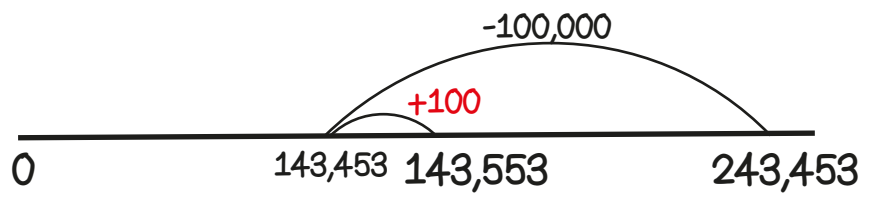


200,450
199,989
461

243,453 - 99,900
Round then adjust



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

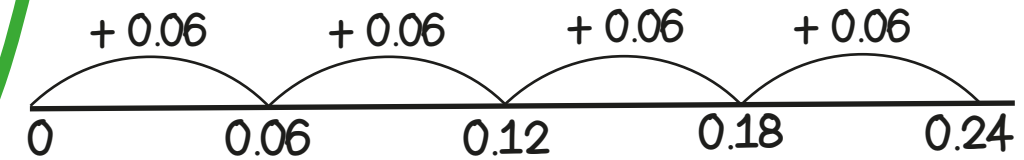
$$\begin{aligned} 60 \times 40 &= 2400 \\ 600 \times 400 &= 240,000 \\ 6000 \times 4000 &= 24,000,000 \end{aligned}$$

$$\begin{aligned} 6 \times 10 \times 4 \times 10 \\ = 24 \times 100 \end{aligned}$$

0.6 is ten times
smaller than 6

6 x 4
Use known facts
and place value

$$\begin{aligned} 0.06 \times 4 &= 0.24 \\ 4 \text{ jumps of } 0.06 \end{aligned}$$



2.34 x 1000
Multiply by 10, 100, 1000

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

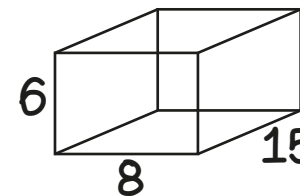
$$\begin{aligned} 2.34 &\xrightarrow{\times 10} 23.4 \\ &\xrightarrow{\times 10} 234 \\ &\xrightarrow{\times 10} 2340 \end{aligned}$$

How shall I multiply?

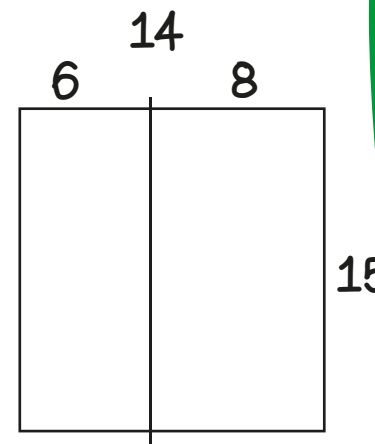


15 x 42
Using factors and
distributive law

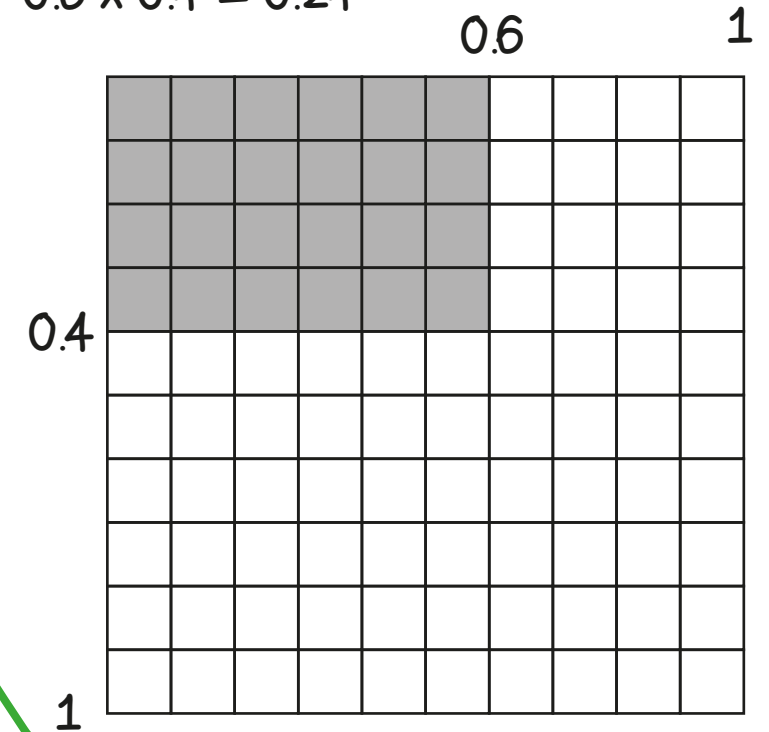
$$\begin{aligned} 15 \times 48 \\ = 15 \times 6 \times 8 \\ = 90 \times 8 \\ = 720 \end{aligned}$$



$$\begin{aligned} 15 \times 14 \\ = 15 \times 6 + 15 \times 8 \\ = 90 + 120 \\ = 210 \end{aligned}$$



$$\begin{aligned} 0.6 \times 0.4 &= 24 \text{ hundredths} \\ 0.6 \times 0.4 &= 0.24 \end{aligned}$$



4203 x 4
Partition and recombine

$$\begin{aligned} 4203 \times 4 \\ \begin{array}{r} 4000 \\ 200 \\ 3 \end{array} \times 4 \\ 16,000 + 800 + 12 = 16,812 \end{aligned}$$

2427 x 38
Formal written method

$$\begin{array}{r} 2427 \\ \times 38 \\ \hline 19416 \\ 72810 \\ \hline 92226 \end{array}$$

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

Include calculations where remainders occur

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

240 is ten times greater than 24

$$\begin{aligned} 240 \div 40 &= 6 \\ 2400 \div 400 &= 6 \\ 24,000 \div 4000 &= 6 \\ 240,000 \div 40,000 &= 6 \\ 2,400,000 \div 400,000 &= 6 \end{aligned}$$

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?

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

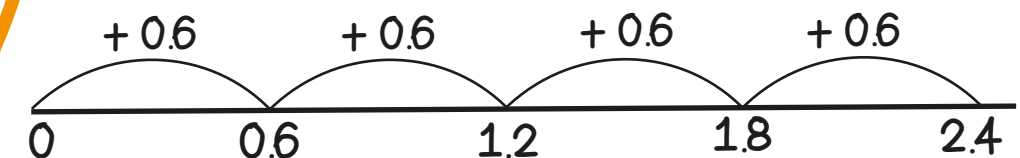
$$\frac{2400}{4} = 600$$

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

0.6 is ten times smaller than 6

$$2.4 \div 0.6 = 4$$

How many steps of 0.6 make 2.4?



$24 \div 1000$
Divide by 10, 100, 1000

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

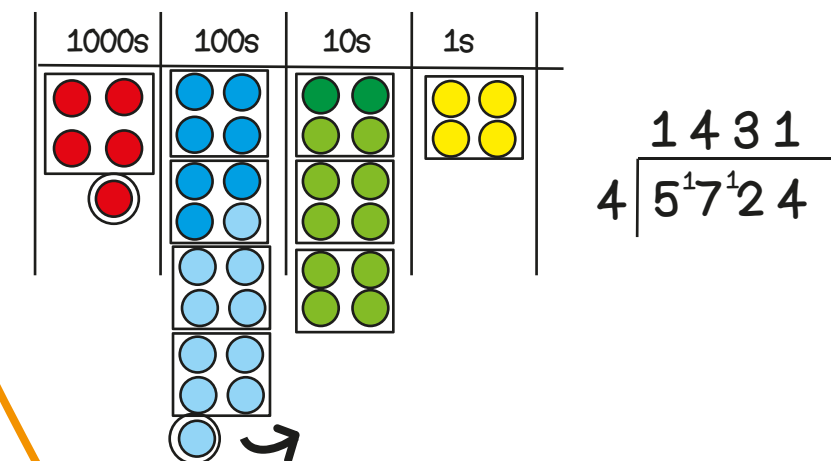
$$\begin{aligned} 24 &\xrightarrow{\div 10} 2.4 \\ 2.4 &\xrightarrow{\div 10} 0.24 \\ 0.24 &\xrightarrow{\div 10} 0.024 \end{aligned}$$

$\div 1000$

How shall I divide?



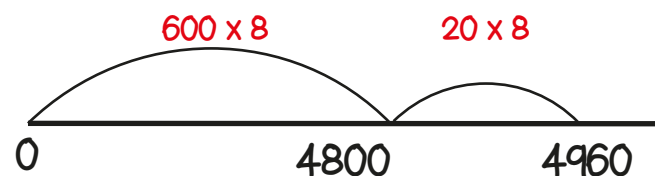
$7182 \div 21$
Formal written method



$1512 \div 24$
Using factors

$4960 \div 8$
Partition and recombine

$$\begin{aligned} 4960 \div 8 &= 4800 \div 8 + 160 \div 8 \\ &= 600 + 20 = 620 \end{aligned}$$



$$1512 \div 6 \div 4$$

1512																							
252				252				252				252				252				252			
63	63	63	63																				

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