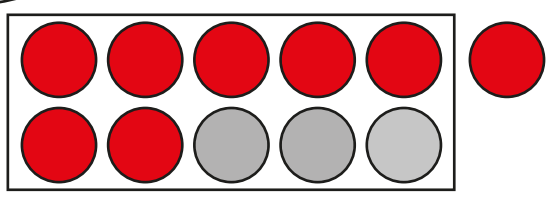


$4 + 1, 6 + 3, 10 + 4$   
 Number facts  
 Single digit numbers  
 Doubles  
 Ten and single digits

I just knew it!

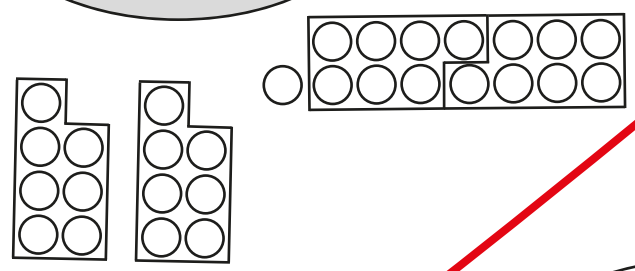
$3 + 7$   
 Use known addition facts

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

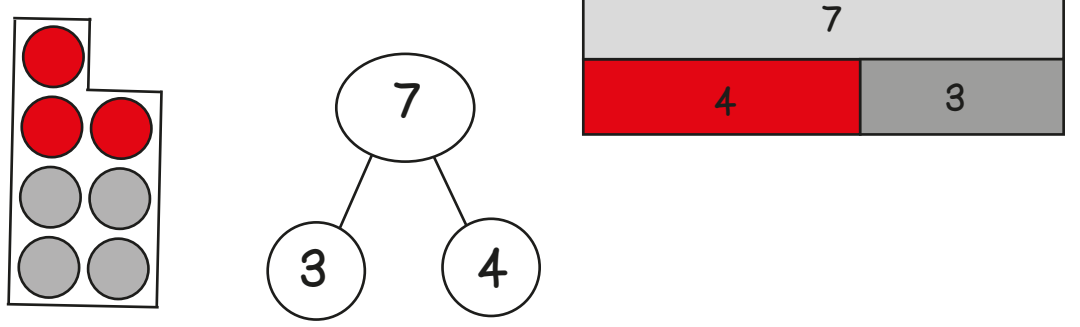


$7 + 8$   
 Use near doubles

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

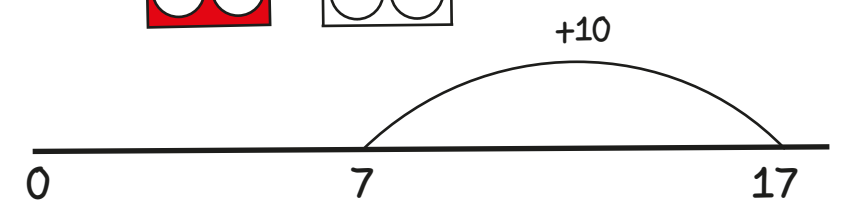
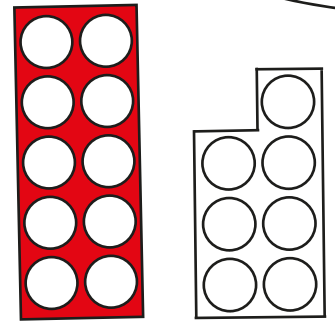


$7 = 3 + 4$   
 Secure addition bonds of  
 single digits and ten

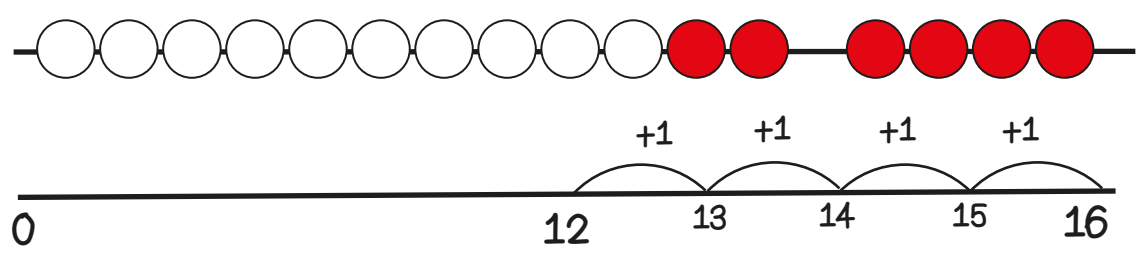


How shall I add?

$7 + 10$   
 Add ten



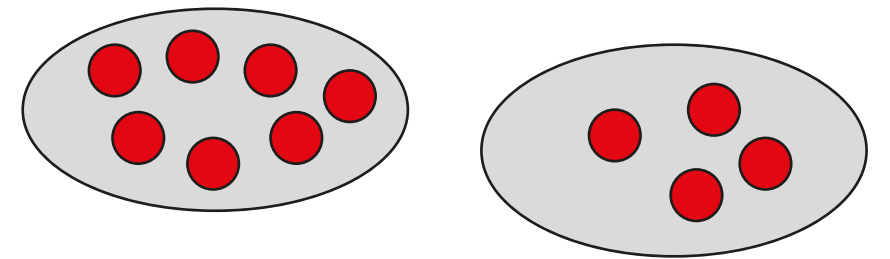
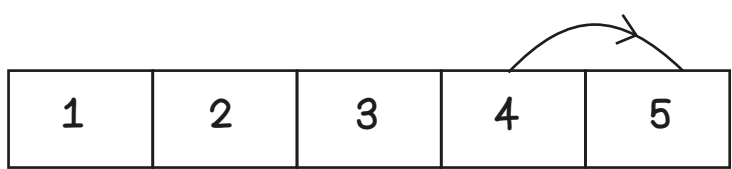
$12 + 4$   
 Counting on in 1s



Notice the relationships

$24 + 1$   
 Find one more

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



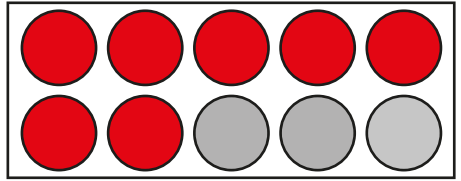
$7 + 4$   
 Count all

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

I just knew it!

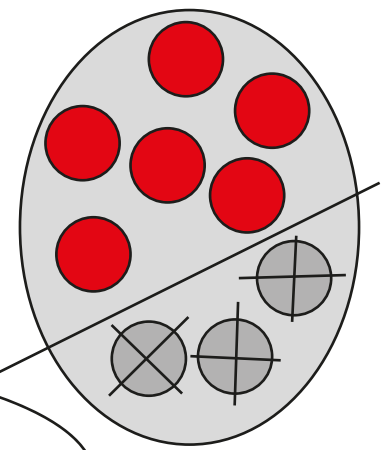
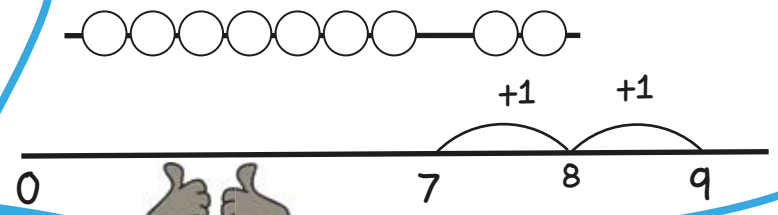
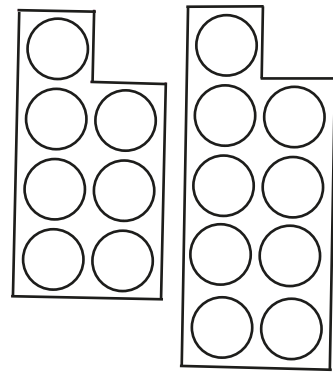
3 + 7  
Use known addition facts  
to derive subtraction facts

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

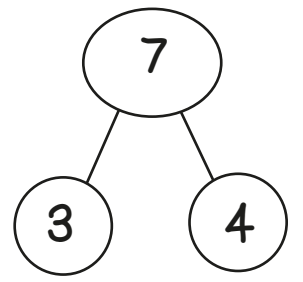
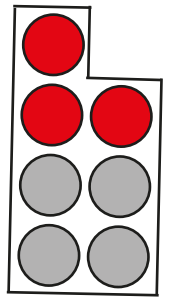


9 - 7  
Find the difference between  
two numbers

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



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



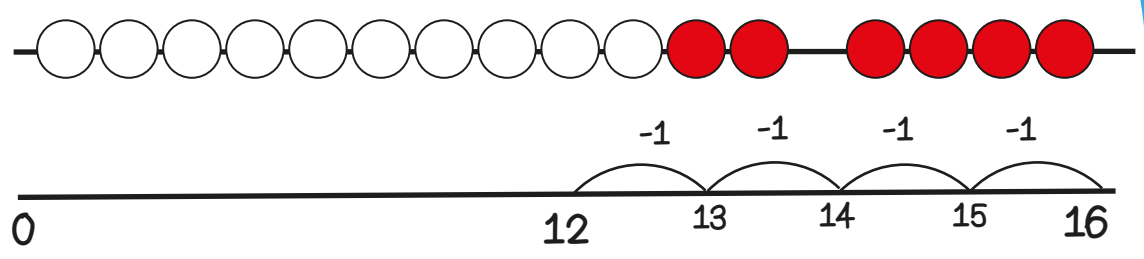
7	
4	3

### How shall I subtract?



9 - 3  
Take away

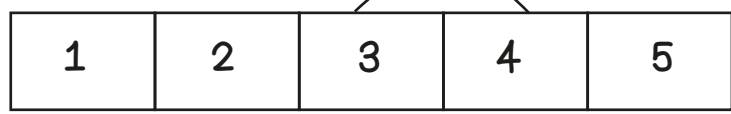
16 - 4  
Counting back in 1s



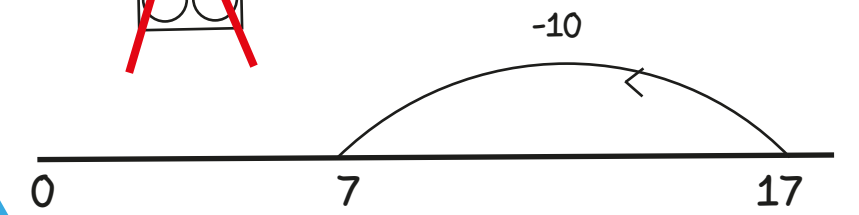
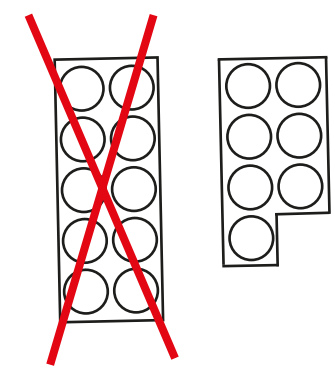
Notice the relationships

23 - 1  
Find one less

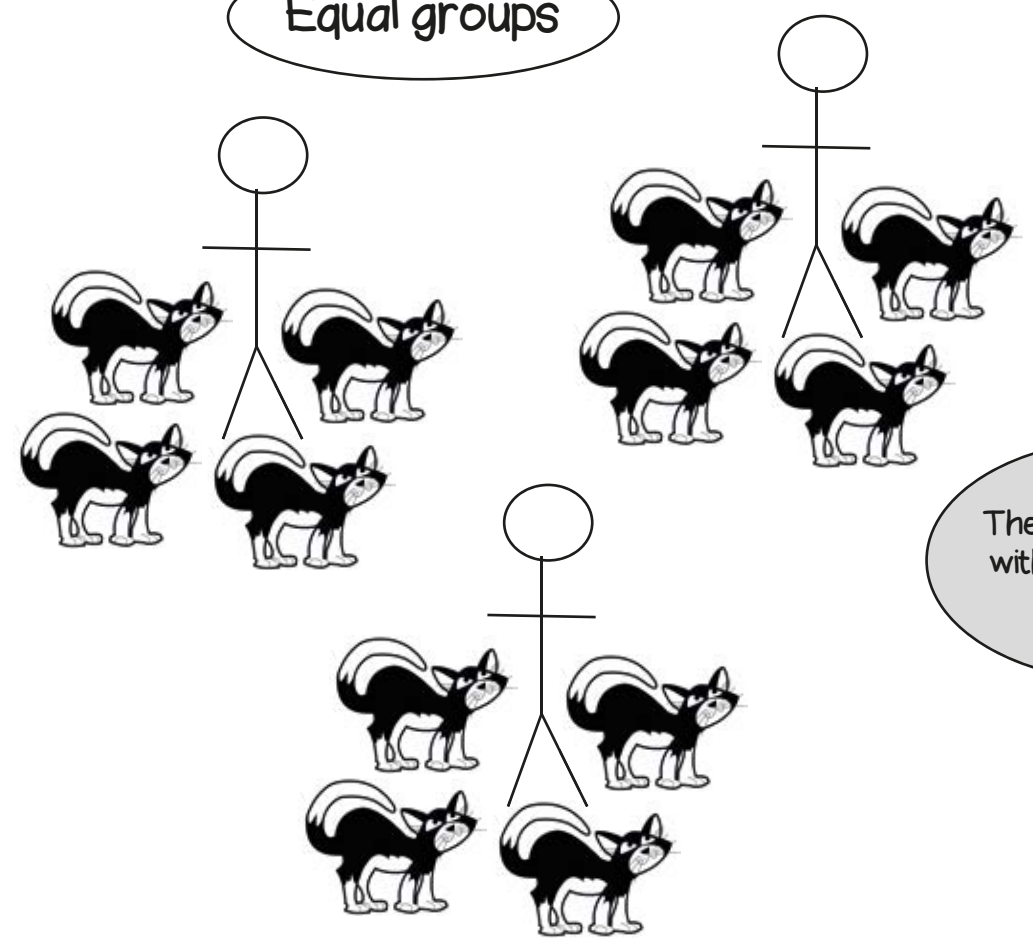
1 less than 4 is 3  
1 less than 14 is 13  
1 less than 24 is 23



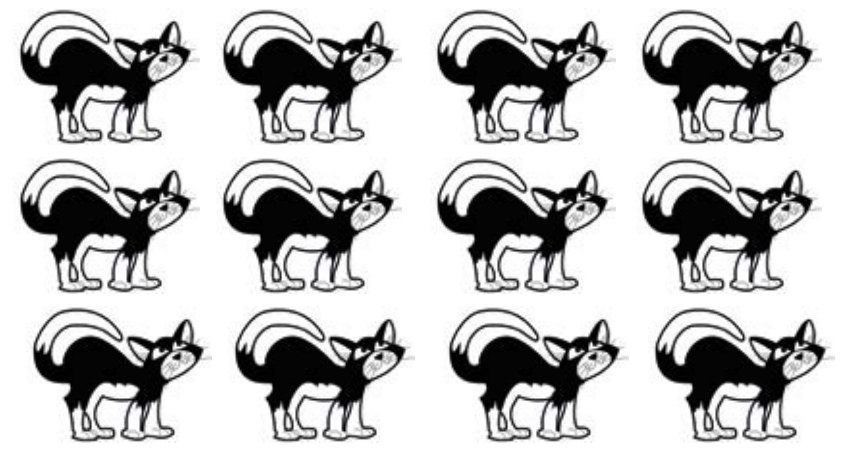
17 - 10  
Take away ten



Equal groups

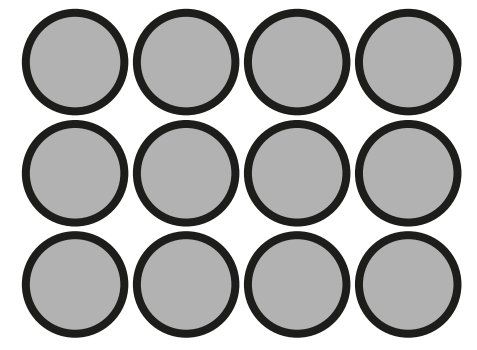


3 people each have 4 cats.  
How many cats are there in total?



There are 3 groups with 4 cats in each group

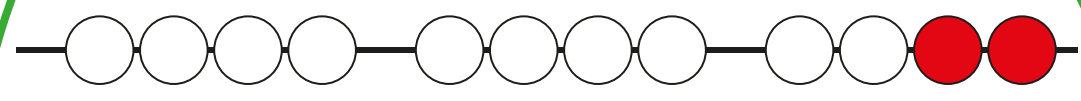
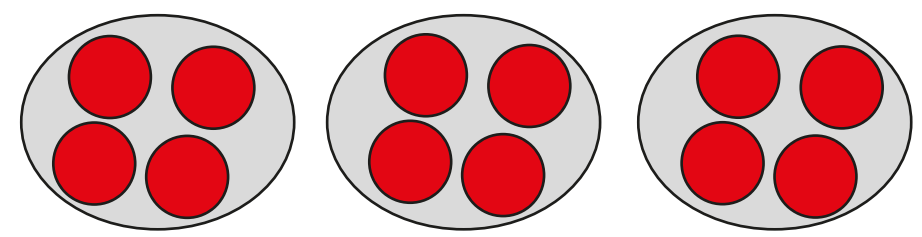
Arrays



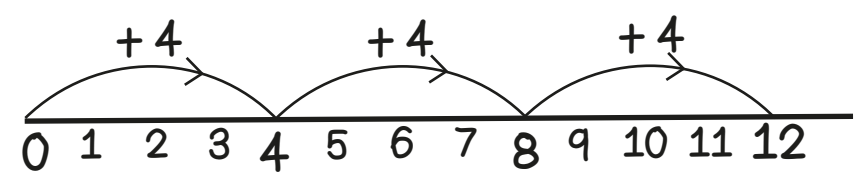
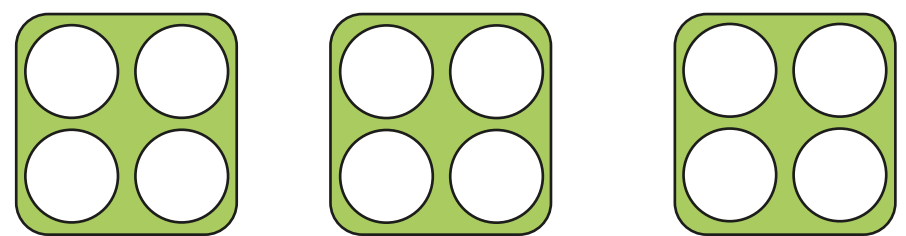
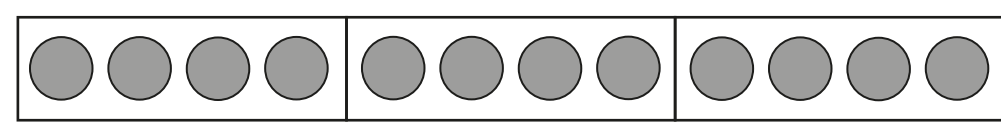
How shall I multiply?

Count in ones

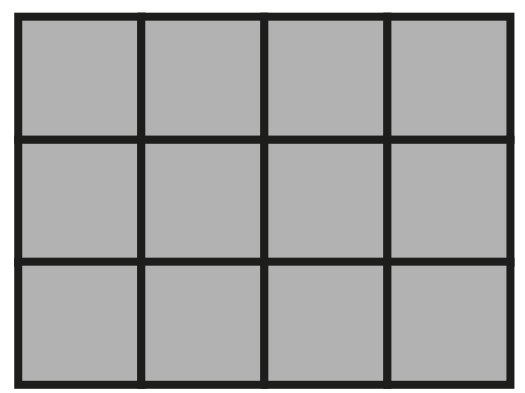
1,2,3,4,5,6,7,8,9,10,11,12



Repeated addition



4 + 4 + 4 = 12





# Sharing

12 shared into 3 equal groups

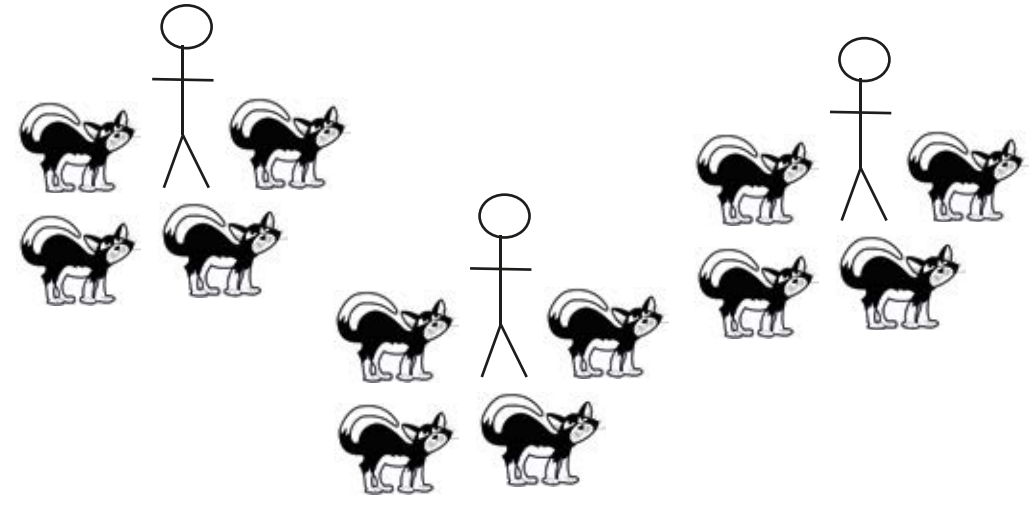
$$12 \div 3 = 4$$

# Grouping

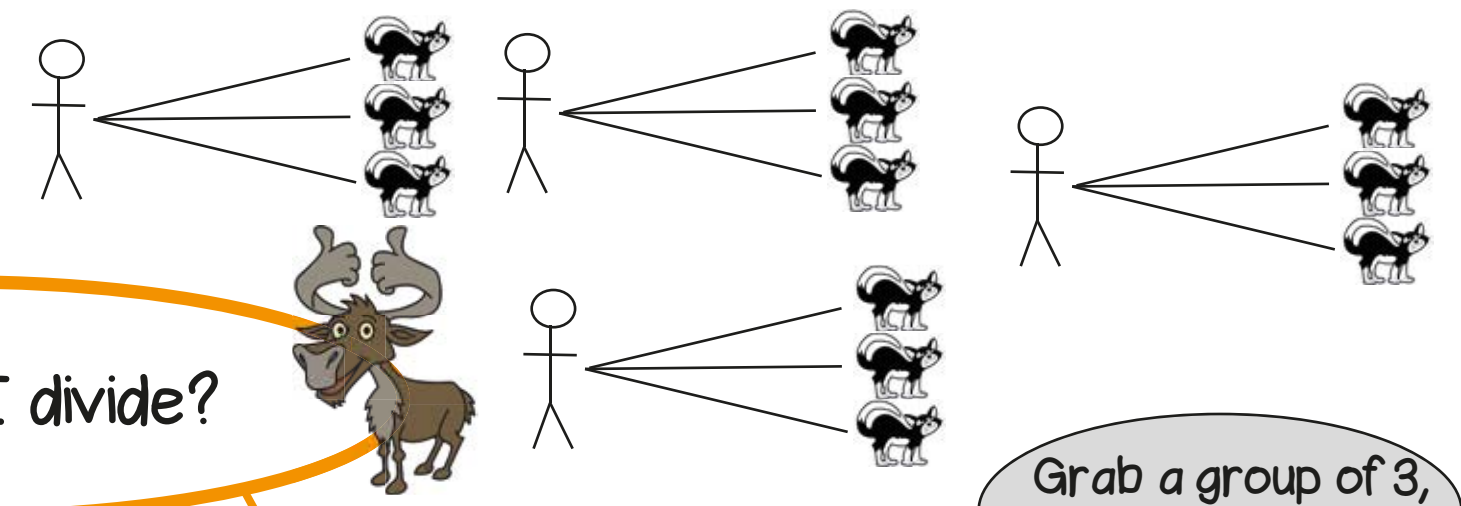
How many groups of 3 are there in 12?

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

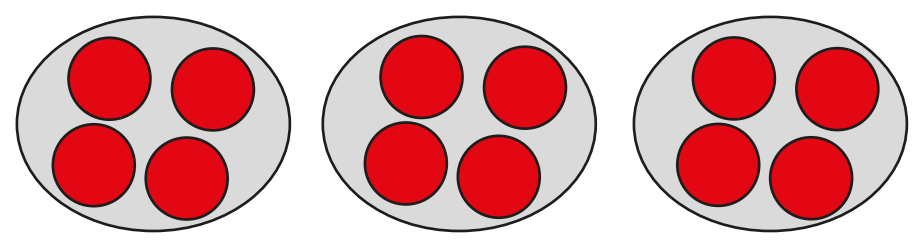
There are 12 cats.  
Each person owns 3 cats.  
How many people are there?



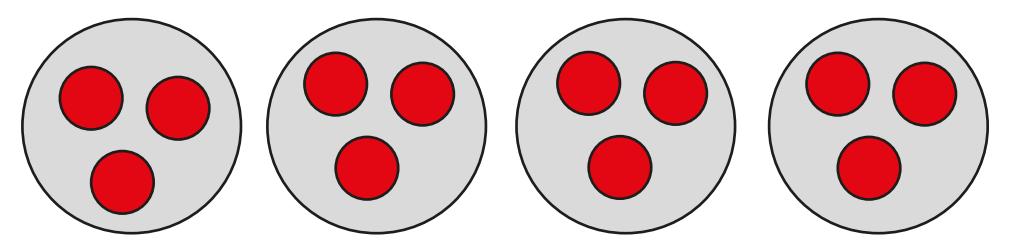
1 for you, 1 for you,  
1 for you...



How shall I divide?

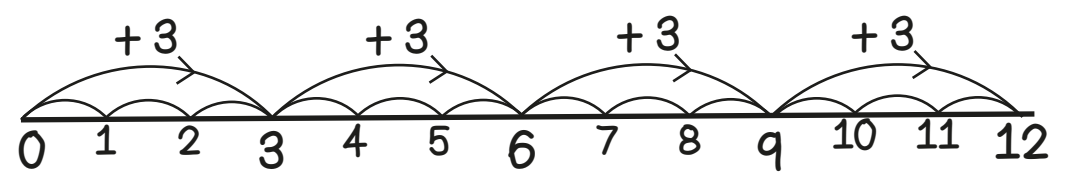
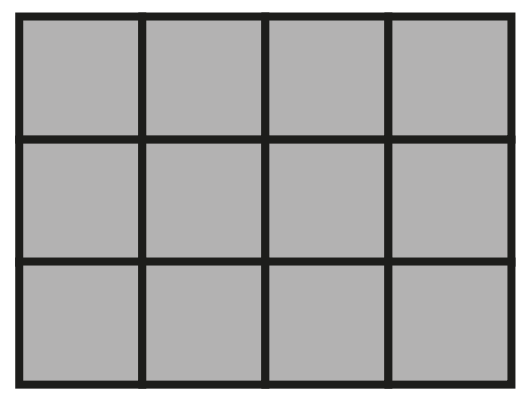
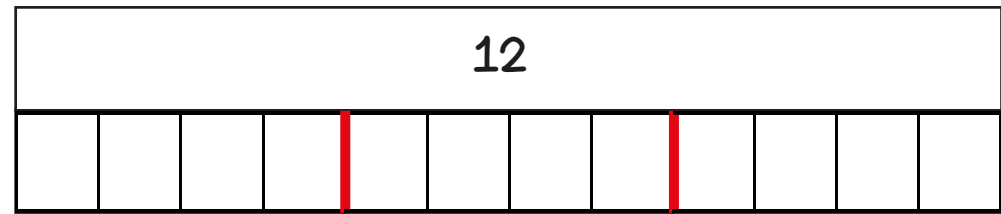
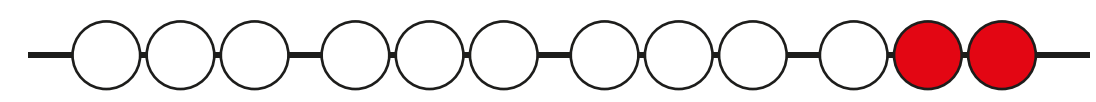
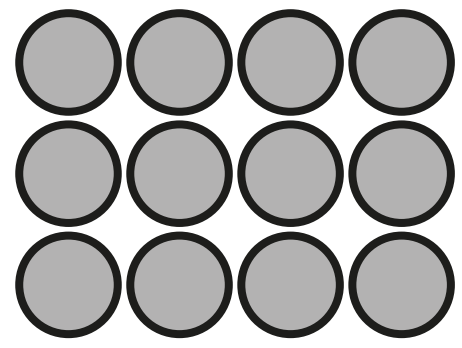
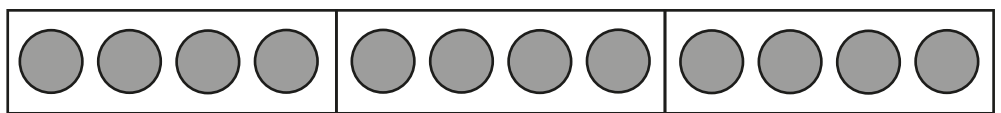


12 can be described as  
3 columns of 4  
or 4 rows of three



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

Bar model



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

I just knew it!

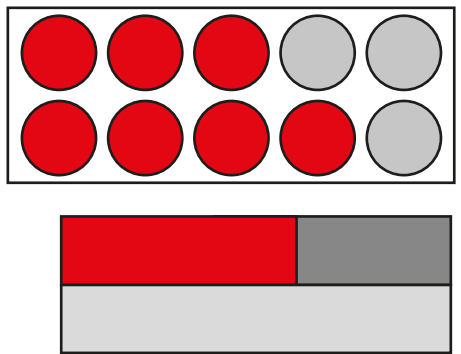
13 + 17  
 Use known facts  
 30 + 70

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

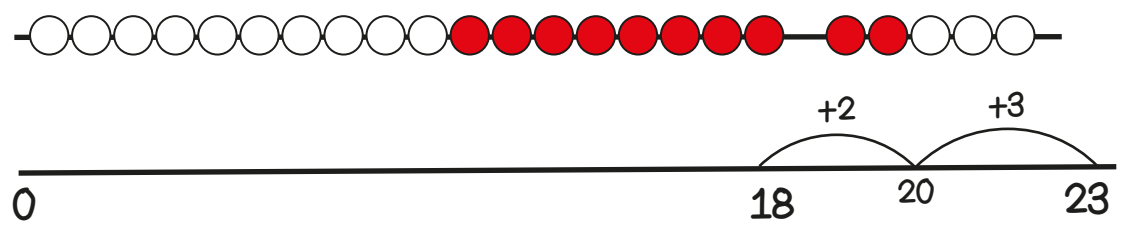
If I know 3 + 7 = 10  
 then I know  
 13 + 17 is 2 tens more

35 + 20  
 Add multiples of ten

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

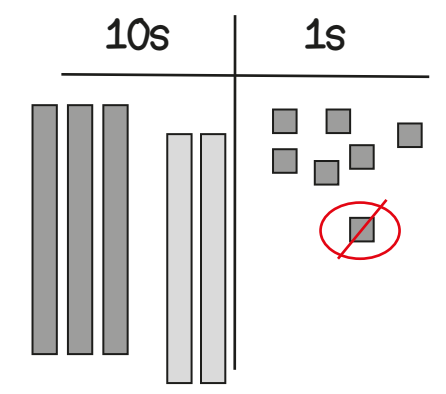


5 + 18  
 Greatest number first  
 then bridge

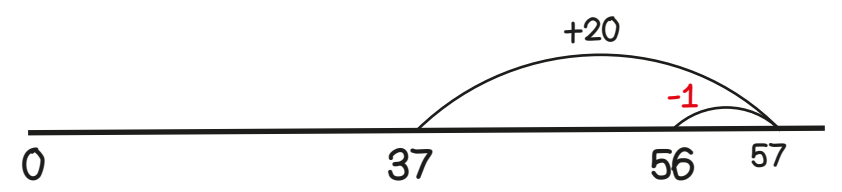


How shall I add?

37 + 19  
 Round then adjust

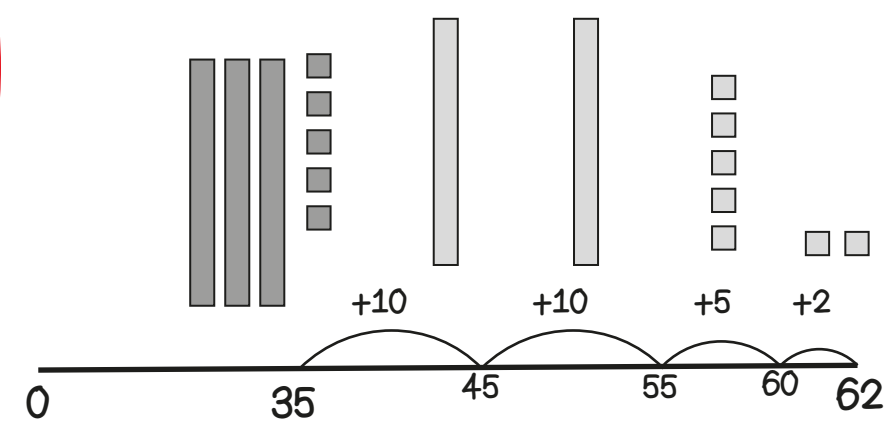
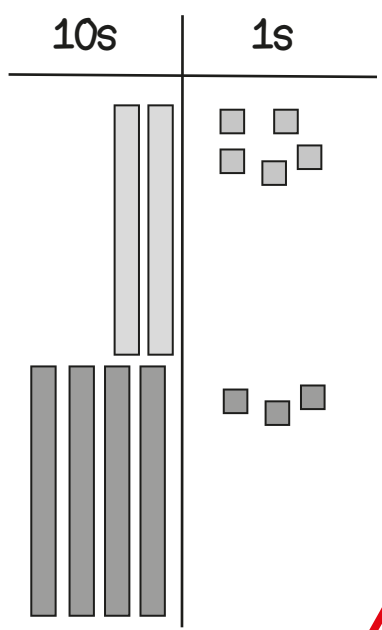


Add 20 then subtract 1



25 + 43  
 Partition and recombine

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

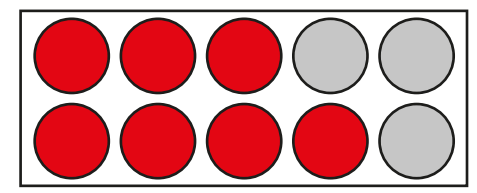


35 + 27  
 Count on in tens then ones

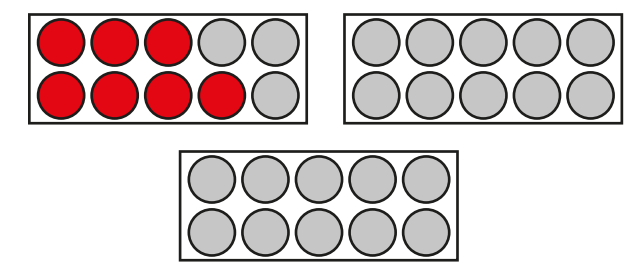
9 - 4, 13 - 5, 18 - 9  
Number facts  
Single digit numbers  
Halves  
Teens and single digits

I just knew it!

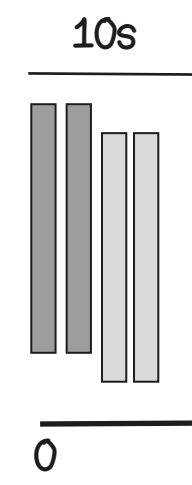
30 - 7  
Use known facts  
100 - 70



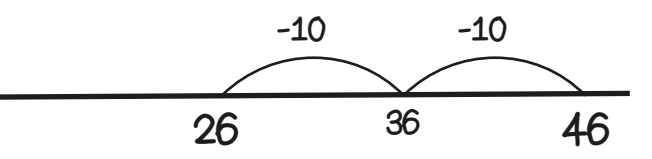
If I know 10 - 7 = 3  
then I know  
30 - 7 is 2 tens and 3



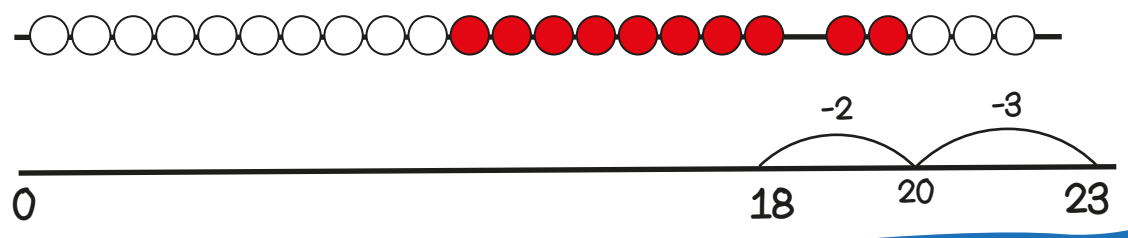
46 - 20  
Count back: multiples of ten



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



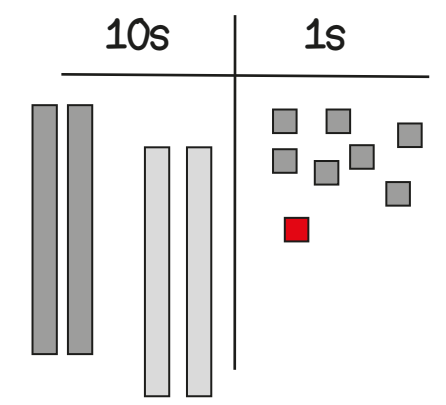
23 - 5  
Count back: bridge through  
a multiple of ten



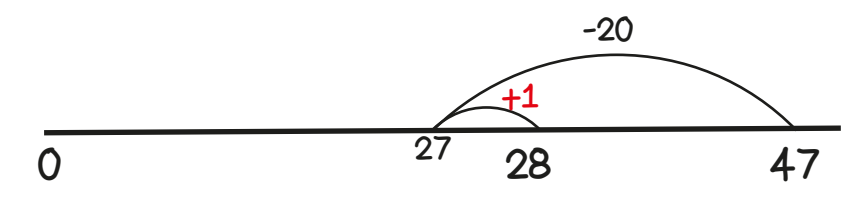
How shall I subtract?



47 - 19  
Round then adjust

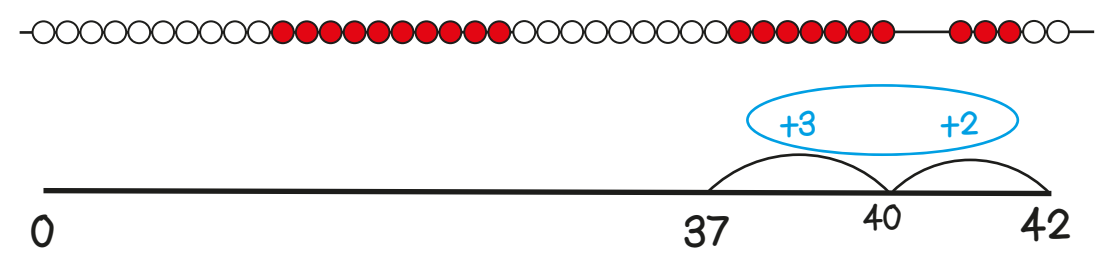
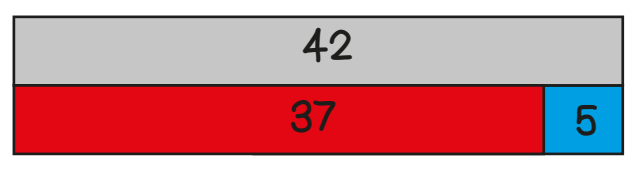


Take away 20 then **add 1**

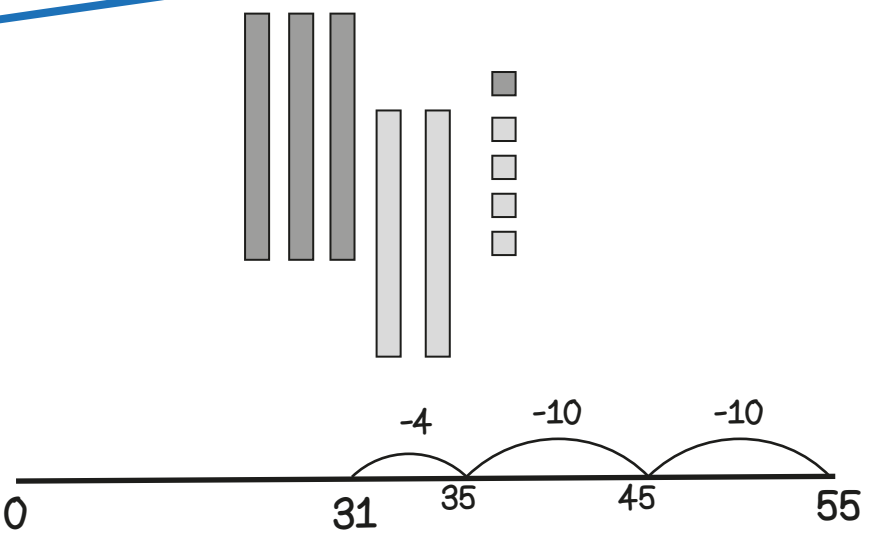


42 is 5 more than 37,  
37 is 5 less than 42 so  
the difference between  
37 and 42 is 5

42 - 37  
Find the difference between  
two numbers



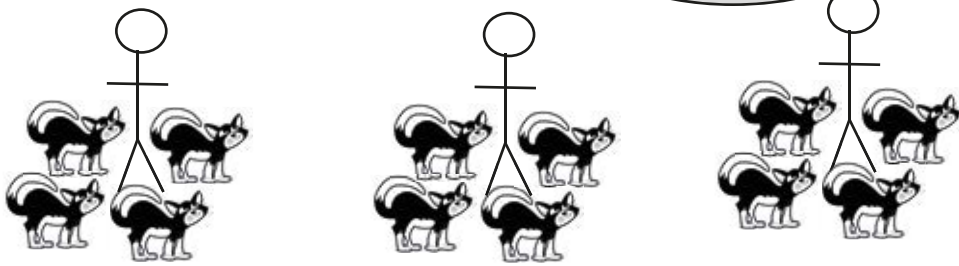
55 - 24  
Count back in tens then ones



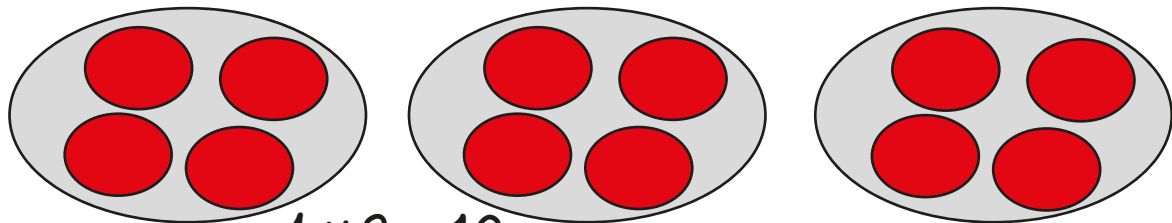


### Equal groups

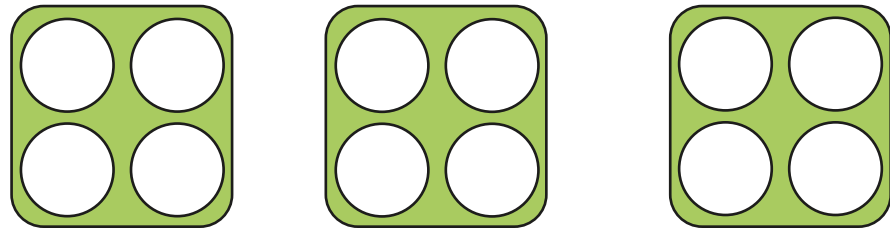
There are 3 groups with 4 cats in each group



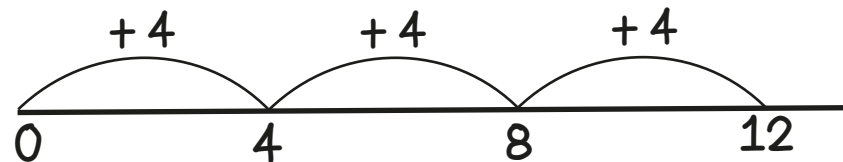
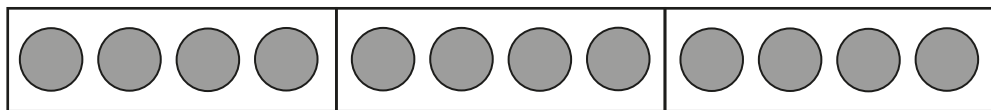
Four cats, multiplied by 3



$4 \times 3 = 12$



### Repeated addition



$4 + 4 + 4 = 12$

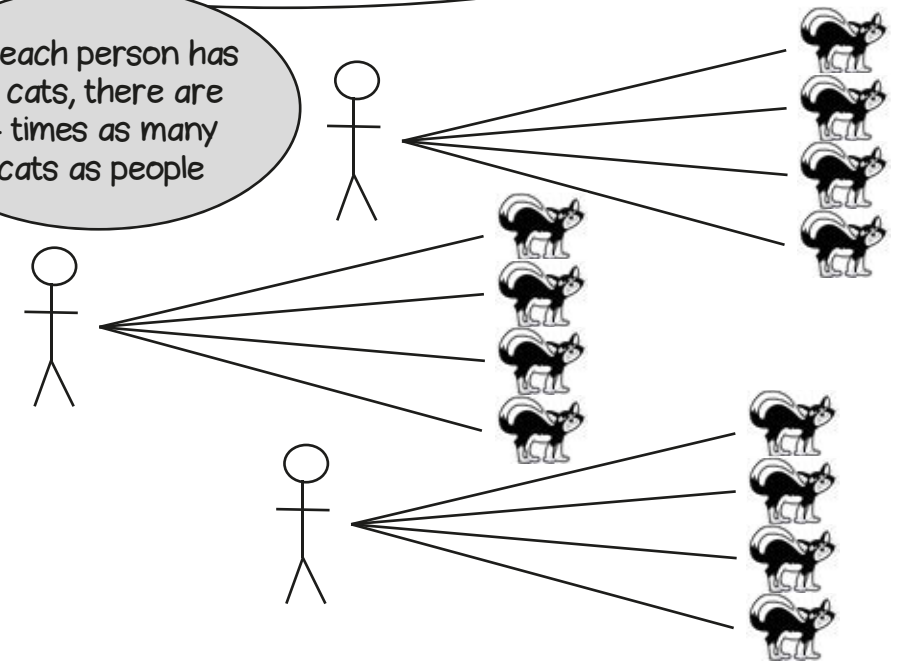
3 people each have 4 cats.  
How many cats are there in total?

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



## How shall I multiply?

Count in ones

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

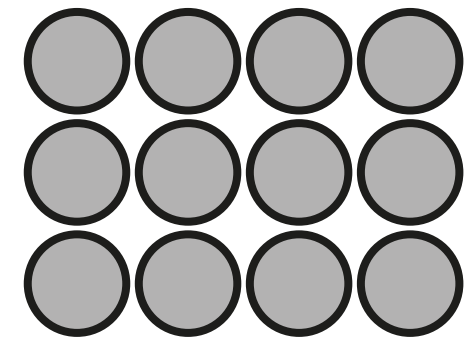
Count in twos

2, 4, 6, 8, 10, 12

Use a known fact

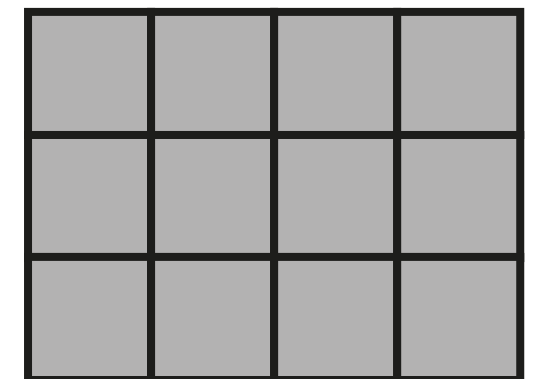
If 2 x 3 is 6, then  
4 x 3 is double 6.

### Arrays



$4 \times 3 = 12$

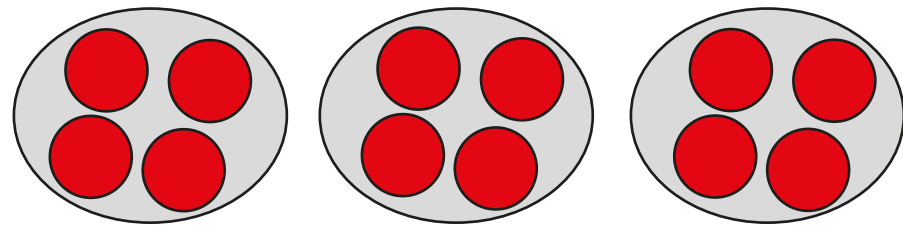
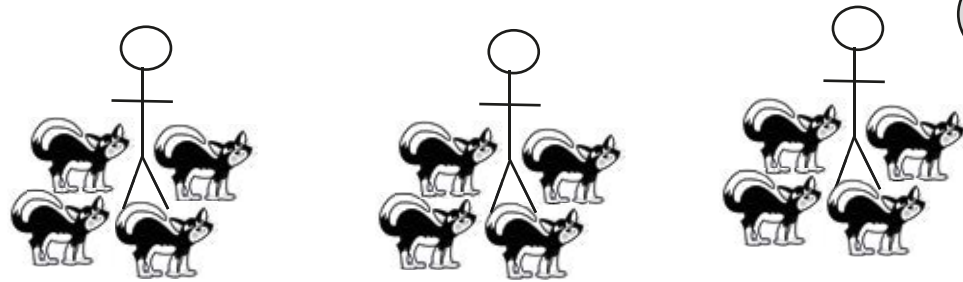
$3 \times 4 = 4 \times 3$



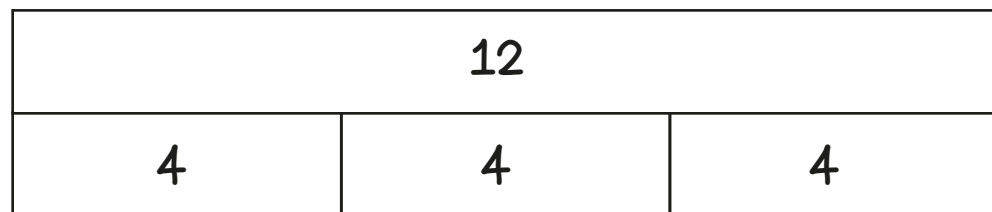
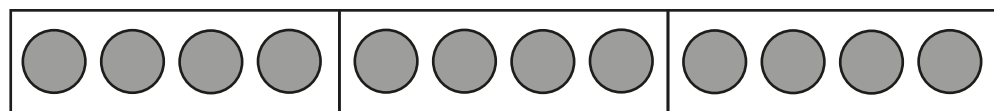
### Sharing

12 shared into 3 equal groups

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



### Bar model



Link to fractions.  
One third of 12 is 4

$12 \div 3 = 4$

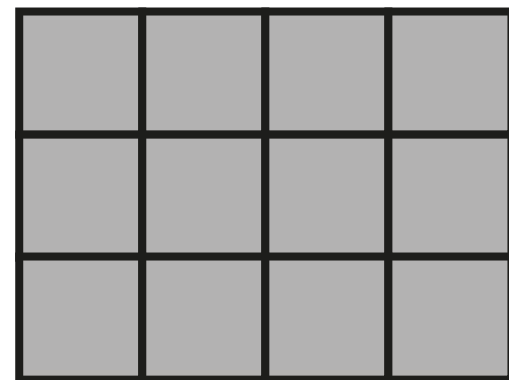
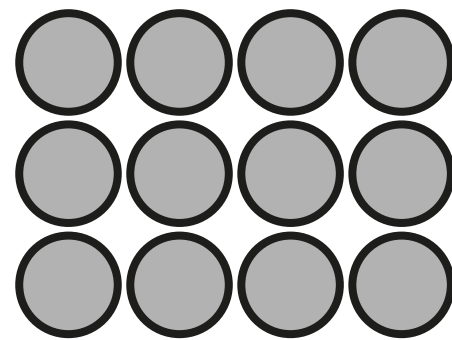
Recall and use 2x, 5x and 10x tables

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

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

### How shall I divide?

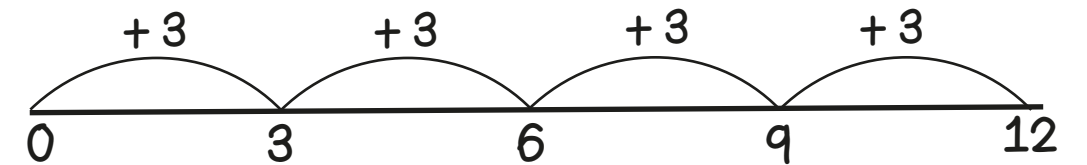
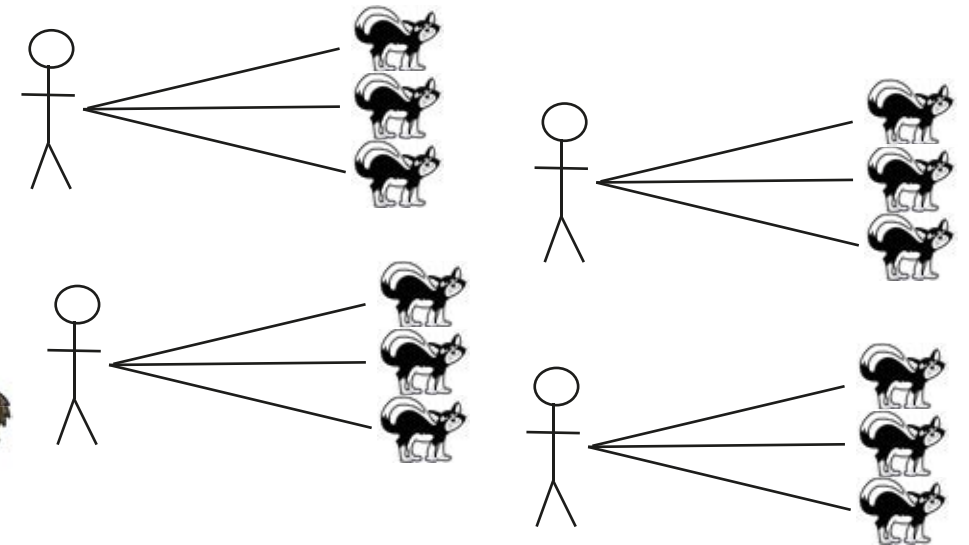
12 can be described as  
3 columns of 4  
or 4 rows of three



### 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!

243 + 7  
 Use known facts  
 300 + 700

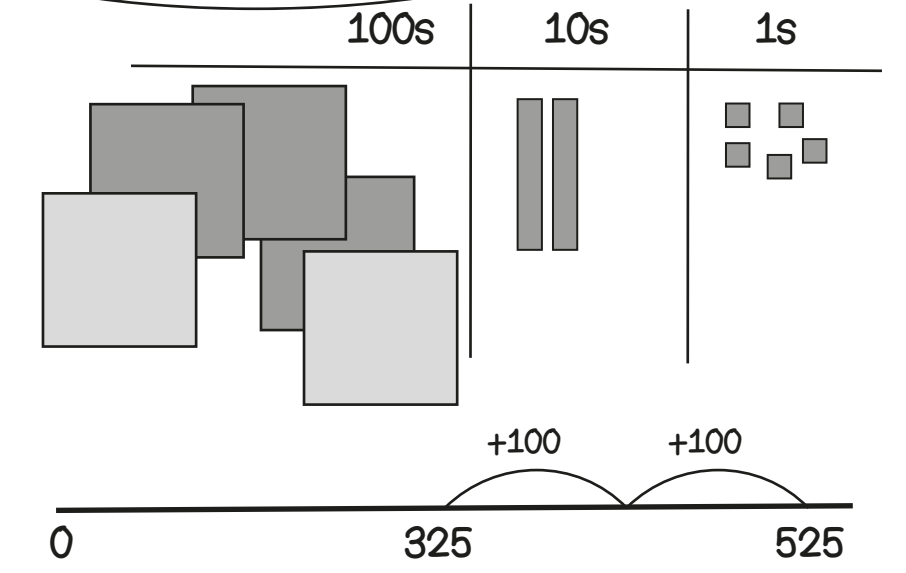
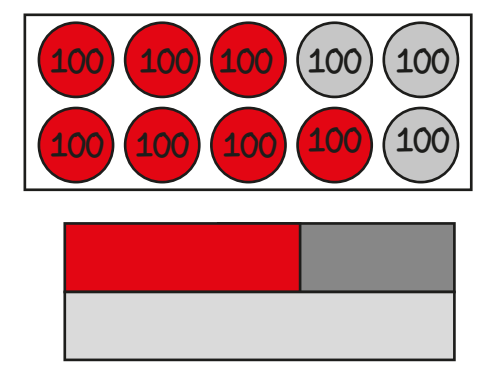
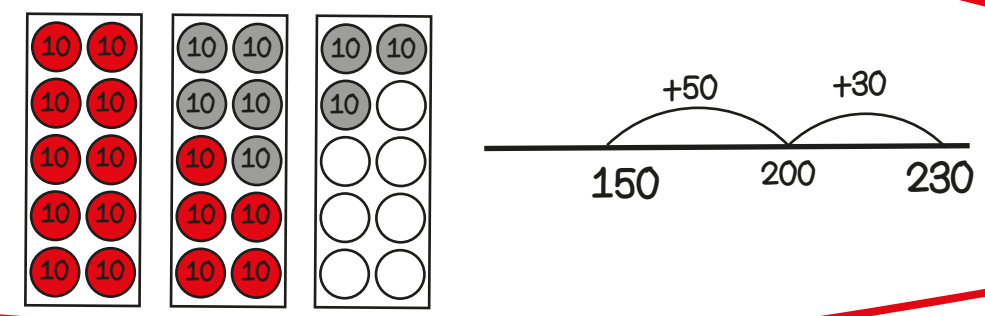
If I know 3 + 7 = 10  
 then I know  
 3 hundreds + 7 hundreds  
 = 10 hundreds

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

325 + 200  
 Add multiples of ten and hundred

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

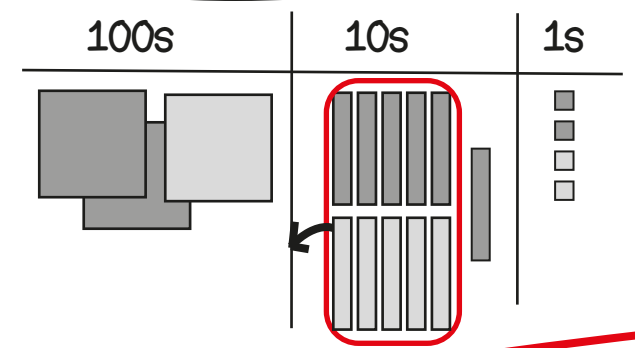
150 + 80  
 Bridging boundaries



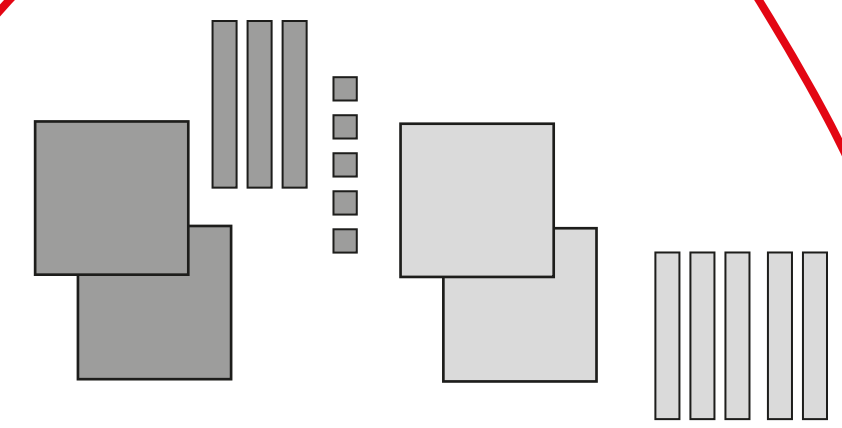
How shall I add?

262 + 152  
 Formal written method

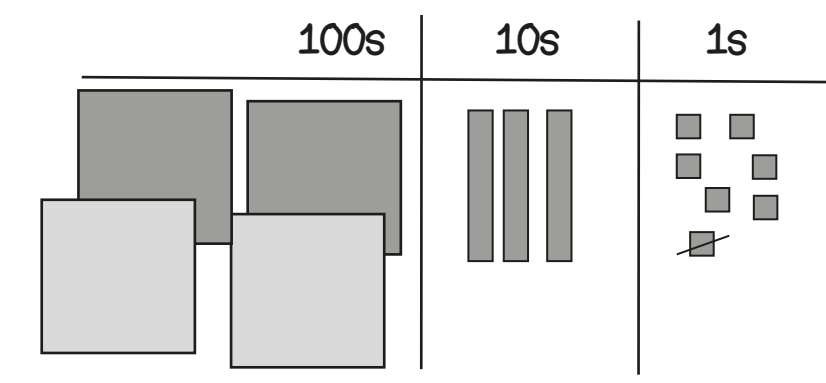
6 tens add 5 tens  
 = 11 tens or 110



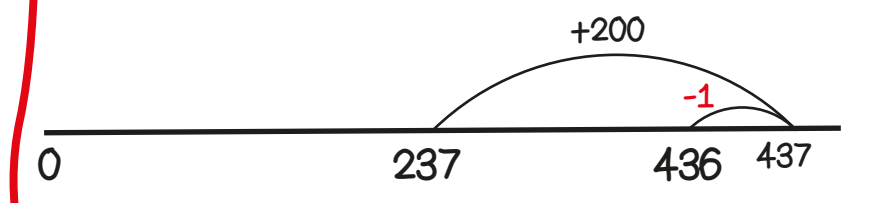
$$\begin{array}{r} 262 \\ + 152 \\ \hline 414 \\ \hline 1 \end{array}$$



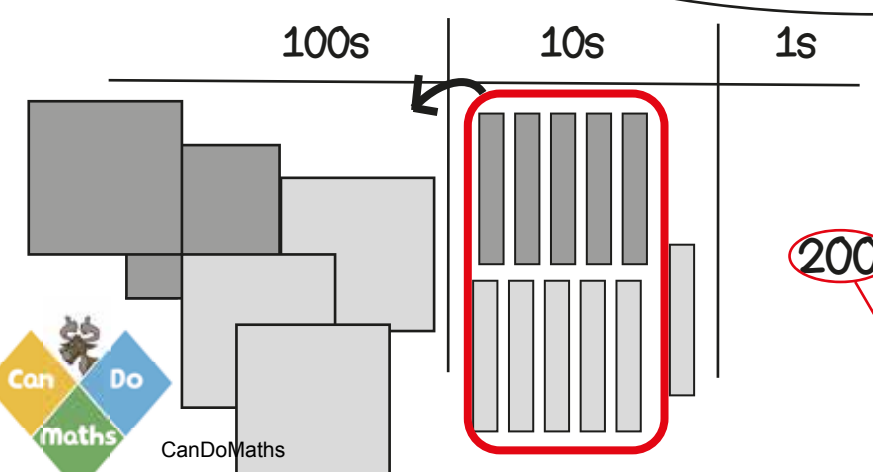
237 + 199  
 Round then adjust



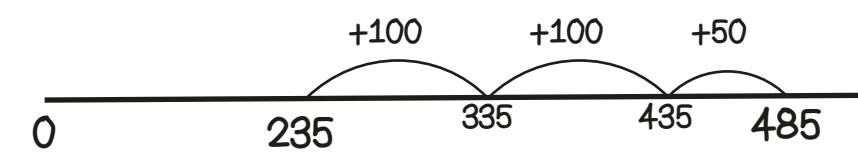
Add 200 then subtract 1



250 + 360  
 Partition and recombine



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



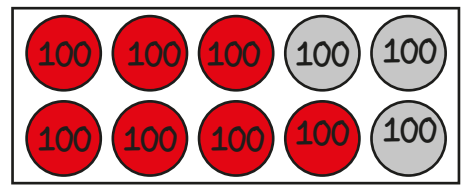
235 + 250  
 Count on in hundreds then tens

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

I just knew it!

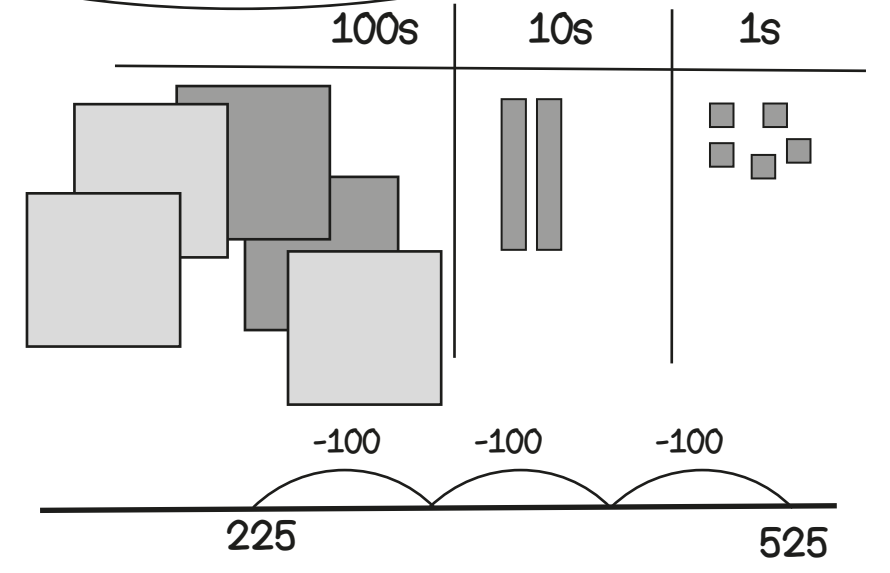
240 - 7  
Use known facts  
1000 - 700

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

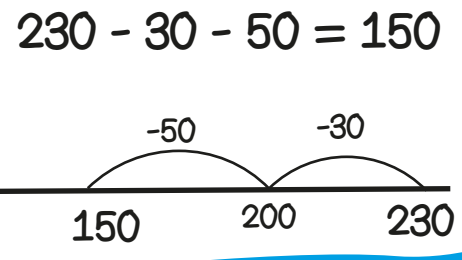
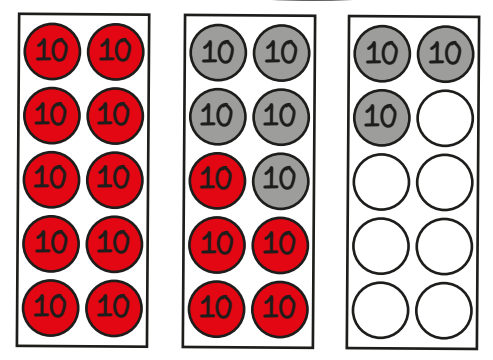


525 - 300  
Take away multiples of ten  
and a hundred

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



230 - 80  
Bridging boundaries  
by counting back in efficient steps



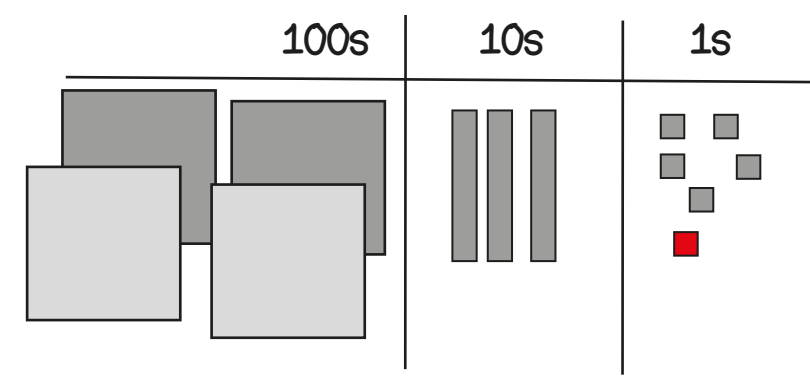
10 - 7 = 3

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

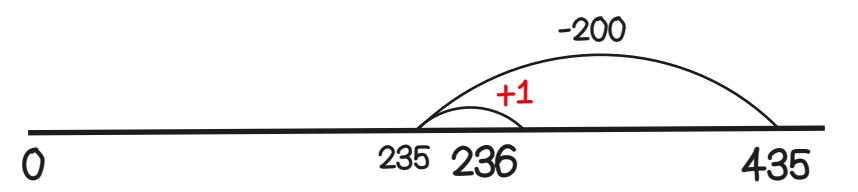
# How shall I subtract?



435 - 199  
Round then adjust



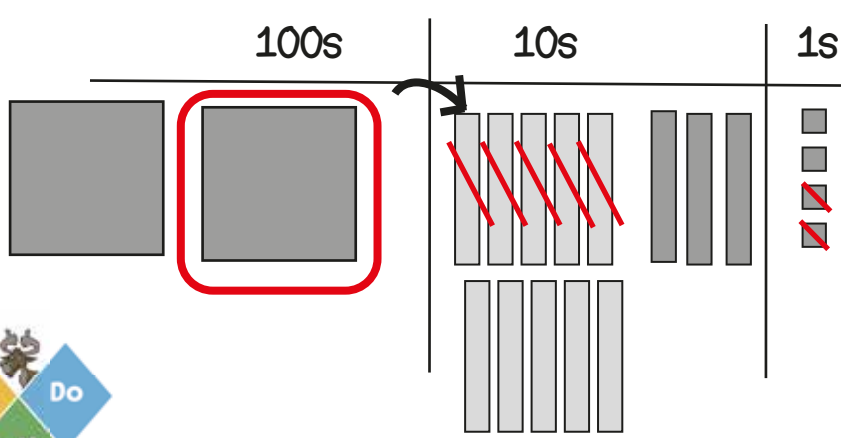
Take away 200 then **add 1**



234 - 152  
Formal written method

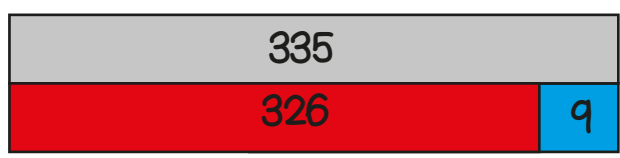
$$\begin{array}{r} 234 \\ - 152 \\ \hline 82 \end{array}$$

234 = 100 + 130 + 4



335 - 326  
Find the difference  
between two numbers

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



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

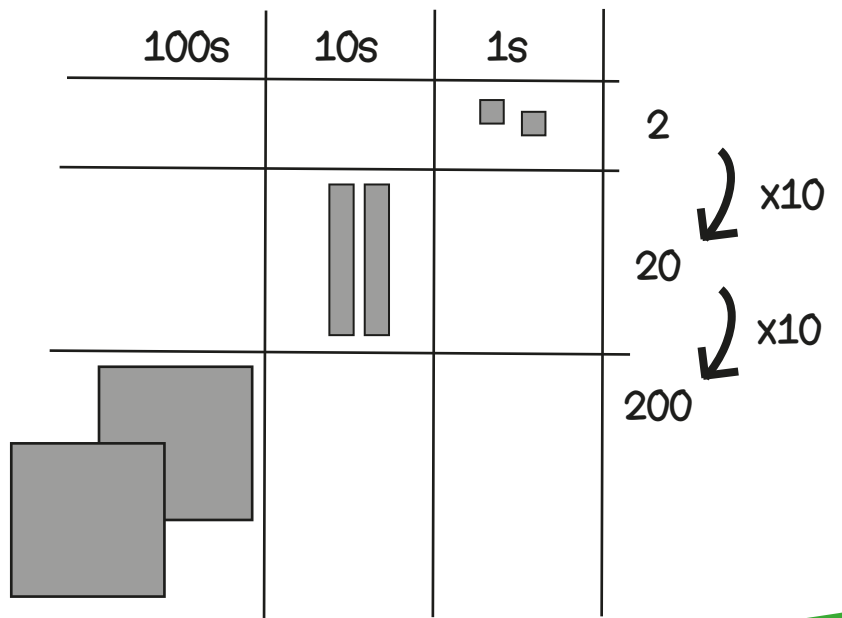
6 x 4  
Use known facts  
and place value

40 is ten times  
greater than 4

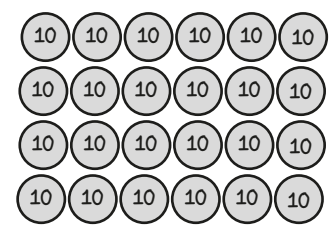
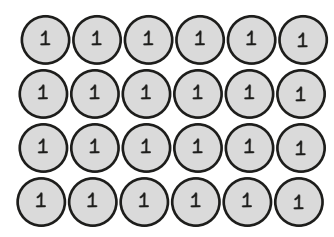
8 x 3  
Repeated addition

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

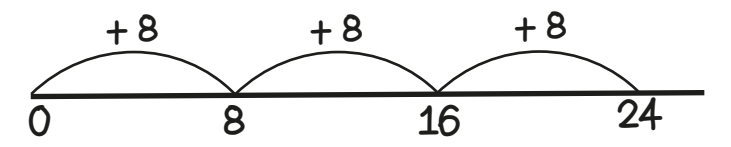
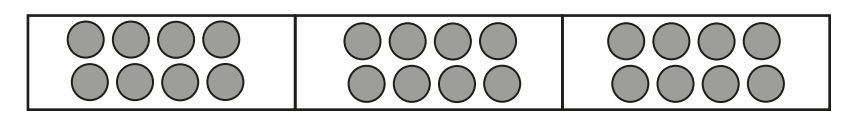
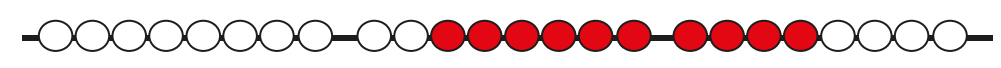
Multiply by 10



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



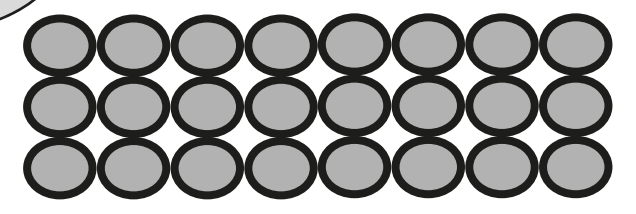
6 x 10 x 4  
= 24 x 10



# How shall I multiply?

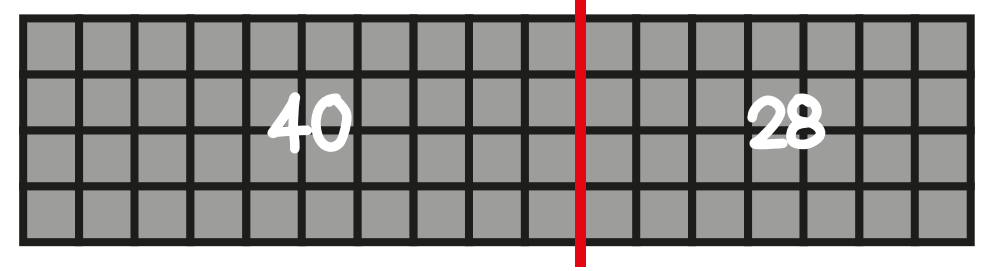
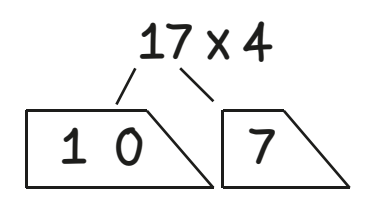


Arrays  
If I know 3 x 8  
then I know 8 x 3



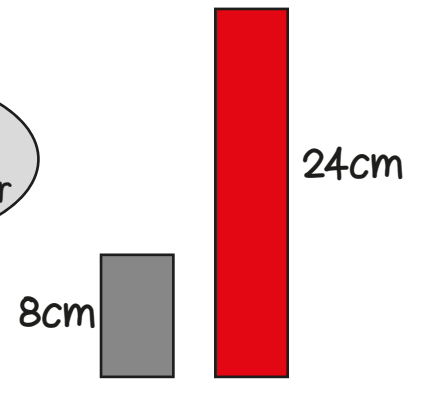
17 x 4  
Partition and recombine

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



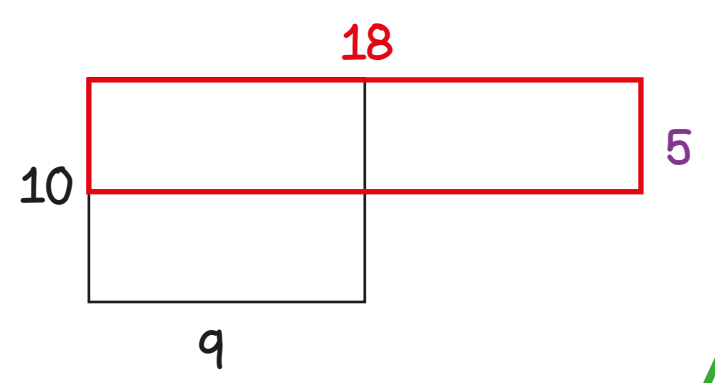
Scaling

The red tower is  
3 times taller  
than the grey tower



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



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

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

240 is ten times  
greater than 24

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

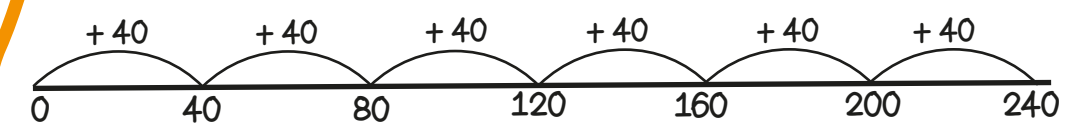
24 biscuits shared between  
4 people means they will get  
6 biscuits each.  
If there are 10 times as many  
people and 10 times as many  
biscuits, how many biscuits  
each now?

$240 \div 40$   
Repeated addition

How many 40s  
are there in 240?

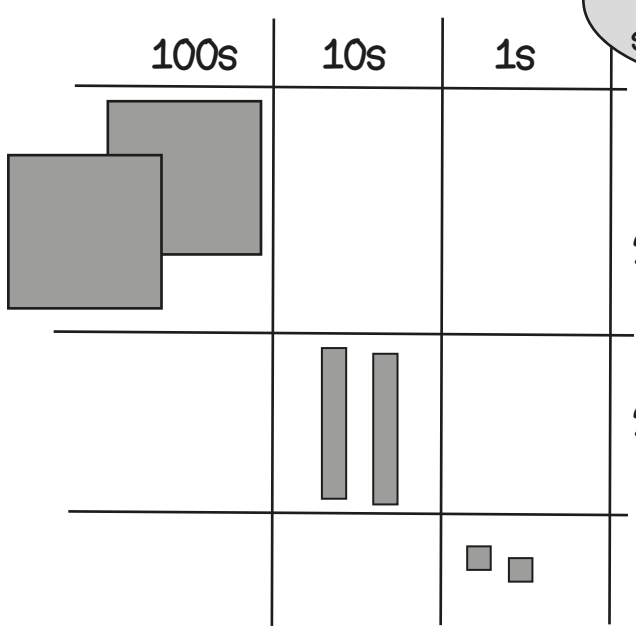
$240 \div 40 = 6$

How many steps of 40 make 240?



$200 \div 10$   
Divide by 10

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



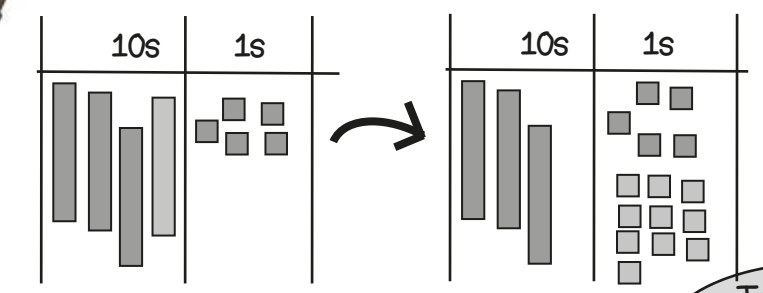
$200 \div 10 = 20$   
 $20 \div 10 = 2$

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

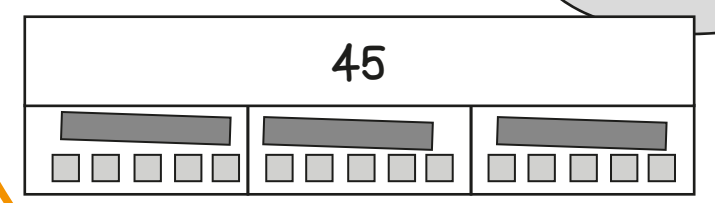
How shall I divide?



$45 \div 3$   
Sharing equally



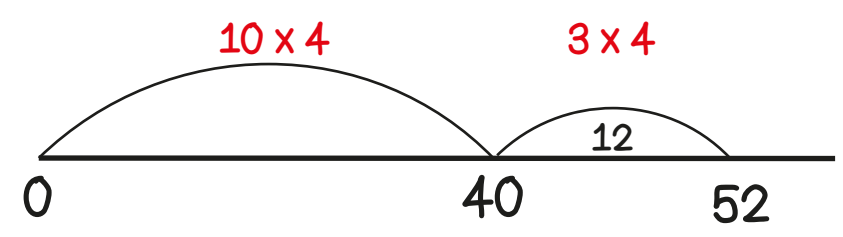
Ten for you,  
ten for you,  
ten for you...



$52 \div 4$   
Partition and recombine

ten lots and the rest

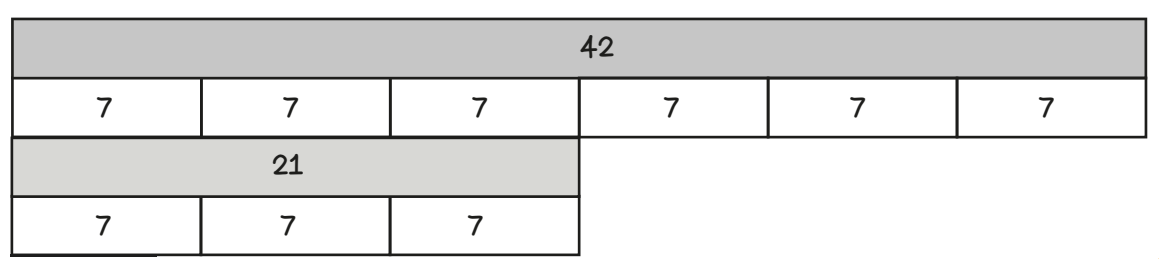
$52 \div 4$   
 $40 \div 4 = 10$   
 $12 \div 4 = 3$   
 $10 + 3 = 13$



$42 \div 6$   
Double and halve

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

$42 \div 6 = 21 \div 3$



Link to fractions

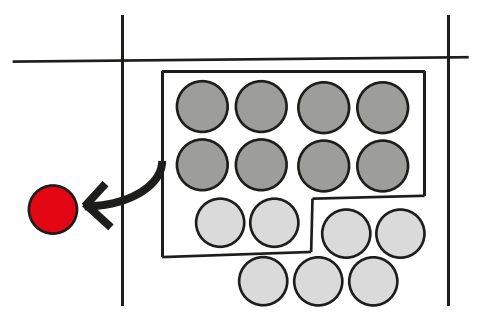
$0.9 + 0.9, 74 + 26$   
 Number facts  
 Single digit decimals  
 Doubles  
 Bonds of 100

I just knew it!

$7 + 8$   
 Use known facts

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

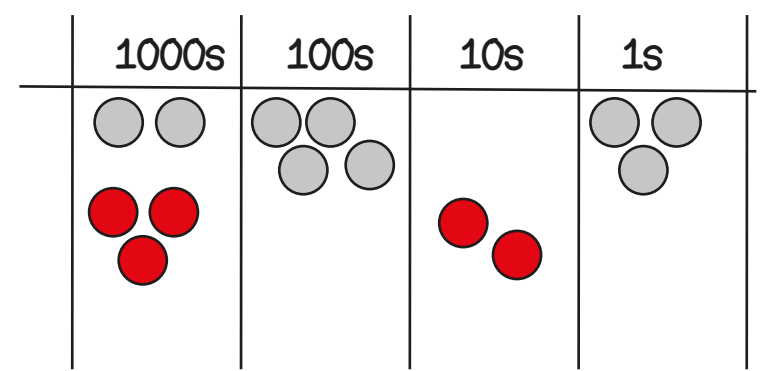
$70 + 80 = 150$   
 $700 + 800 = 1,500$



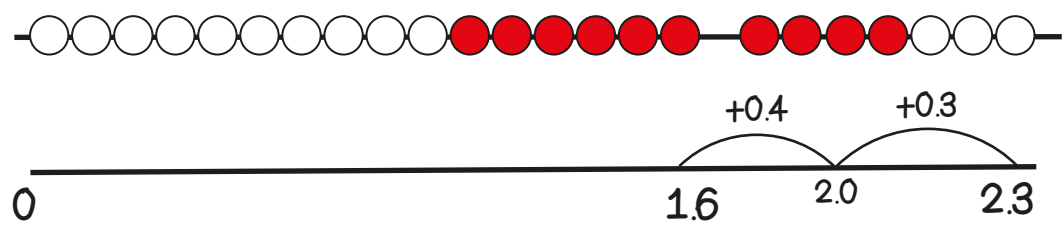
$2,403 + 3,020$   
 Use place value to add

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

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



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



How shall I add?

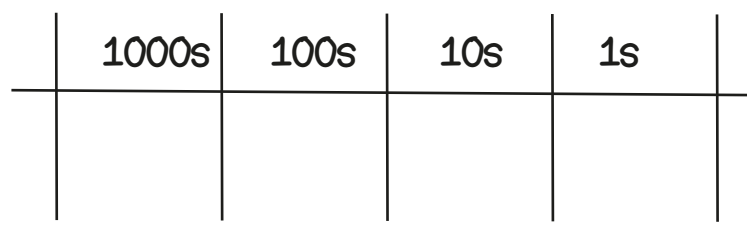


$5,748 + 3,374$   
 Formal written method

Exchange ten of these for one of those!

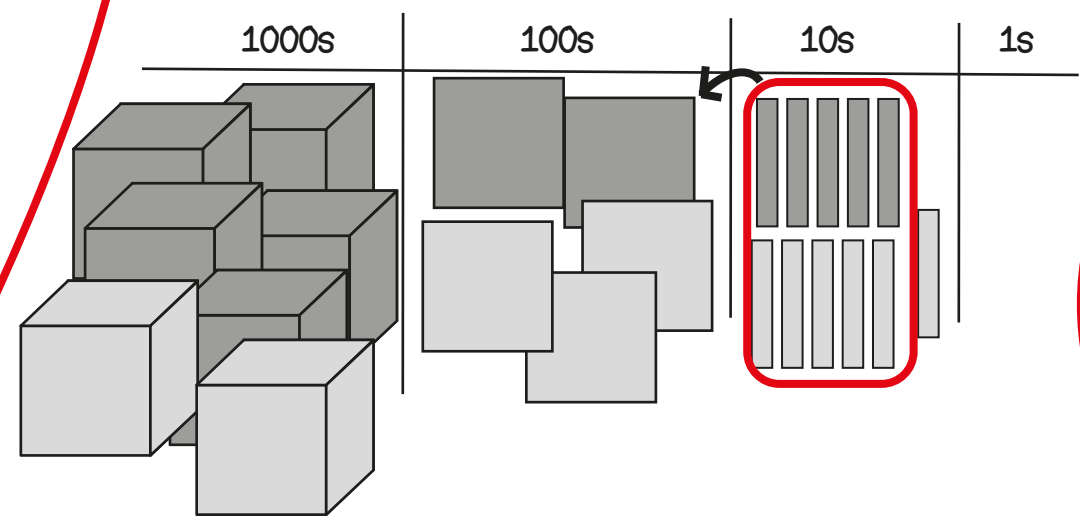
$$\begin{array}{r} 5,748 \\ + 3,374 \\ \hline 9,122 \\ \hline 1 \ 1 \ 1 \end{array}$$

Regroup and rename

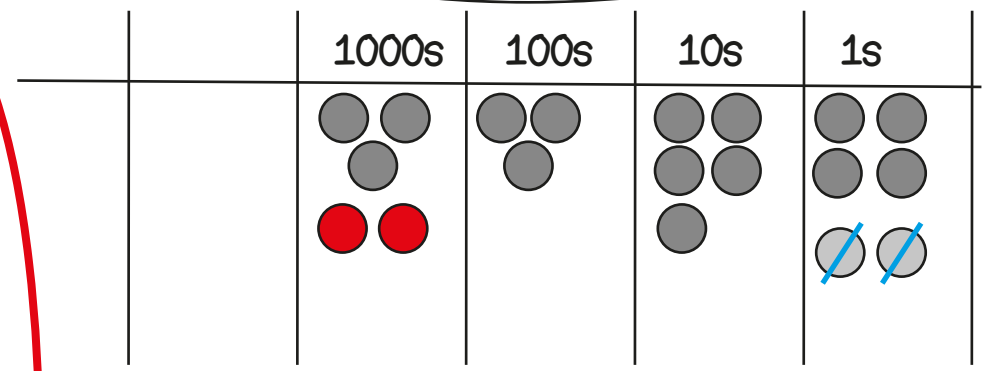


$5,250 + 2,360$   
 Partition and recombine

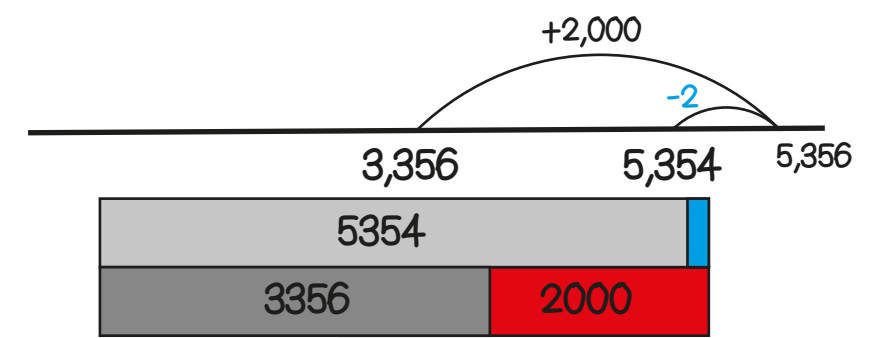
$5000 + 200 + 50 + 2000 + 300 + 60$   
 $7000 + 500 + 110 = 7610$



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



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



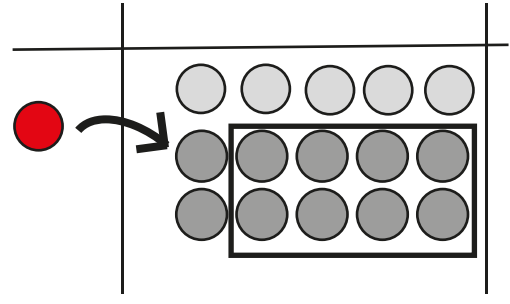
13 - 5, 1.8 - 0.8  
 Number facts  
 Single digit numbers  
 Halves  
 Wholes and tenths

I just knew it!

15 - 8 = 7  
 Use known facts

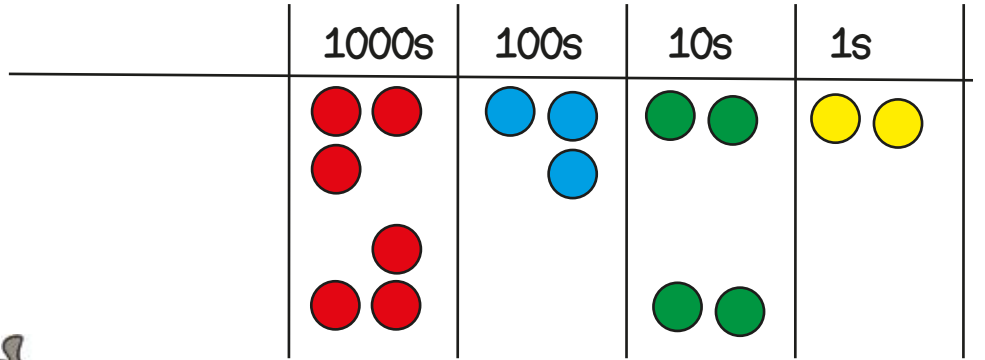
If I know 15 - 8 = 7  
 then I know  
 1.5 - 0.8 = 0.7

150 - 80 = 70  
 1500 - 800 = 700

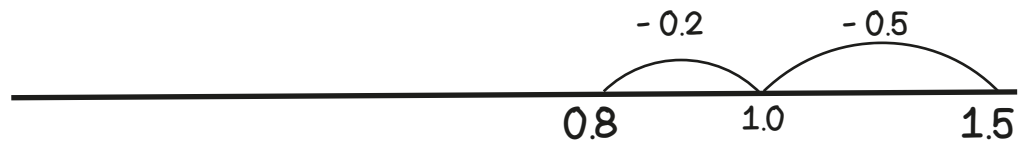


6,342 - 3,020  
 Use place value to subtract

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



1.5 - 0.7  
 Bridge through boundaries  
 by counting in efficient steps



How shall I subtract?



5,352 - 2,136  
 Formal written method

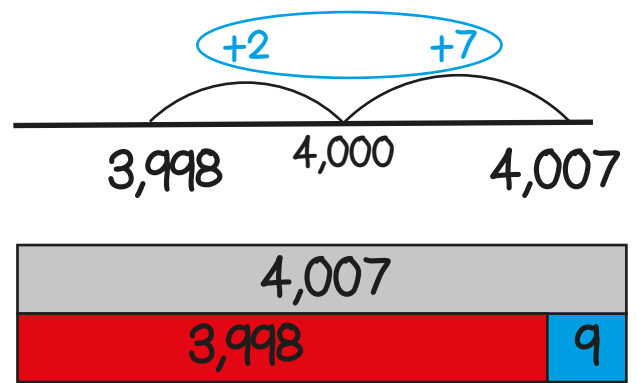
Exchange ten of these for one of those!

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

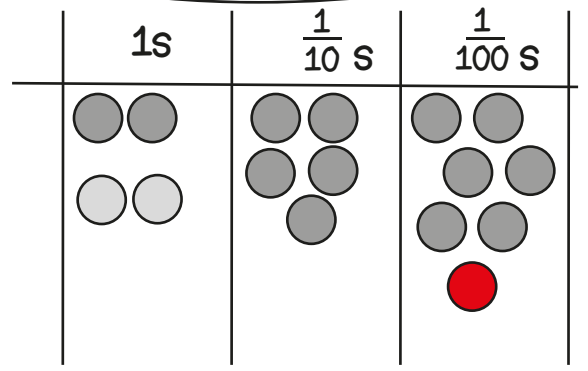
Regroup and rename

1000s	100s	10s	1s

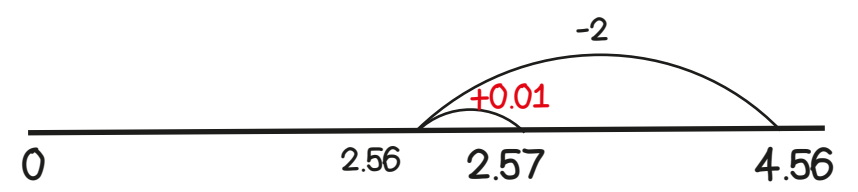
4007 - 3998  
 Find the difference between two numbers



4.56 - 1.99  
 Round then adjust



Take away 2 then add one hundredth



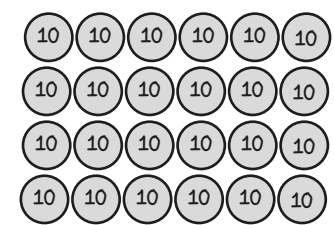
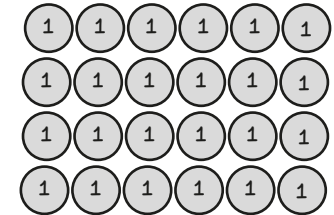


Known facts:  
Rapid recall of all multiplication tables up to 12 x 12

6 x 4  
Use known facts and place value

40 is ten times greater than 4

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

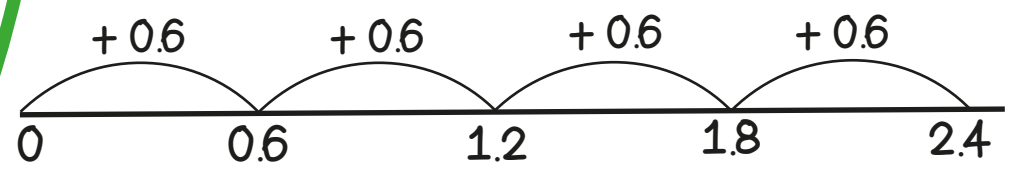


6 x 10 x 4 x 10  
= 24 x 100

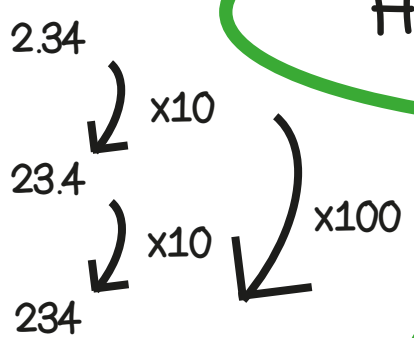
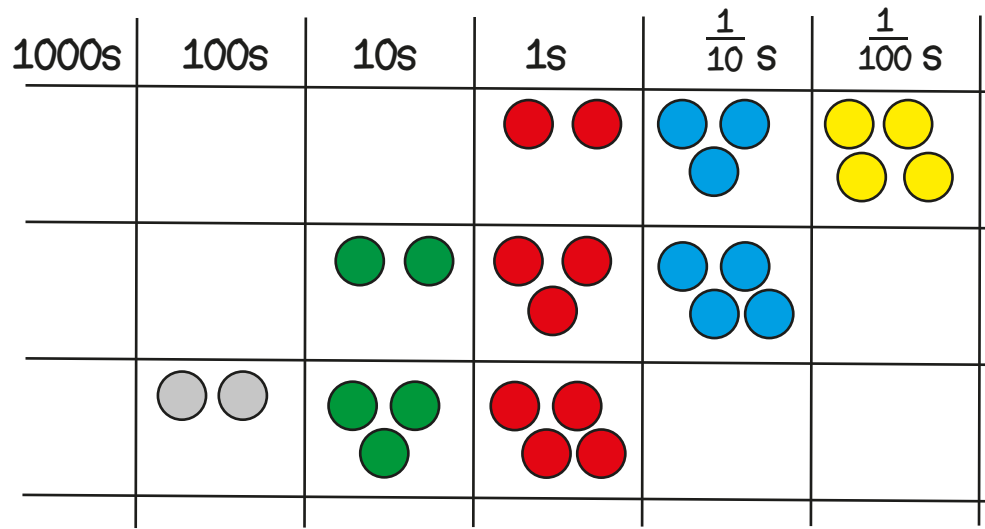
0.6 is ten times smaller than 6

6 x 4  
Use known facts and place value

0.6 x 4 = 2.4  
4 jumps of 0.6

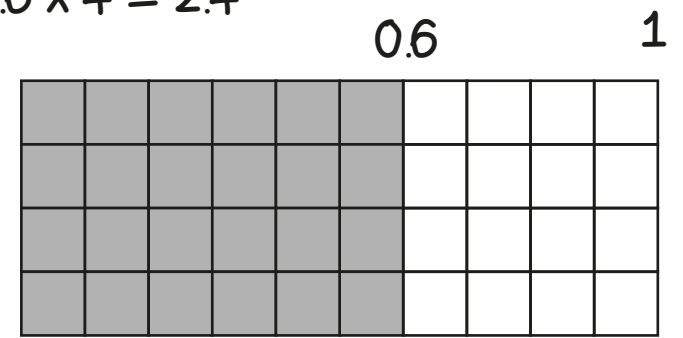


2.34 x 100  
Multiply by 10, 100



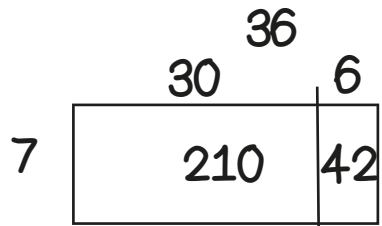
How shall I multiply?

0.6 x 4 = 24 tenths  
0.6 x 4 = 2.4

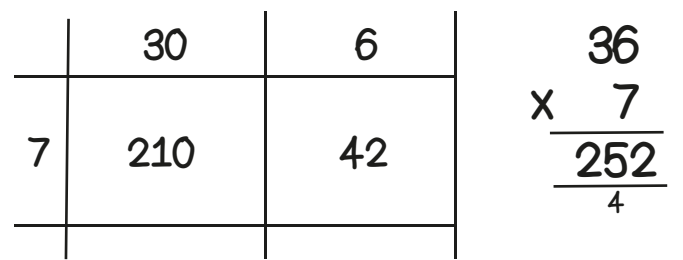


7 x 36  
Use the distributive law

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



36 x 7  
Formal written method



45 x 6  
Use factors and commutativity

Write as factors then re-order

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

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

236 x 7

200	30	6
x7	x7	x7
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 ÷ 4**  
Use known facts and place value

240 is ten times greater than 24

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

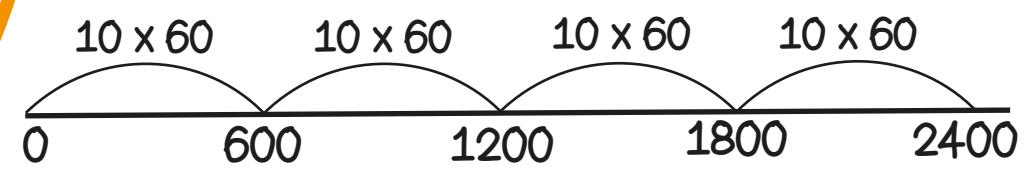
24 biscuits shared between 4 people means they will get 6 biscuits each.  
If there are 100 times as many people and 100 times as many biscuits, how many biscuits each now?

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

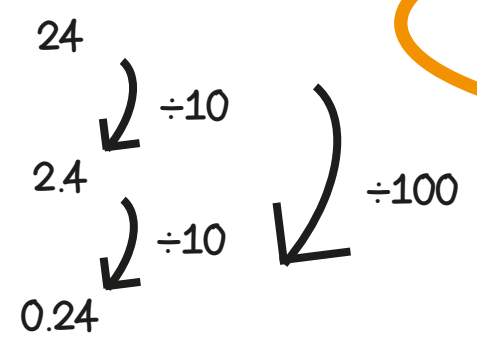
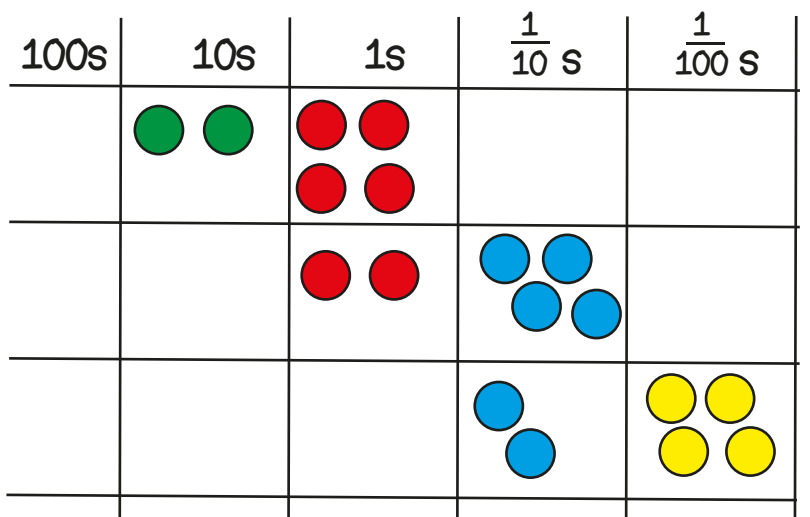
60 is ten times greater than 6

**2400 ÷ 60**  
Use known facts and place value

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



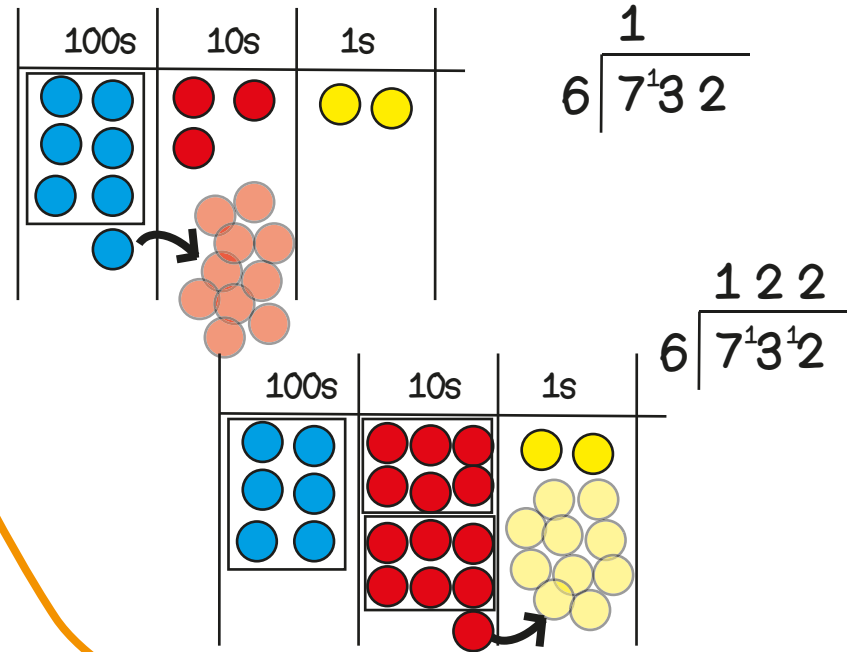
**24 ÷ 100**  
Divide by 10, 100



**How shall I divide?**

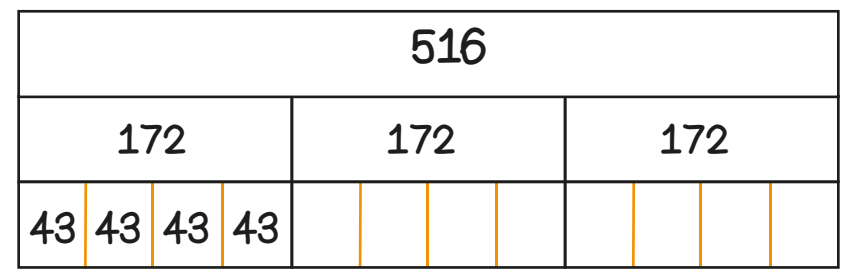


**732 ÷ 6**  
Formal written method



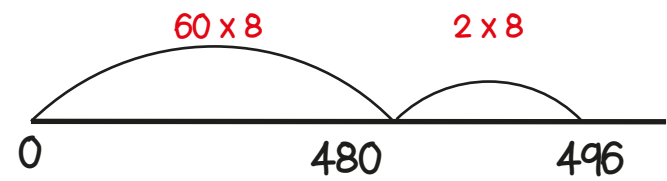
**516 ÷ 12**  
Using factors

$516 \div 3 \div 4$



**496 ÷ 8**  
Partition and recombine

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



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

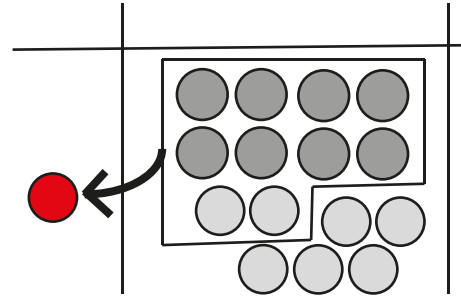
I just knew it!

Rapid fluency of  
 2 digit add 2 digit numbers

$7 + 8$   
 Use known facts

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

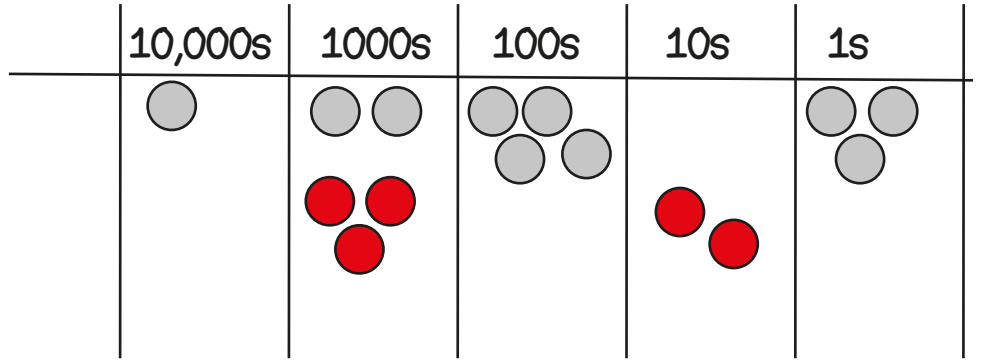
$7,000 + 8,000 = 15,000$   
 $70,000 + 80,000 = 150,000$   
 $700,000 + 800,000 = 1,500,000$



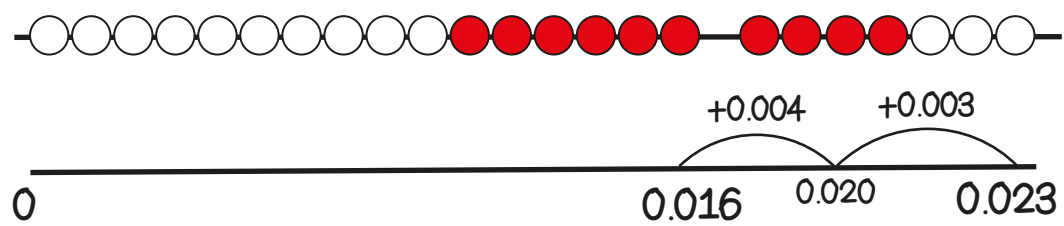
$12,403 + 3,020$   
 Use place value to add

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

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



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



How shall I add?

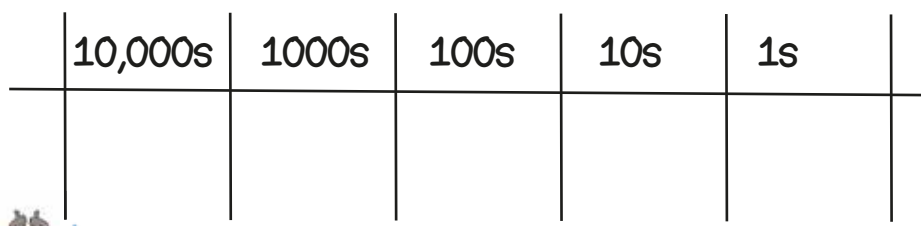


$25,748 + 46,374$   
 Formal written method

Exchange ten of  
 these for one of  
 those!

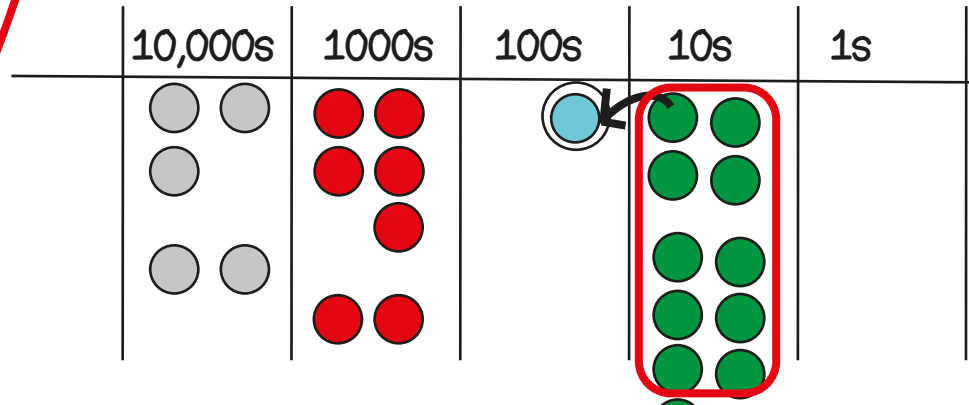
$$\begin{array}{r} 25,748 \\ + 46,374 \\ \hline 72,122 \end{array}$$

Regroup and rename

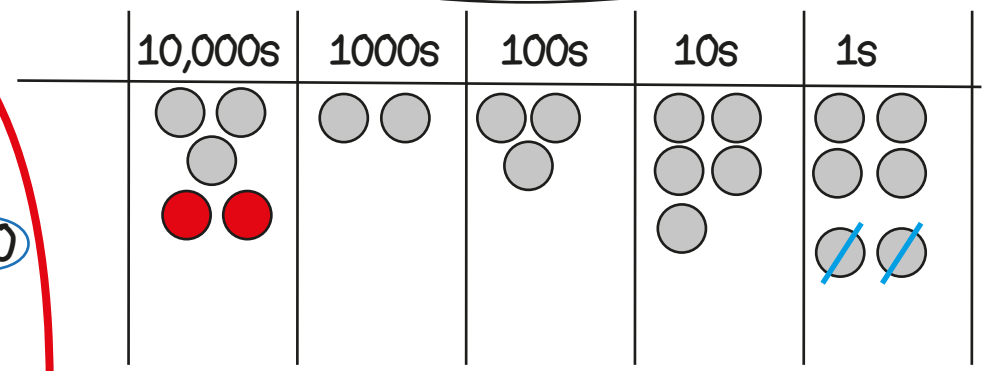


$35,040 + 22,070$   
 Partition and recombine

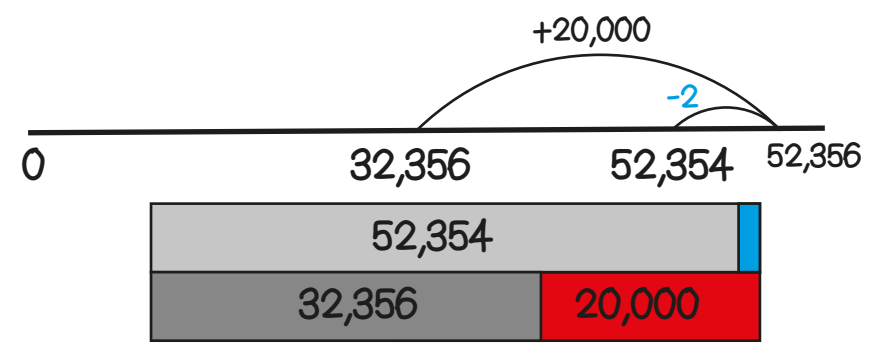
$$30,000 + 5,000 + 40 + 20,000 + 2,000 + 70 = 57,110$$



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



Add 20,000 then subtract 2





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

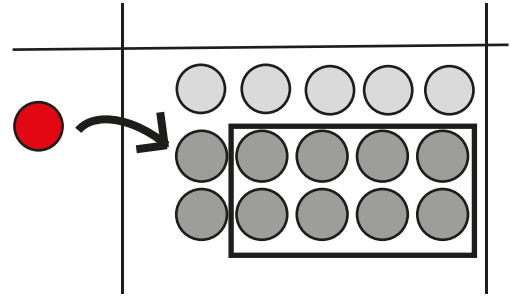
I just knew it!

Rapid fluency of  
 2 digit subtract  
 2 digit numbers

15 - 8 = 7  
 Use known facts

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

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



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

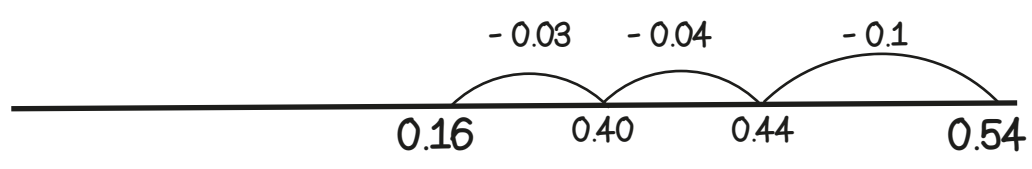
5 less than 12 is 7  
 Now it is easy to  
 take away 3000

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

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

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

0.54 - 0.17  
 Bridge through boundaries  
 by counting in efficient steps



How shall I subtract?



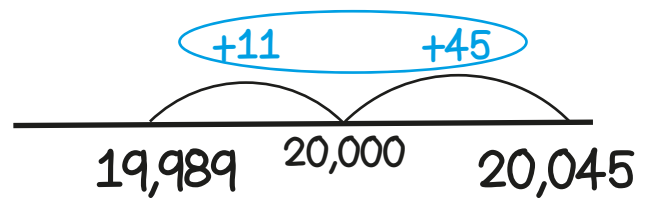
45,748 - 26,374  
 Formal written method

Exchange ten of  
 these for one of  
 those!

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

Regroup and rename

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

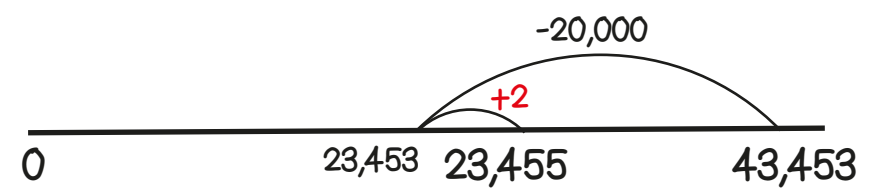


20,045	
19,989	56

43,453 - 19,998  
 Round then adjust

10,000s	1000s	100s	10s	1s
2 circles, 1 crossed out	3 circles	3 circles	4 circles	3 circles, 2 red

Take away 20,000 then add 2



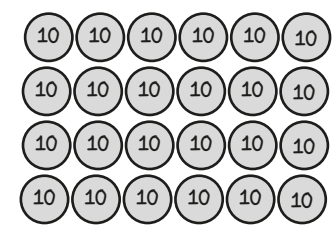
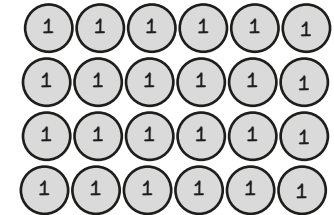
10,000s	1000s	100s	10s	1s

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

6 x 4  
Use known facts and place value

40 is ten times greater than 4

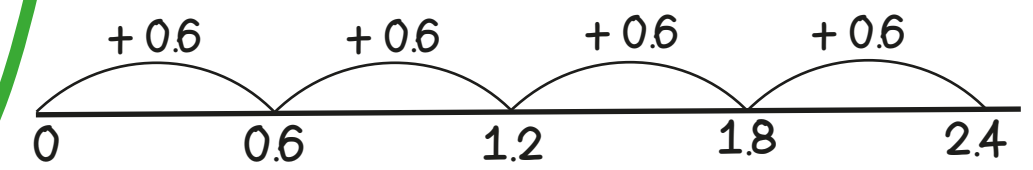
6 x 4 = 24  
60 x 4 = 240  
60 x 40 = 2400



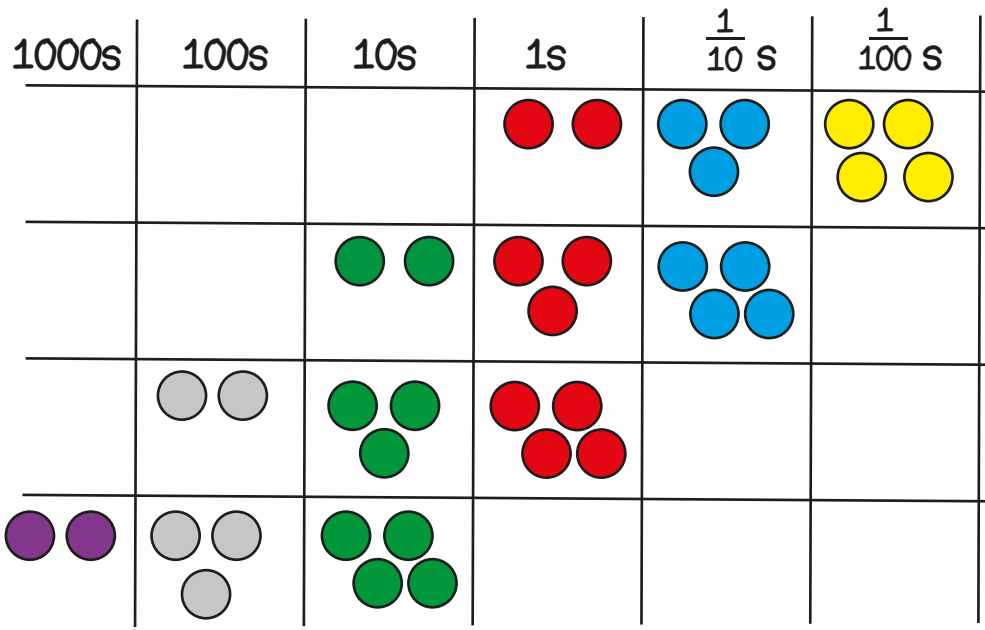
0.6 is ten times smaller than 6

6 x 4  
Use known facts and place value

0.6 x 4 = 2.4  
4 jumps of 0.6



2.34 x 1000  
Multiply by 10, 100, 1000

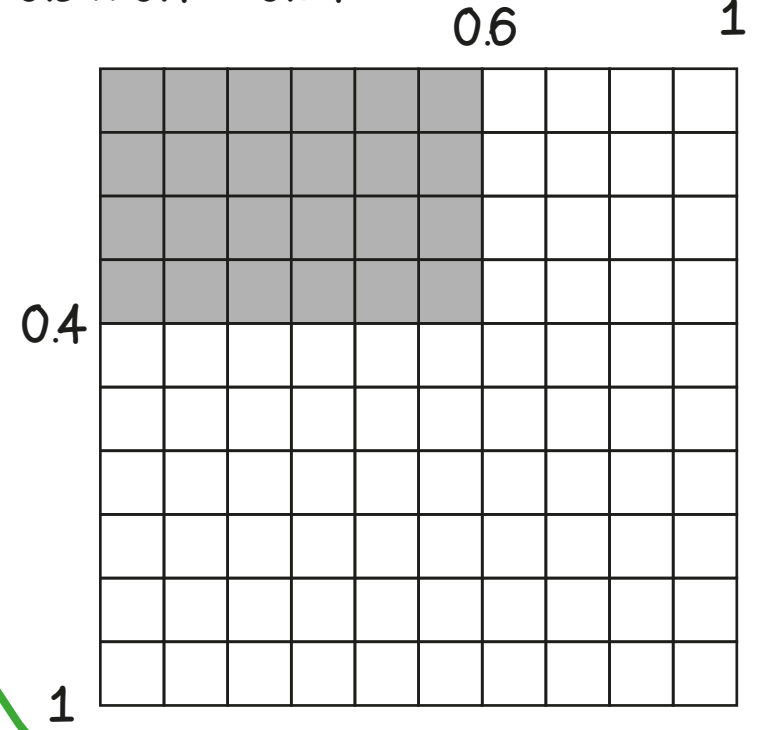


How shall I multiply?

15 x 42  
Using factors and distributive law

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

0.6 x 0.4 = 24 hundredths  
0.6 x 0.4 = 0.24

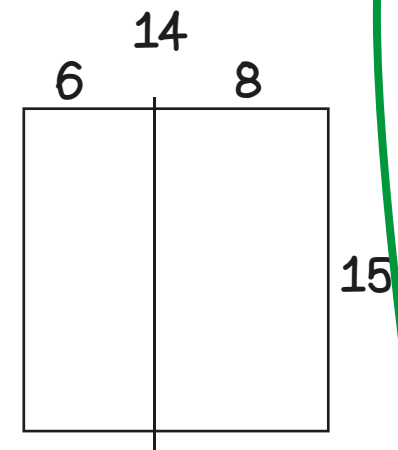


423 x 4  
Partition and recombine

423 x 4

400	20	3	
x4	x4	x4	
1600	80	12	= 1692

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



427 x 38  
Formal written method

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

427	
x 38	
3416	
12810	
16226	

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

Include calculations where remainders occur

**24 ÷ 4**  
Use known facts and place value

24,000 is a thousand times greater than 24

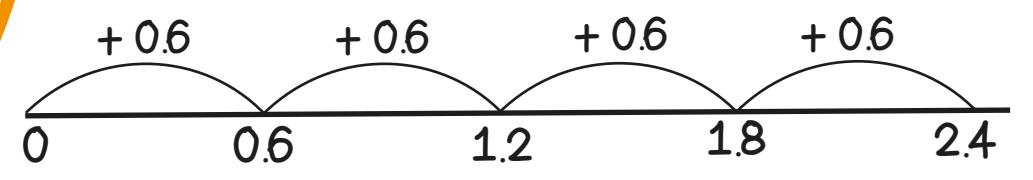
0.6 is ten times smaller than 6

**2.4 ÷ 0.6**  
Use known facts and place value

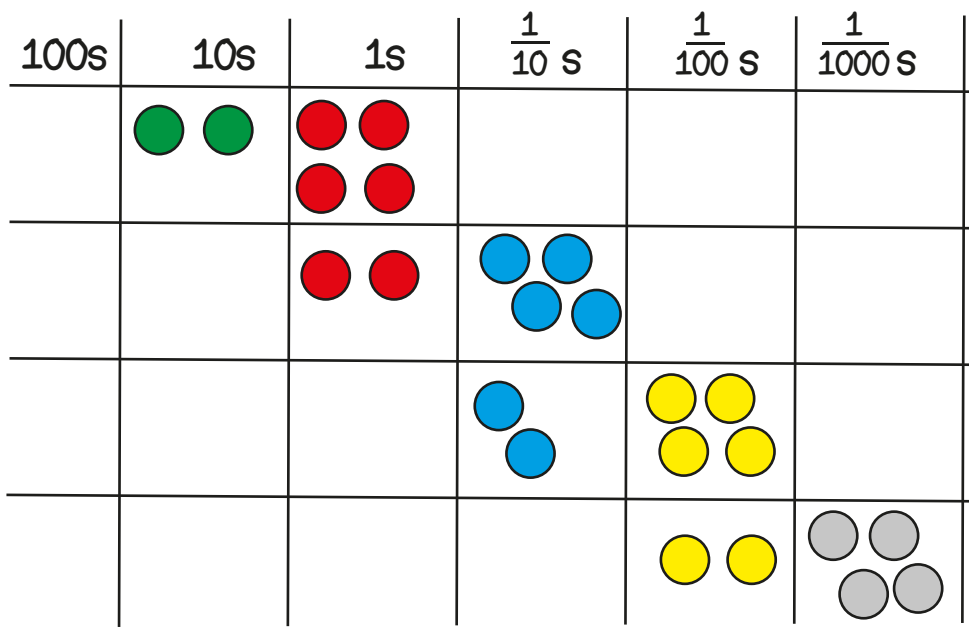
$24 \div 4 = 6$   
 $240 \div 40 = 6$   
 $2400 \div 400 = 6$   
 $24,000 \div 4000 = 6$

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

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



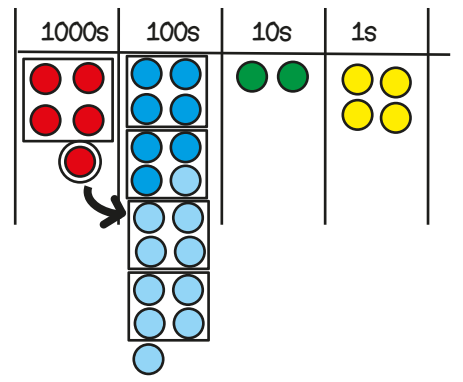
**24 ÷ 1000**  
Divide by 10, 100, 1000



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

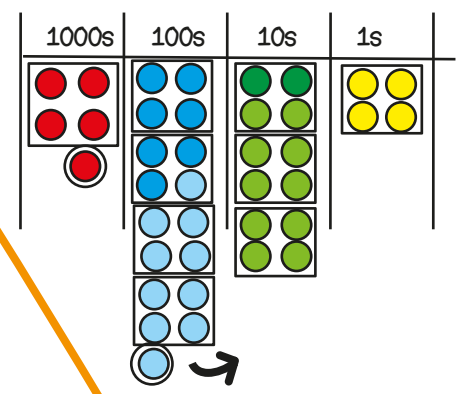
**How shall I divide?**

**5724 ÷ 4**  
Formal written method



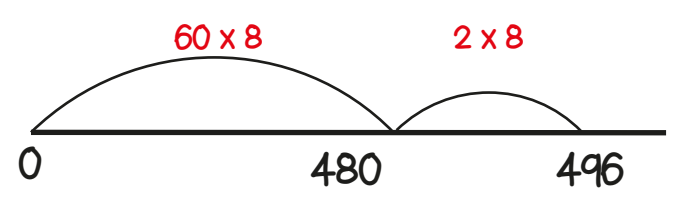
$$\begin{array}{r} 14 \\ 4 \overline{) 5724} \end{array}$$

**1512 ÷ 24**  
Using factors



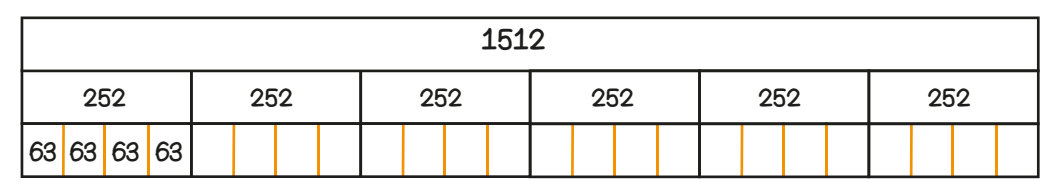
$$\begin{array}{r} 1431 \\ 4 \overline{) 5724} \end{array}$$

**496 ÷ 8**  
Partition and recombine



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

$1512 \div 6 \div 4$





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

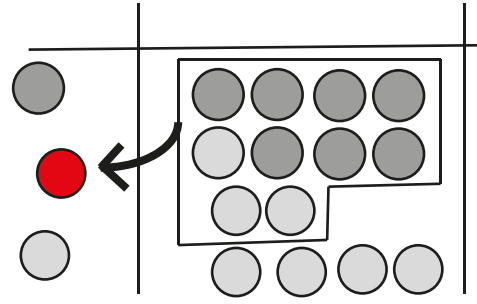
I just knew it!

Rapid fluency of  
 2 digit add 2 digit numbers

17 + 17  
 Use known facts

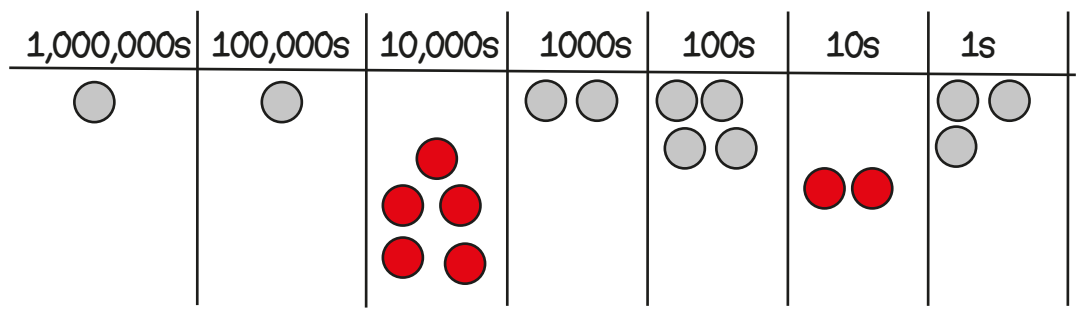
If I know 17 + 17 = 34  
 then I know  
 1.7 + 1.7 = 3.4

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

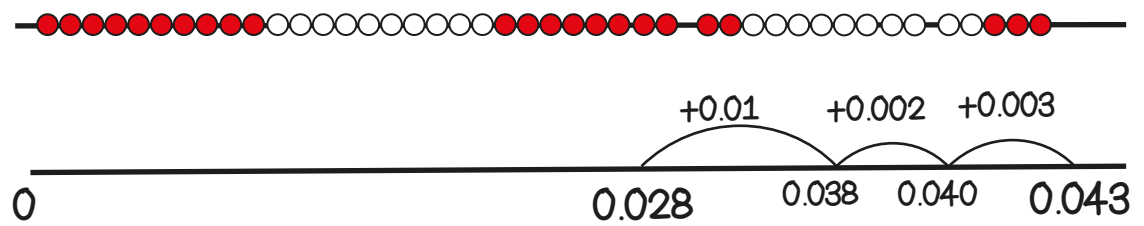


1,102,403 + 50,020  
 Use place value to add

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



0.028 + 0.015  
 Bridge through boundaries  
 by counting in efficient steps



How shall I add?

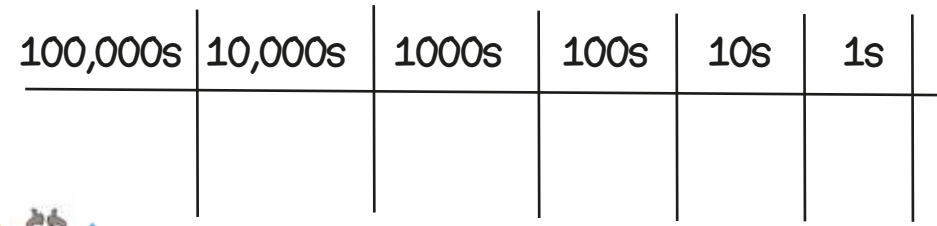


325,748 + 246,374  
 Formal written method

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

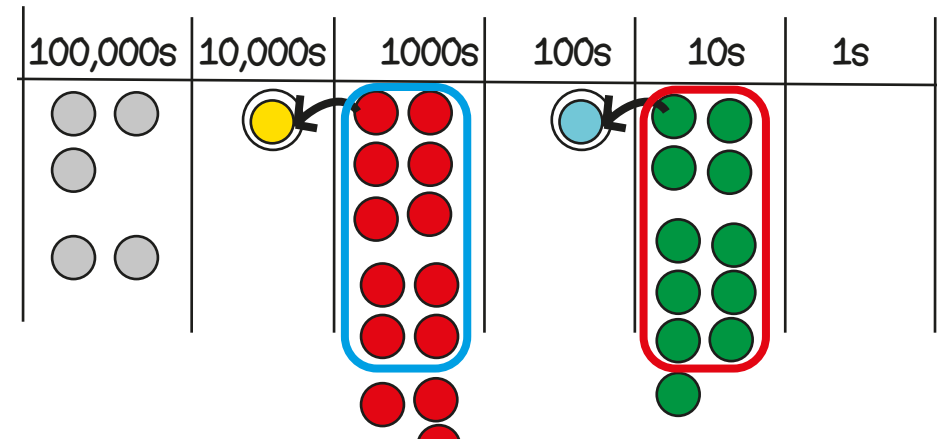
Regroup and rename

Exchange ten of  
 these for one of  
 those!

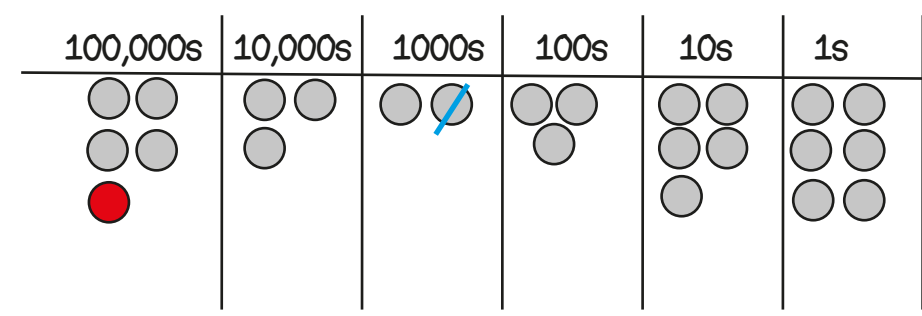


307,040 + 206,070  
 Partition and recombine

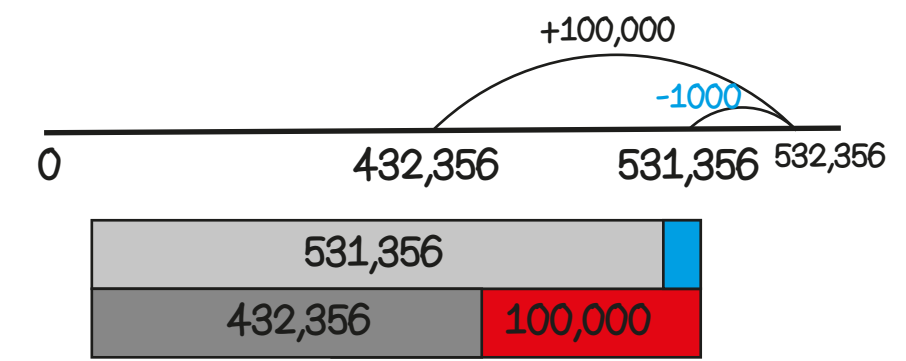
300,000 + 7,000 + 40 + 200,000 + 6,000 + 70  
 500,000 + 13,000 + 110 = 513,110



432,356 + 99,000  
 Round then adjust



Add 100,000 then take away 1,000

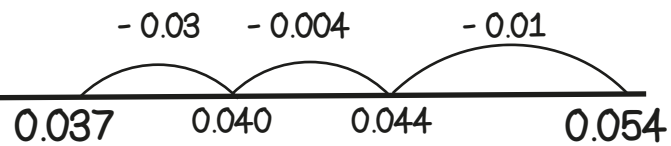


0.9 - 0.4, 100 - 65  
 Number facts  
 Single digit decimals  
 Halves  
 Bonds of 1 and 100

I just knew it!

Rapid fluency of  
 2 digit subtract  
 2 digit numbers

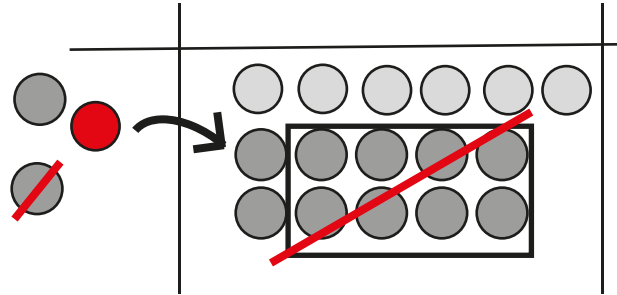
0.054 - 0.017  
 Bridge through boundaries  
 by counting in efficient steps



36 - 18 = 18  
 Use known facts

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

36,000 - 18,000 = 18,000  
 360,000 - 180,000 = 180,000  
 3,600,000 - 1,800,000 = 1,800,000



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

5 less than 32 is 27

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

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

How shall I subtract?



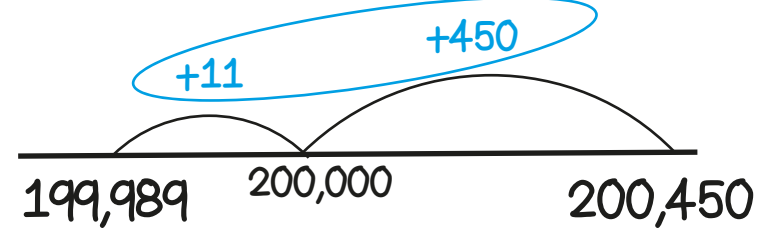
445,748 - 126,374  
 Formal written method

Exchange ten of  
 these for one of  
 those!

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

Regroup and rename

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

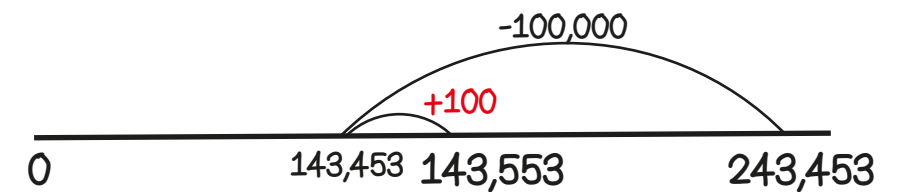


200,450	
199,989	461

243,453 - 99,900  
 Round then adjust

100,000s	10,000s	1000s	100s	10s	1s
1	2	3	4	5	3
<del>1</del>	2	3	3	4	3
			1	5	3

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



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

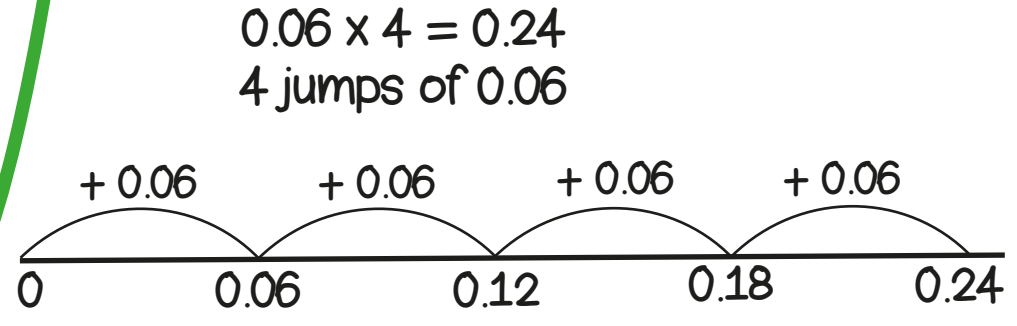
6 x 4  
Use known facts and place value

40 is ten times greater than 4

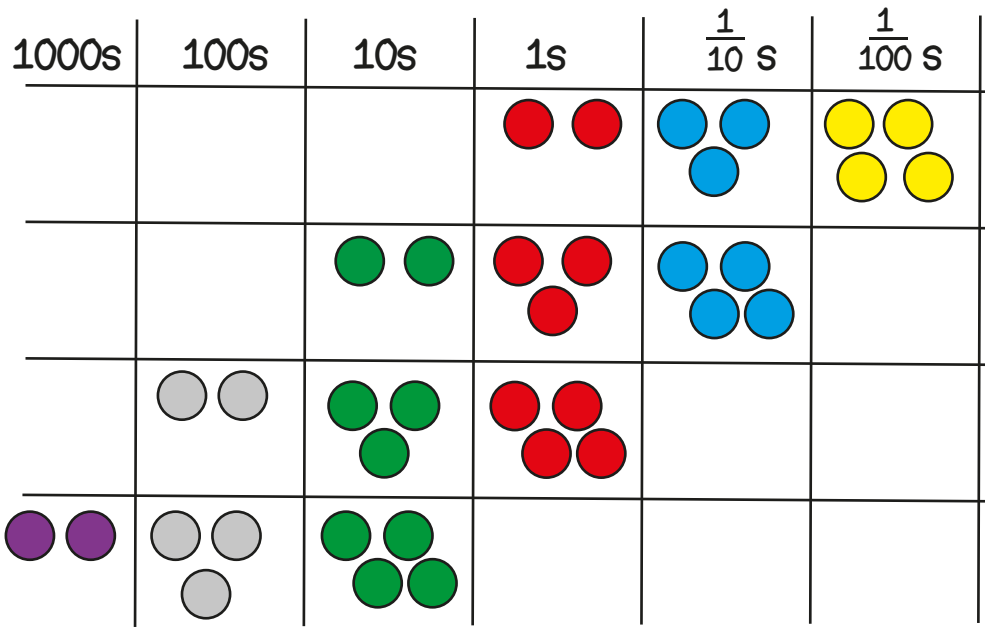
0.6 is ten times smaller than 6

6 x 4  
Use known facts and place value

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

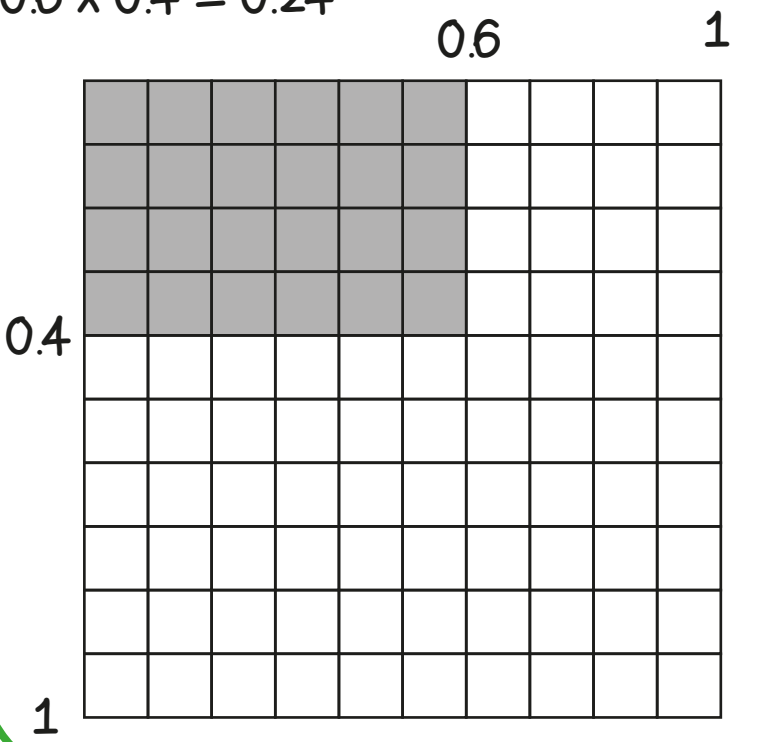


2.34 x 1000  
Multiply by 10, 100, 1000



How shall I multiply?

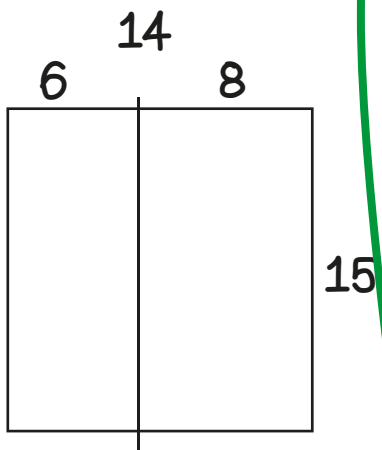
0.6 x 0.4 = 24 hundredths  
0.6 x 0.4 = 0.24



15 x 42  
Using factors and distributive law

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

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



2427 x 38  
Formal written method

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

4203 x 4  
Partition and recombine

4203 x 4

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



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

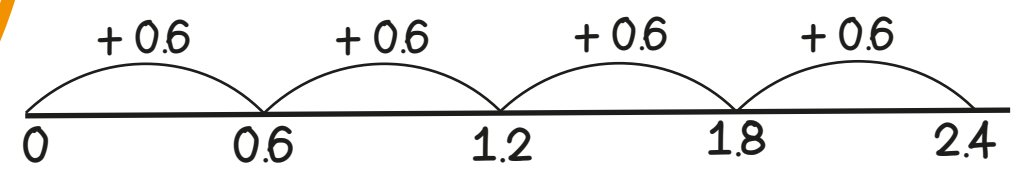
0.6 is ten times smaller than 6

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

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

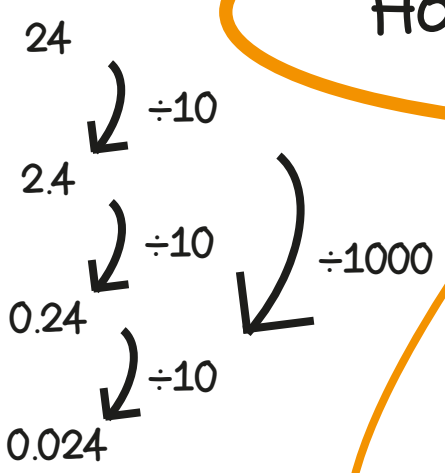
24 biscuits shared between 4 people means they will get 6 biscuits each.  
If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

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



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

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



How shall I divide?

$7182 \div 21$   
Formal written method

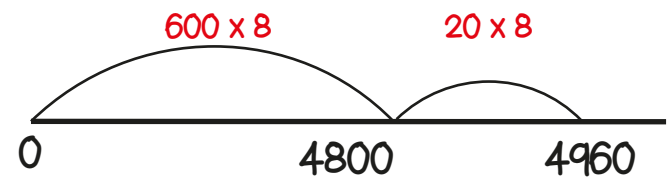
1000s	100s	10s	1s
● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ●

$4 \overline{) 1431} \begin{matrix} 357 \\ \underline{12} \\ 23 \\ \underline{18} \\ 51 \\ \underline{42} \\ 9 \end{matrix}$

$1512 \div 24$   
Using factors

$4960 \div 8$   
Partition and recombine

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



$1512 \div 6 \div 4$

1512					
252	252	252	252	252	252
63	63	63	63		

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