

MARLBOROUGH ROAD ACADEMY

MATHEMATICS CALCULATION POLICY

This Calculation Policy supports the Maths No Problem Singapore Maths scheme that is used in Y1-6 and the EYFS White Rose scheme of work.

Progression within in each area of calculation is in line with the programme of study in the 2014 National Curriculum. This calculation policy should be used to support children to develop a deep understanding of number and calculation.

This policy has been designed to teach children using concrete, pictorial and abstract methods/representations. C-P-A.

Concrete representation - a pupil is first introduced to an idea or a skill by acting it out with real objects. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Pictorial representation - a pupil has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

Abstract representation - a pupil is now capable of representing problems by using mathematical notation, for example: $12 \div 2 = 6$. It is important that conceptual understanding, supported using representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

Document Status

| Version | Date | Action |
|---------|--------------|---------------|
| 1 | October 2019 | First Written |
| 2 | | |
| 3 | | |
| 4 | | |

This Policy has been impact assessed to ensure that it does not have an adverse effect on race, gender or disability equality

Explore part- part –whole relationship: combining 2 parts to make a whole.

Using the ten frame to support the addition of 2 numbers: combining two groups.

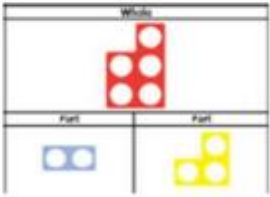
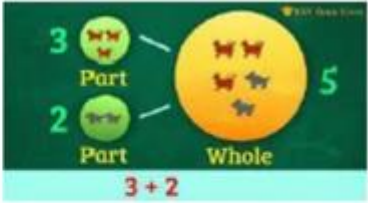
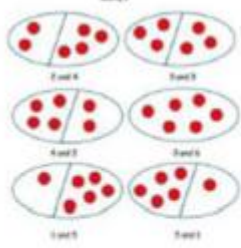
Recognise different ways of making numbers.

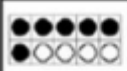
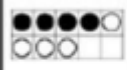
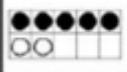
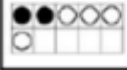
Solving problems using concrete and pictorial images.


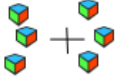


Addition

They develop ways of recording calculations using pictures



Activity 1






| | |
|---|--------------|
|  | $6 + 4 = 10$ |
|  | $4 + 4 = 8$ |
|  | $5 + 2 = 7$ |
|  | $2 + 4 = 6$ |



Sara has 2 apples.
Jon has 5 apples.
How many apples do they have altogether?
How many more apples does Jon have than Sara?





Subtraction

Using concrete strategies for counting.

Taking away after counting out practical equipment. Children would be encouraged to physically remove these using touch counting.



By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.

Those who are ready may record their own calculations

Using the ten frame to support subtraction by taking away.

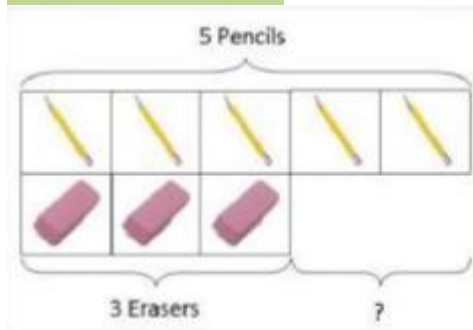


$$8 - 4 = \underline{\quad}$$



Solving problems using concrete and pictorial images.

Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?



Multiplication

Identifying and making equal objects of groups.

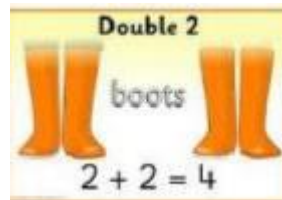
Using doubling when solving concrete and pictorial problems.

Children will experience equal groups of objects.

They will work on practical problem solving activities involving



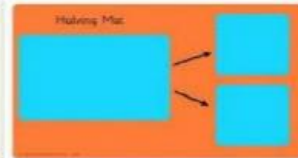
There are 6 pairs of socks.
How many socks are there altogether?



Division

Sharing objects into equal groups practically and pictorially.

Hearing and being exposed to the language of sharing and halving. Practically exploring halving and seeing pictorial representations.



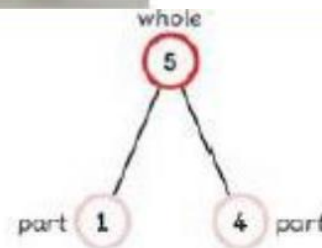
Addition

Combining two parts to make a whole: part-part-whole model. Joining two groups and recounting all of the objects. With a focus on finding and learning number bonds for all numbers to 10- number bond cards are to be used to develop recall alongside the Numbots app.

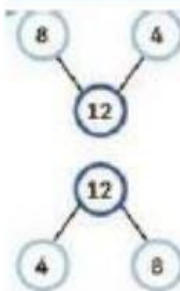
Learn number bonds to 20 and demonstrate an understanding of related facts.

Add and subtract one digit numbers to and from 2 digit numbers to 20, including zero.

$$3 + 4 = 7$$



| | | |
|---|---|--|
| <p> $6 + 4 = 10$ $4 + 6 = 10$ $10 - 4 = 6$ $10 - 6 = 4$ </p> <p>Tens Frame</p> | <p> $6 + 4 = 10$ $4 + 6 = 10$ $10 - 4 = 6$ $10 - 6 = 4$ </p> <p>Part Whole Model</p> | <p> $6 + 4 = 10$ $4 + 6 = 10$ $10 - 4 = 6$ $10 - 6 = 4$ </p> <p>Bar Model</p> |
|---|---|--|



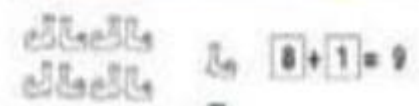
$$8 + 4 = 12$$

$$4 + 8 = 12$$

This is a family of addition and subtraction facts.

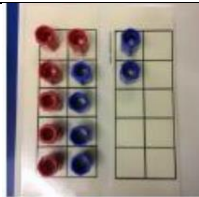
$$12 - 8 = 4$$

$$12 - 4 = 8$$



Bridging ten using ten frames, bar models, and number lines.

Children should start with the largest number and see how many more needed to make ten.



$$6 + 6 = 12$$



Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten... $10 + 2 = 12$

Subtraction

Subtraction as taking away practically using cubes, objects, Dienes etc.



$$6 - 3 = 3$$

Subtract by crossing out

Subtract by Crossing Out



$$7 - 2 = 5$$

5 ladybirds are left.

Subtract using the part-part-whole model (including missing number problems)



$$7 - 5 = 2$$

2 boats are not red.

Subtraction by counting back.

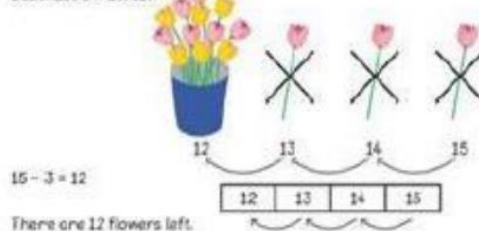
Subtract 1 digit number from a 2 digit number by subtracting from 10.

Subtract a one digit number from a 2 digit number by renaming / regrouping ten as ten ones, using Deines.

Let's Learn

Subtract by Counting Back

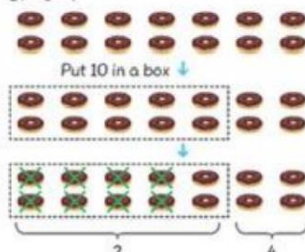
Subtract 3 from 15.



Let's Learn

Subtract from 10

$14 - 8 = ?$



$$20 - 4 = 16$$

Multiplication

Count in multiples of 2, 5, and 10 from zero.



4 groups of 2 = 8

$$4 \times 2 = 8$$



$$2 \times 4 = 8$$



Emphasis the vocabulary in pictorial and written calculations.

Solve multiplication problems using repeated addition.



This image represents two groups of 4 or 4 twice



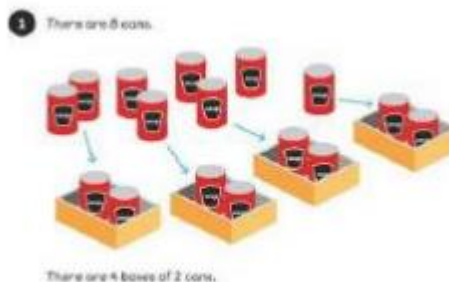
How many apples are there altogether?

$$3 + 3 + 3 = 9$$

Division

Pupils should be taught to share practically, and the sharing should be shown beneath the whole, as shown in the image.

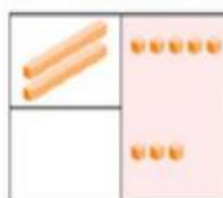
$$10 \div 2 = 5$$



Year 2

Addition

Use concrete objects and pictorial representations to add a 1 digit number to a 2 digit number.



| tens | ones |
|-------|------|
| 2 | 5 |
| + | 3 |
| <hr/> | |
| | 8 |

Use concrete and pictorial representations to add a multiple of 10 to a 2 digit number.

Use concrete and pictorial representations to add two 2 digit numbers.

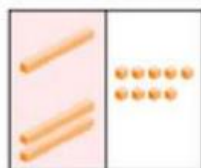
Step 1 Add the ones.



| tens | ones |
|-------|------|
| 1 | 9 |
| + 2 | 0 |
| <hr/> | |
| | 9 |

Step 2 Add the tens.

1 ten + 2 tens = 3 tens

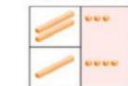


| tens | ones |
|-------|------|
| 1 | 9 |
| + 2 | 0 |
| <hr/> | |
| 3 | 9 |

$$19 + 20 = 39$$

Step 1 Add the ones.

3 ones + 4 ones = 7 ones



| tens | ones |
|-------|------|
| 2 | 3 |
| + 1 | 4 |
| <hr/> | |
| | 7 |

Step 2 Add the tens.

2 tens + 1 ten = 3 tens



| tens | ones |
|-------|------|
| 2 | 3 |
| + 1 | 4 |
| <hr/> | |
| 3 | 7 |

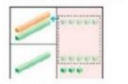
$$23 + 14 = 37$$

Adding with renaming

Add 15 and 18.

Use to help you add.

Step 1 Add the ones.
5 ones + 8 ones = 13 ones
Regroup the ones.
13 ones = 1 ten and 3 ones



| tens | ones |
|-------|------|
| 1 | 5 |
| + 1 | 8 |
| <hr/> | |
| 1 | 3 |

Step 2 Add the tens.

1 ten + 1 ten + 1 ten = 3 tens



| tens | ones |
|-------|------|
| 1 | 5 |
| + 1 | 8 |
| <hr/> | |
| 1 | 5 |
| + 2 | 0 |
| <hr/> | |
| 3 | 3 |

$$15 + 18 = 33$$

Use concrete objects and pictorial objects to add 3 1 digit numbers.

$$7 + 3 + 2 = \quad \text{leads to } 10 + 2 =$$



Use bar models to find missing numbers.

Helen has 14 breadsticks. Her friend has 17. How many do they have altogether?



| | |
|----|----|
| ? | |
| 14 | 17 |

Subtraction


Use concrete objects and pictorial representations to subtract a 1 digit number from a 2 digit number.

Use concrete and pictorial representations to subtract a multiple of 10 from a 2 digit number.

Use concrete and pictorial representations to subtract 2 digit number from a 2 digit number.


Recognise and use the inverse relationship between addition and subtraction.

Step 1 Subtract the ones.
6 ones - 3 ones = 3 ones



| tens | ones |
|-------|------|
| 2 | 6 |
| - | 3 |
| <hr/> | |
| | 3 |


Step 2 Subtract the tens.
2 tens - 0 tens = 2 tens



| tens | ones |
|-------|------|
| 2 | 3 |
| - | 0 |
| <hr/> | |
| 2 | 3 |


26 - 3 = 23

Step 1 Subtract the ones.
6 ones - 0 ones = 6 ones



| tens | ones |
|-------|------|
| 3 | 6 |
| - | 0 |
| <hr/> | |
| | 6 |

Step 2 Subtract the tens.
3 tens - 2 tens = 1 ten




| tens | ones |
|-------|------|
| 3 | 6 |
| - | 0 |
| <hr/> | |
| 1 | 6 |

36 - 20 = 16

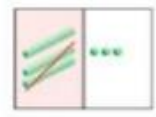
Subtract 24 from 37.

Step 1 Subtract the ones.
7 ones - 4 ones = 3 ones




| tens | ones |
|-------|------|
| 3 | 7 |
| - | 4 |
| <hr/> | |
| | 3 |


Step 2 Subtract the tens.
3 tens - 2 tens = 1 ten



| tens | ones |
|-------|------|
| 3 | 3 |
| - | 4 |
| <hr/> | |
| 1 | 3 |

37 - 24 = 13

Use  to help you subtract.



| | |
|----|----|
| ? | |
| 23 | 53 |

| | |
|----|---|
| 76 | |
| 23 | ? |

Use this to check calculations and solve missing number problems.

Multiplication

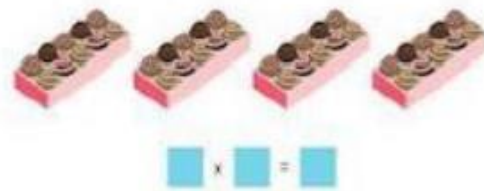
Skip count in multiples of 2, 3, 5 and 10 from 0.



Recall and use multiplication facts for the multiplication tables 2, 5 and 10.

| | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-------------------|
| 1x2=2 | 2x2=4 | 3x2=6 | 4x2=8 | 5x2=10 | 6x2=12 | 7x2=14 | 8x2=16 | 9x2=18 | 10x2=20 | $2 \times 5 = 10$ |
| 1x3=3 | 2x3=6 | 3x3=9 | 4x3=12 | 5x3=15 | 6x3=18 | 7x3=21 | 8x3=24 | 9x3=27 | 10x3=30 | $2 \times 5 = 10$ |
| 1x4=4 | 2x4=8 | 3x4=12 | 4x4=16 | 5x4=20 | 6x4=24 | 7x4=28 | 8x4=32 | 9x4=36 | 10x4=40 | $2 \times 5 = 10$ |
| 1x5=5 | 2x5=10 | 3x5=15 | 4x5=20 | 5x5=25 | 6x5=30 | 7x5=35 | 8x5=40 | 9x5=45 | 10x5=50 | $2 \times 5 = 10$ |
| 1x6=6 | 2x6=12 | 3x6=18 | 4x6=24 | 5x6=30 | 6x6=36 | 7x6=42 | 8x6=48 | 9x6=54 | 10x6=60 | $2 \times 5 = 10$ |
| 1x7=7 | 2x7=14 | 3x7=21 | 4x7=28 | 5x7=35 | 6x7=42 | 7x7=49 | 8x7=56 | 9x7=63 | 10x7=70 | $2 \times 5 = 10$ |
| 1x8=8 | 2x8=16 | 3x8=24 | 4x8=32 | 5x8=40 | 6x8=48 | 7x8=56 | 8x8=64 | 9x8=72 | 10x8=80 | $2 \times 5 = 10$ |
| 1x9=9 | 2x9=18 | 3x9=27 | 4x9=36 | 5x9=45 | 6x9=54 | 7x9=63 | 8x9=72 | 9x9=81 | 10x9=90 | $2 \times 5 = 10$ |
| 1x10=10 | 2x10=20 | 3x10=30 | 4x10=40 | 5x10=50 | 6x10=60 | 7x10=70 | 8x10=80 | 9x10=90 | 10x10=100 | $2 \times 5 = 10$ |

Use the multiplication (x) and equals (=) sign when writing out multiplication calculations.



Understand that multiplication is commutative. Pupils should understand that an array can represent different equations, and that as multiplication is commutative, the order of the multiplication does not affect the answer.

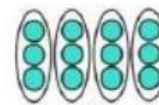
How many dots are there?



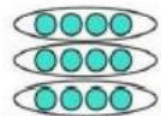
$$2 \times 5 = 10$$



$$5 \times 2 = 10$$



$$12 = 3 \times 4$$



$$12 = 4 \times 3$$

2×5 is equal to 5×2 .

Solve multiplication problems in context using arrays and repeated addition.



$$3 \times 5 = \square$$

$$5 \times 3 = \square$$



$$3 + 3 + 3 = 9$$

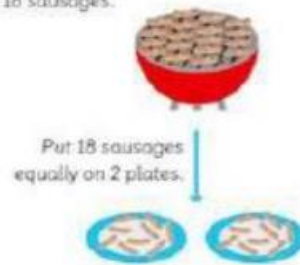
Division

Recall and use division facts for the 2, 5 and 10 times tables.

| | | | |
|-----------------|---|---|---------------------------------|
| $10 \div 10 =$ | • | • | <input type="text" value="1"/> |
| $20 \div 10 =$ | • | • | <input type="text" value="2"/> |
| $30 \div 10 =$ | • | • | <input type="text" value="3"/> |
| $40 \div 10 =$ | • | • | <input type="text" value="4"/> |
| $50 \div 10 =$ | • | • | <input type="text" value="5"/> |
| $60 \div 10 =$ | • | • | <input type="text" value="6"/> |
| $70 \div 10 =$ | • | • | <input type="text" value="7"/> |
| $80 \div 10 =$ | • | • | <input type="text" value="8"/> |
| $90 \div 10 =$ | • | • | <input type="text" value="9"/> |
| $100 \div 10 =$ | • | • | <input type="text" value="10"/> |

Solve division facts in context, using concrete objects, by sharing.

There are 18 sausages.



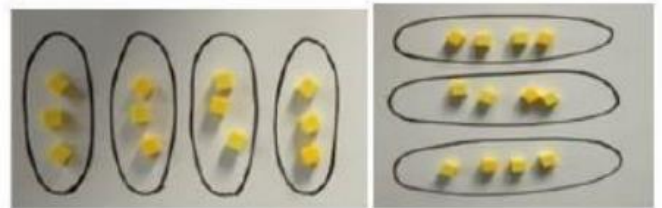
$$2 \times 9 = 18$$



There are 9 sausages on each plate.

$$18 \div 2 = 9$$

Solve division problems, in context, using arrays.



Put 10 buns in groups of 2.
How many plates are there?

Solve division problems, in context, by grouping.



Understand and use the inverse - this should be taught alongside both multiplication and division.



Put into groups of 5.

There are groups.

Make a family of multiplication and division facts.



$$2 \times 10 = 20 \quad \text{---} \quad 20 \div 10 =$$

$$10 \times 2 = 20 \quad \text{---} \quad 20 \div 2 =$$

Year 3

Addition

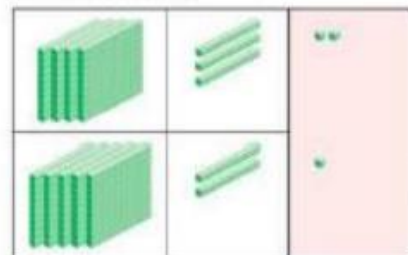
Add two three-digit numbers.

Children need to move from concrete, to pictorial, to abstract. Start without renaming and move to with renaming.

$$432 + 521 =$$

Step 1 Add the ones.

2 ones + 1 one = 3 ones

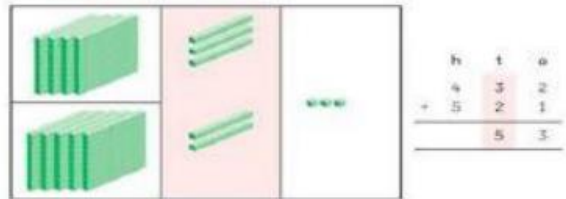


| | h | t | o |
|-------|---|---|---|
| 432 | 4 | 3 | 2 |
| + 521 | 5 | 2 | 1 |
| | | | 3 |

Solve problems using bar modelling.

Add fractions with the same denominator within one whole

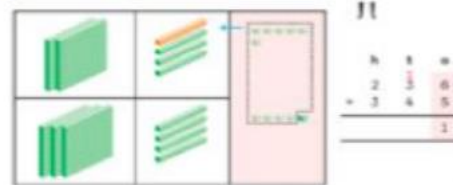
Step 2 Add the tens.
3 tens + 2 tens = 5 tens



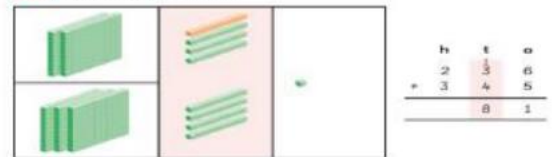
Step 3 Add the hundreds.
4 hundreds + 5 hundreds = 9 hundreds



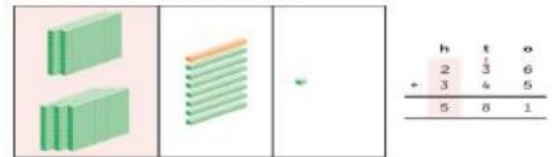
$$236 + 345 =$$



Step 2 Add the tens.
1 ten + 3 tens + 4 tens = 8 tens

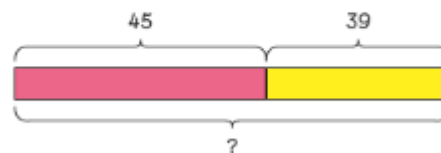


Step 3 Add the hundreds.
2 hundreds + 3 hundreds = 5 hundreds

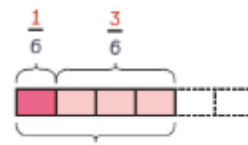


$$236 + 345 = 581$$

- Sam had 45 stamps.
His father gave him 39 stamps.
How many stamps did Sam have?



Add $\frac{1}{6}$ and $\frac{3}{6}$.



$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$$

1 sixth + 3 sixths = 4 sixths



Add $\frac{1}{7}$ and $\frac{3}{7}$.

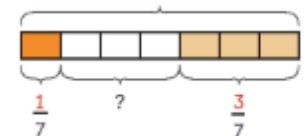


$$\frac{1}{7} + \frac{3}{7} = \frac{4}{7}$$

1 seventh + 3 sevenths = 4 sevenths



1 = 7 sevenths



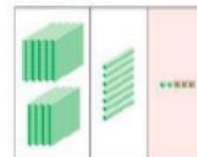
$$\frac{1}{7} + \frac{3}{7} + \frac{3}{7} = 1$$

Subtraction

Subtract numbers up to three digits from a 3-digit number. It is very important that children use Dienes alongside a place value chart to support understanding. Only when secure with this, should exchanging be introduced.

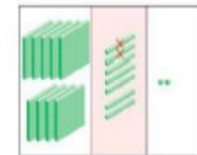
Subtract 723 from 955.

Step 1 Subtract the ones.
5 ones - 3 ones = 2 ones



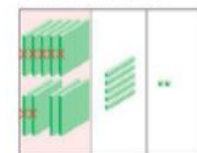
$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 9 \ 5 \ 5 \\ - 7 \ 2 \ 3 \\ \hline 2 \end{array}$$

Step 2 Subtract the tens.
5 tens - 2 tens = 3 tens



$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 9 \ 3 \ 5 \\ - 7 \ 2 \ 3 \\ \hline 2 \ 3 \ 2 \end{array}$$

Step 3 Subtract the hundreds.
9 hundreds - 7 hundreds = 2 hundreds

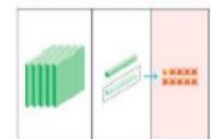


$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 2 \ 3 \ 2 \\ - 7 \ 2 \ 3 \\ \hline 2 \ 3 \ 2 \end{array}$$

$$955 - 723 = 232$$

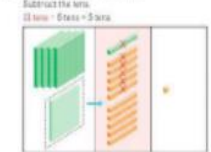
Subtract 269 from 500.

Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
10 ones - 9 ones = 1 one



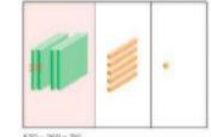
$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 5 \ 0 \ 0 \\ - 2 \ 6 \ 9 \\ \hline 2 \ 3 \ 1 \end{array}$$

Step 2 Regroup 1 ten into 10 ones.
Subtract the tens.
10 tens - 6 tens = 4 tens



$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 4 \ 10 \ 1 \\ - 2 \ 6 \ 9 \\ \hline 2 \ 3 \ 1 \end{array}$$

Step 3 Subtract the hundreds.
4 hundreds - 2 hundreds = 2 hundreds



$$\begin{array}{r} \text{h} \text{ t} \text{ o} \\ 2 \ 3 \ 1 \\ - 2 \ 6 \ 9 \\ \hline 2 \ 3 \ 1 \end{array}$$

$$500 - 269 = 231$$

Use the bar model to visualise finding missing numbers.

| | |
|-----|---|
| 315 | |
| 185 | ? |

$$315 - 185 = ?$$

$$185 + ? = 315$$

| | |
|-----|-----|
| ? | |
| 185 | 315 |

$$185 + 315 = ?$$

$$? - 185 = 315$$

Use bar models to help to solve problems.

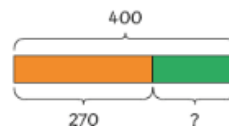
In Focus

Hannah baked 400 tarts.
She gave 270 tarts away.
How many tarts did Hannah have left?



Let's Learn

Subtract 270 from 400.



| | h | t | o |
|---|---|---|---|
| | 3 | 4 | 0 |
| - | 2 | 7 | 0 |
| | 1 | 3 | 0 |

$$400 - 270 = \boxed{}$$

$$300 - 200 = \boxed{}$$

$$100 - 70 = \boxed{}$$

Hannah had 130 tarts left.

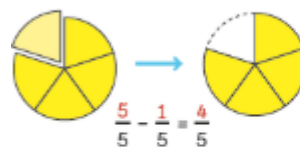


Subtract fractions with the same denominator within one whole.

The pizza was cut into 5 equal slices.

Sam ate $\frac{1}{5}$ of the pizza.

Subtract $\frac{1}{5}$ from $\frac{5}{5}$.



$\frac{4}{5}$ of the pizza was left.

$$1 = \frac{5}{5}$$

$$5 \text{ fifths} - 1 \text{ fifth} = 4 \text{ fifths}$$



Subtract $\frac{1}{3}$ from 1.

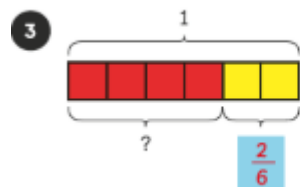


$$1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3}$$

$$= \frac{2}{3}$$

$$1 - \frac{1}{3} = \frac{2}{3}$$

$$3 \text{ thirds} - 1 \text{ third} = 2 \text{ thirds}$$



$$1 - \frac{2}{6} = \frac{6}{6} - \frac{2}{6}$$

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

Multiplication

Children to recall the following times tables:
2, 5, 10, 3, 4, 8.

$3 \times 4 = \square$

$3 \times 8 = \square$

$5 \times 4 = \square$

$5 \times 8 = \square$

$2 \times 8 = \square$

$3 \times 8 = \square$

$2 \times 8 = \square$

$5 \times 8 = \square$

$7 \times 8 = \square$

Multiply a 2 digit number by a one digit number.

In Focus

There are 23 children in a class.
How many children are there in 2 classes?



Let's Learn



Step 1 Multiply the ones by 2.

$3 \text{ ones} \times 2 = 6 \text{ ones}$

Step 2 Multiply the tens by 2.

$2 \text{ tens} \times 2 = 4 \text{ tens}$

Step 3 Add the products.

$6 + 40 = 46$

$23 \times 2 = 46$

There are 46 children in the 2 classes.

| | t | o |
|----------|---|---|
| 23 | 2 | 3 |
| \times | | 2 |
| | | 6 |

| | t | o |
|----------|---|---|
| 23 | 2 | 3 |
| \times | | 2 |
| | | 6 |
| | 4 | 0 |

| | t | o |
|----------|---|---|
| 23 | 2 | 3 |
| \times | | 2 |
| | | 6 |
| + | 4 | 0 |
| | 4 | 6 |

Multiply a 2-digit number by a two-digit number,
including regrouping.

Use the bar model to help to solve multiplication problems.

Let's Learn

- 1 There are 4 groups of 23 fish.
How do we multiply 23 by 4?



4 ones \times 4 = 12 ones
12 ones = 1 ten 2 ones

Step 1 Multiply the ones by 4.

| | |
|----------|---|
| t | o |
| 2 | 3 |
| \times | 4 |
| 12 | |

Step 2 Multiply the tens by 4.

| | |
|----------|---|
| t | o |
| 2 | 3 |
| \times | 4 |
| 12 | |
| 8 | 0 |

2 tens \times 4 = 8 tens

Step 3 Add the products.

| | |
|----------|----|
| t | o |
| 2 | 3 |
| \times | 4 |
| 12 | |
| + | 80 |
| 92 | |

12 + 80 = 92

$$23 \times 4 = 92$$

There are 92 fish in 4 tanks.

In Focus

This is how Hannah did 47×4 .
Is she correct?

| | | |
|----------|---|---|
| h | t | o |
| | 2 | 7 |
| \times | 4 | 4 |
| 188 | | |



Let's Learn

- 1 This is 47.



Step 1 Multiply the ones by 4.

| | | |
|----------|---|---|
| 2 tens | t | o |
| | 2 | 7 |
| \times | 4 | 4 |
| 8 | | |
| 8 ones | | |

7 ones \times 4 = 28 ones
28 ones = 2 tens + 8 ones

Step 2 Multiply the tens by 4.

| | | |
|----------|---|---|
| h | t | o |
| | 2 | 7 |
| \times | 4 | 4 |
| 188 | | |

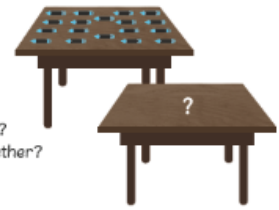
4 tens \times 4 = 16 tens
16 tens + 2 tens = 18 tens

$$47 \times 4 = 188$$

Hannah is correct.

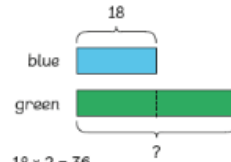
In Focus

There are 18 blue crayons on the table.
There are twice as many green crayons
as blue crayons on another table.
(a) How many green crayons are there?
(b) How many crayons are there altogether?



Let's Learn

1 (a)



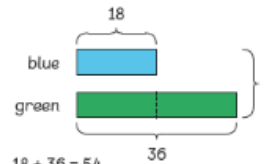
'Twice' means
2 times.



$$18 \times 2 = 36$$

There are 36 green crayons.

(b)



$$18 + 36 = 54$$

There are 54 crayons altogether.

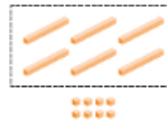
Division

Divide 2-digit numbers by one-digit numbers.

To find the number of sweets each person gets, divide 68 by 2.

$$68 \div 2 = \square$$

Step 1 Divide 6 tens by 2.



6 tens \div 2
= 3 tens



Step 2 Divide 8 ones by 2.



8 ones \div 2
= 4 ones



Step 3 Add the results.

$$68 \div 2 = 30 + 4 = 34$$

Each person gets 34 sweets.

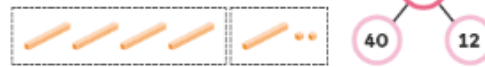
Divide by regrouping.

Let's Learn

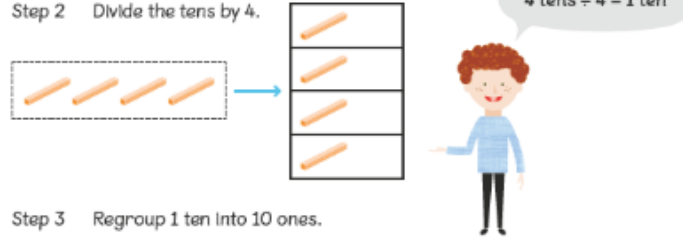
To find the number of ice creams in each box, divide 52 by 4.

$$52 \div 4 = \square$$

Step 1 Split 52 into 40 and 12.



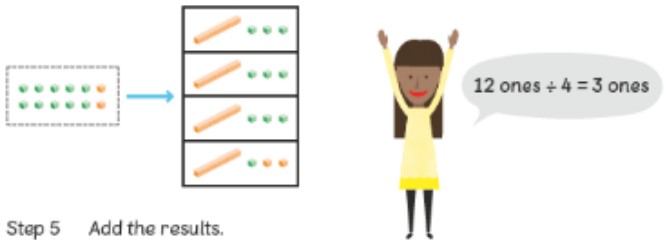
Step 2 Divide the tens by 4.



Step 3 Regroup 1 ten into 10 ones.



Step 4 Divide the ones by 4.



Step 5 Add the results.

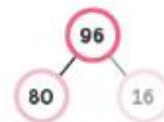
$$52 \div 4 = 10 + 3 = 13$$

There are 13 ice creams in each box.

Let's Learn



First, I take 80 from 96.
Then, I take 16 from the remaining 16.



$$\begin{array}{r} 1 \text{ ten} \\ 8 \overline{) 96} \\ \underline{- 80} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

$$8 \text{ tens} \div 8 = 1 \text{ ten}$$

$$\begin{array}{r} 1 \quad 2 \\ 8 \overline{) 96} \\ \underline{- 80} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

16 ones $\div 8 = 2$ ones

$$\begin{array}{r} 12 \\ 8 \overline{) 96} \\ \underline{- 8} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

2 ones

1 ten + 2 ones = 12

$96 \div 8 = 12$

$$\begin{array}{r} 12 \\ 8 \overline{) 96} \\ \underline{- 8} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

In Focus

I have 36 beads.

How many beads do the children have altogether?

Emma Sam

She has twice as many beads as I have.

Let's Learn

36

Emma:

Sam:

?

$36 \div 2 = 18$

Sam has 18 beads.

36

Emma:

Sam:

18

?

$36 + 18 = 54$

The children have 54 beads altogether.

Year 4

Addition

Adding numbers with up to 4 digits, including renaming.

$$\begin{array}{r} 2314 \\ + 4240 \\ \hline 6554 \end{array}$$

Step 1: Add the ones. 4 ones + 0 ones = 4 ones

Step 2: Add the tens. 1 ten + 4 tens = 5 tens

Step 3: Add the hundreds. 3 hundreds + 2 hundreds = 5 hundreds

Step 4: Add the thousands. 2 thousands + 4 thousands = 6 thousands

$2314 + 4240 = 6554$

Step 2: Add the tens. 7 tens + 5 tens + 5 tens = 17 tens. Rename the tens: 10 tens = 1 hundred and 7 tens.

Step 3: Add the hundreds. 6 hundreds + 2 hundreds + 1 hundred = 9 hundreds.

Step 4: Add the thousands. 6 thousands + 1 thousand = 7 thousands.

In Focus

Charles uses digit cards to make two numbers.



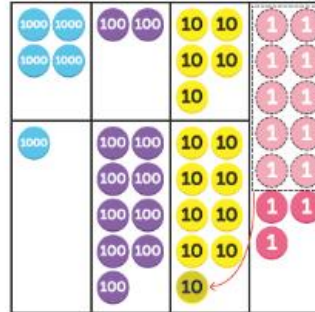
Find their sum.

Let's Learn

1 Estimate the sum of 4256 and 1987.

2 Find the sum of 4256 and 1987.

Step 1 Add the ones. 6 ones + 7 ones = 13 ones
Rename the ones. 13 ones = 1 ten and 3 ones



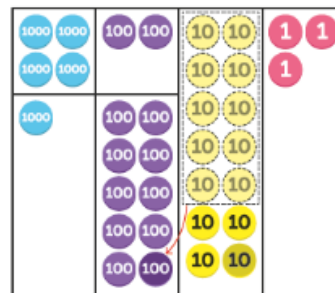
$$\begin{array}{r} 4000 \\ + 2000 \\ \hline 6000 \end{array}$$

4000 + 2000 = 6000



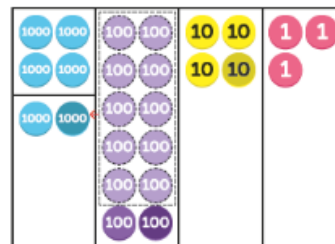
$$\begin{array}{r} 4256 \\ + 1987 \\ \hline 3 \end{array}$$

Step 2 Add the tens. 5 tens + 8 tens + 1 ten = 14 tens
Rename the tens. 14 tens = 1 hundred and 4 tens



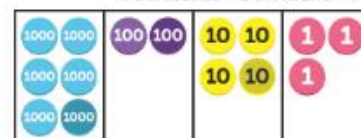
$$\begin{array}{r} 4256 \\ + 1987 \\ \hline 43 \end{array}$$

Step 3 Add the hundreds.
2 hundreds + 9 hundreds + 1 hundred = 12 hundreds
Rename the hundreds. 12 hundreds = 1 thousand and 2 hundreds



$$\begin{array}{r} 4256 \\ + 1987 \\ \hline 243 \end{array}$$

Step 4 Add the thousands.
4 thousands + 1 thousand + 1 thousand = 6 thousands



$$\begin{array}{r} 4256 \\ + 1987 \\ \hline 6243 \end{array}$$

Use the bar model to help to solve 2 step problems.

Add fractions with the same denominator

2 $£3.89 + £2.80 = £6.69$

£3.89 is £3 and 89p. £2.80 is £2 and 80p.

Bar model: £3 + £2 = £5. 89p + 80p = 169p.

Columnar addition:
$$\begin{array}{r} 89 \\ + 80 \\ \hline 169 \end{array}$$

169p = £1 and 69p.

Altogether they cost £6 and 69p or £6.69.

In Focus

On Saturday, 3018 people attended a funfair. 850 more people attended the funfair on Saturday than attended it on Sunday.

Altogether, how many people attended the funfair over the two days?



Let's Learn

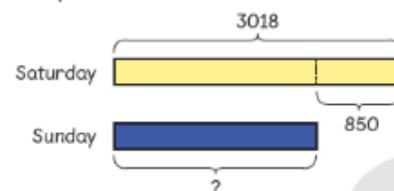
1 Understand the problem

| | |
|-------|---------|
| Who? | people |
| What? | funfair |

Make a plan



Carry out the plan



$$3018 - 850 = 2168$$

2168 people attended the funfair on Sunday.

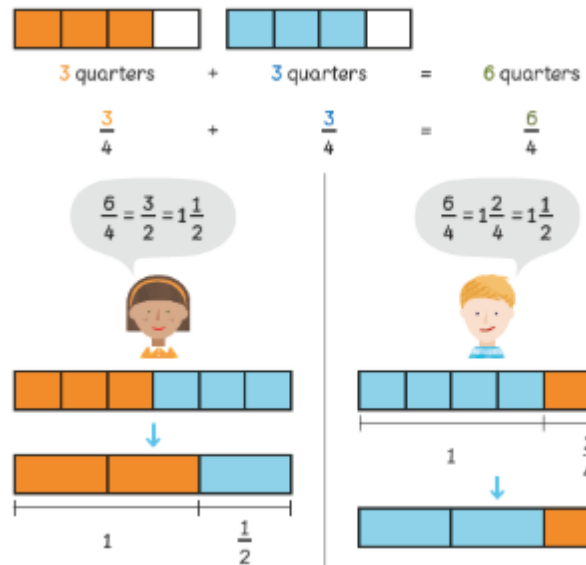
$$\begin{array}{r} \text{Saturday} \quad 3 \quad 0 \quad 1 \quad 8 \\ \text{Sunday} \quad + \quad 2 \quad 1 \quad 6 \quad 8 \\ \hline 5 \quad 1 \quad 8 \quad 6 \end{array}$$

$$3018 + 2168 = 5186$$

Altogether, 5186 people attended the funfair over the two days.

$$\begin{array}{r} 2 \quad 9 \quad 11 \quad 8 \\ 3 \quad 0 \quad 1 \quad 8 \\ - \quad 8 \quad 5 \quad 0 \\ \hline \end{array}$$





Subtraction

Subtract numbers with up to four digit, including renaming.

Use place value charts and counters to support, before moving to the abstract.

In Focus

I have £5280 with me.

After Ruby spent £3169, how much was left?

Let's Learn

$\overbrace{\hspace{10em}}^{\text{£}5280}$

| | |
|--------------|----------|
| £3169 | ? |
|--------------|----------|

 spent remaining
 $5280 - 3169 = \boxed{}$

5280

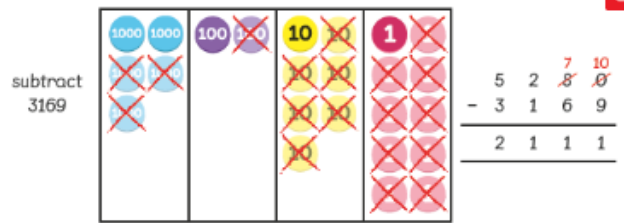
| | | | |
|---|--|---|--|
| <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> | <div style="background-color: #9c27b0; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">100</div> <div style="background-color: #9c27b0; border-radius: 50%; width: 40px; height: 40px; line-label: 40px; margin: 2px;">100</div> | <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> | |
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|---|---|---|---|
| <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> <div style="background-color: #00bcd4; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1000</div> | <div style="background-color: #9c27b0; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">100</div> <div style="background-color: #9c27b0; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">100</div> | <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> <div style="background-color: #ffc107; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">10</div> | <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> <div style="background-color: #d32f2f; border-radius: 50%; width: 40px; height: 40px; line-height: 40px; margin: 2px;">1</div> |
|---|---|---|---|

$$\begin{array}{r} 5\ 2\ \overset{7}{8}\ 0 \\ - 3\ 1\ 6\ 9 \\ \hline \end{array}$$

Use the bar model to help to solve 2 step problems.



$$5280 - 3169 = 2111$$

£2111 was left.

| | | | |
|-----|---|---|---|
| 2 | 1 | 1 | 1 |
| + 3 | 1 | 6 | 9 |
| 5 | 2 | 8 | 0 |



In Focus

A baker made 2750 chocolate cookies and 1638 vanilla cookies.
He sold 3195 cookies altogether.
How many cookies did he have left?

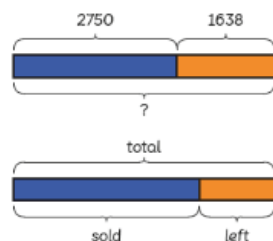


Let's Learn

1 Understand the problem

| | |
|-------|--|
| Who? |  baker |
| What? |  cookies |

Make a plan



Find the total number of cookies he made.

Then, subtract the number of cookies sold.

Subtract fractions with the same denominator.

Carry out the plan

$$2750 + 1638 = 4388$$

The baker baked 4388 cookies.

$$4388 - 3195 = 1193$$

He had 1193 cookies left.

Check

| | |
|---------------|------|
| Cookies sold | 3195 |
| Cookies left | 1193 |
| Cookies baked | 4388 |

$$\begin{array}{r} 1 \\ 2750 \\ + 1638 \\ \hline 4388 \end{array}$$

$$\begin{array}{r} 2 \quad 18 \\ 4388 \\ - 3195 \\ \hline 1193 \end{array}$$

$$\begin{array}{r} 3195 \\ + 1193 \\ \hline 4388 \end{array}$$



In Focus

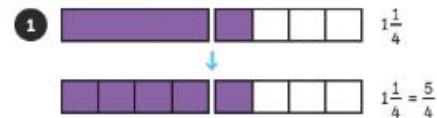


There is $1\frac{1}{4}$ kg of flour in the sack.



What is the mass of flour left in the sack after $\frac{3}{4}$ kg is removed?

Let's Learn



$$1\frac{1}{4} - \frac{3}{4} = \frac{5}{4} - \frac{3}{4} = \frac{2}{4}$$

$$1\frac{1}{4} - \frac{3}{4} = \frac{1}{2}$$

There is $\frac{1}{2}$ kg of flour left in the sack.

$$\frac{2}{4} = \frac{1}{2}$$



Multiplication

Children to know all times tables to 12 x 12.

1 $2 \times 12 = 24$

$3 \times 12 =$

12 **12** **12**

2 $2 \times 12 = 24$

$4 \times 12 =$

$6 \times 12 =$

12 **12** **12** **12** **12** **12**

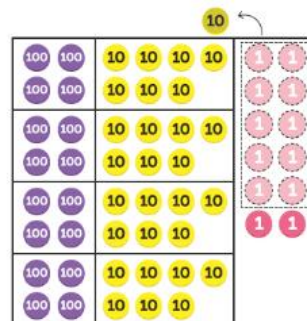
Multiply 2 and 3 digit numbers using a formal written method.
Use place value charts and counters to support, before moving to the abstract.

Solve problems involving multiplication using the bar model to help.

3 $473 \times 4 =$



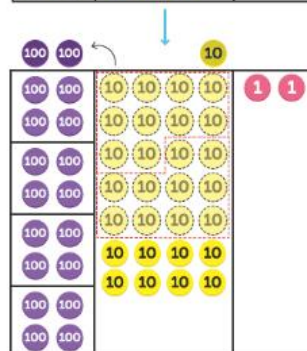
$$\begin{array}{r} 473 \\ \times 4 \\ \hline \end{array}$$



Multiply the ones.

$$\begin{array}{r} 473 \\ \times 4 \\ \hline 2 \end{array}$$

Don't forget to add the 1 ten.



Multiply the tens.

$$\begin{array}{r} 2473 \\ \times 4 \\ \hline 92 \end{array}$$

Don't forget to add the 2 hundreds.

Multiply the hundreds.

$$\begin{array}{r} 2473 \\ \times 4 \\ \hline 1892 \end{array}$$



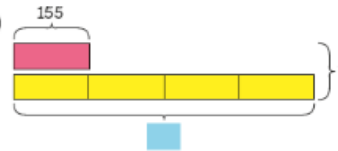
In Focus

Lulu has 155 beads.
Holly has 4 times as many beads as Lulu has.
How many beads do Lulu and Holly have altogether?



Let's Learn

1



Method 1

$$155 \times 4 = \square$$

Holly has \square beads.

$$\square + \square = \square$$

Lulu and Holly have \square beads altogether.

$$\begin{array}{r} 155 \\ \times 4 \\ \hline \end{array}$$

Method 2

1 unit = 155

5 units = 155×5

$$= \square$$

Lulu and Holly have \square beads altogether.

$$\begin{array}{r} 155 \\ \times 5 \\ \hline \end{array}$$

Division

Divide 2 and 3 digit numbers by a one digit number, including remainders.

In Focus

A shopkeeper repacks 100 kg of rice into 3-kg bags to sell.
How many bags does he get?



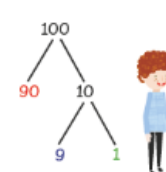
Let's Learn

1

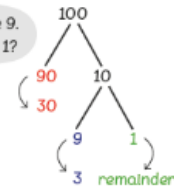
$$100 \div 3 = 33 \text{ remainder } 1$$



Method 1



Divide 90. Divide 9.
What about the 1?



Method 2

$$\begin{array}{r} 3 \overline{) 100} \\ \underline{- 90} \\ 10 \\ \underline{- 9} \\ 1 \\ \underline{- 1} \\ 0 \end{array}$$

$$\begin{array}{r} 033 \text{ remainder } 1 \\ 3 \overline{) 100} \\ \underline{- 90} \\ 10 \\ \underline{- 9} \\ 1 \\ \underline{- 1} \\ 0 \end{array}$$

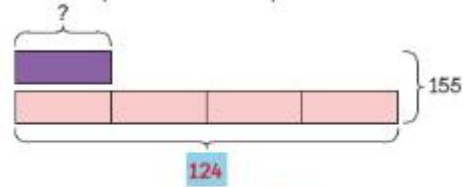
→ 3 tens
→ 3 ones
→ remainder

$$100 \div 3 = 33 \text{ remainder } 1$$

He gets 33 bags and a remainder of 1 kg of rice.

Solve word problems, using the bar model to help visualise the problem.

Holly has 4 times as many beads as Lulu has.
Together they have 155 beads.
How many beads does Holly have?



$$155 \div 5 = 31$$

Lulu has 31 beads.

$$31 \times 4 = 124$$

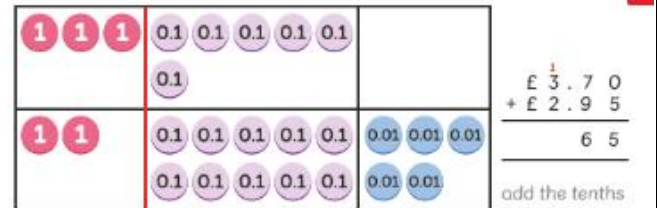
Holly has 124 beads.

Year 5

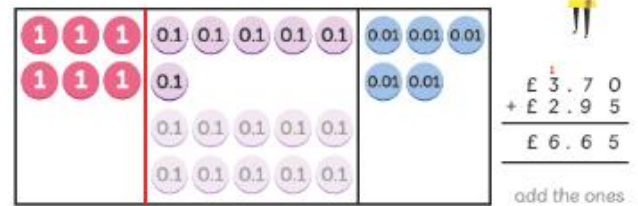
Addition

Adding numbers with more than 4 digits, using formal written methods, including those with decimals.

Use place value charts and counters to support, before moving to the abstract.



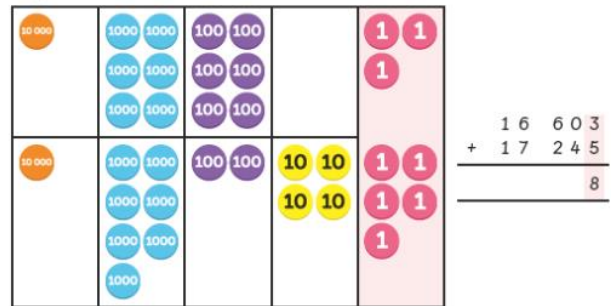
7 tenths + 9 tenths = 16 tenths
16 tenths = 1 one 6 tenths



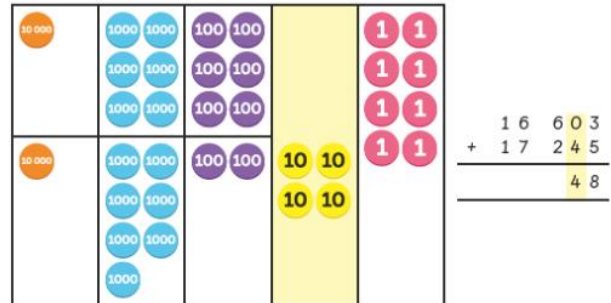
Together they cost £6.65.

Add fractions with the same denominator and denominators that are multiples of the same number

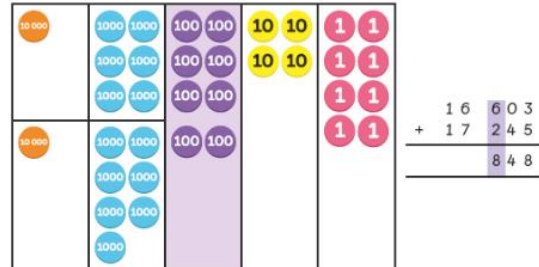
Step 1 Add the ones.



Step 2 Add the tens.



Step 3 Add the hundreds.

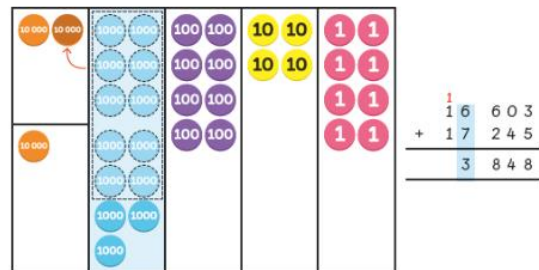


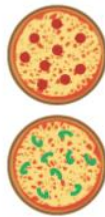
Step 4 Add the thousands.

6 thousands + 7 thousands = 13 thousands

Regroup the thousands.

13 thousands = 1 ten thousand and 3 thousands





Elliott's mother ordered 2 pizzas of the same size.

Elliott ate $\frac{1}{3}$ of one and $\frac{1}{6}$ of the other.

How much pizza did Elliott eat in all?

Let's Learn

1



$$\frac{1}{3}$$



$$\frac{1}{6}$$

We need to make the denominators equal before adding.



$$\frac{1}{3} = \frac{2}{6}$$



$$\frac{1}{6}$$

$$\begin{aligned}\frac{1}{3} + \frac{1}{6} &= \frac{2}{6} + \frac{1}{6} \\ &= \frac{3}{6} \\ &= \frac{1}{2}\end{aligned}$$

$$\frac{3}{6} = \frac{1}{2}$$



Elliott ate half a pizza in all.

- 2 Find the sum of $\frac{1}{6}$, $\frac{1}{2}$ and $\frac{1}{3}$.

Method 1

$$\frac{1}{6} + \frac{1}{2} + \frac{1}{3} = \frac{1}{6} + \frac{3}{6} + \frac{2}{6} \\ = \frac{6}{6} = 1$$

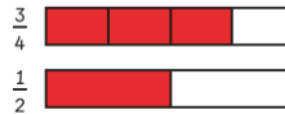
Method 2

$$\frac{1}{6} + \frac{1}{2} + \frac{1}{3} = \frac{1}{2} + \frac{1}{2} \\ = 1$$

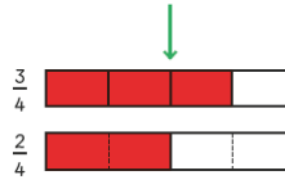
$$\frac{1}{6} + \frac{1}{3} = \frac{1}{2}$$



1 $\frac{3}{4} + \frac{1}{2} =$



The fractions have different denominators. We must make the denominators the same.



$$\frac{3}{4} + \frac{1}{2} \\ = \frac{3}{4} + \frac{2}{4} \\ = \frac{5}{4} \\ = 1\frac{1}{4}$$

$\frac{5}{4}$ is an improper fraction.



2 $\frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4}$

$\frac{1}{4} \quad \frac{1}{4}$

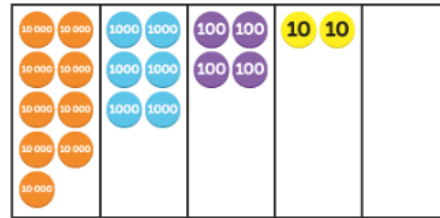
$= 1 + \frac{1}{4}$

$= 1\frac{1}{4}$

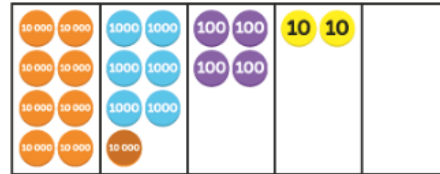
Subtraction

Subtract numbers with at least 4 digits using formal written methods, including decimal numbers.

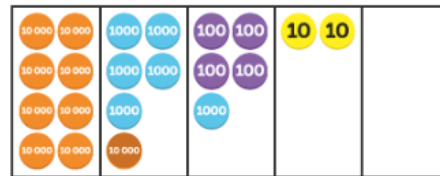
1 $96\,420 - 87\,531 = 8\,889$



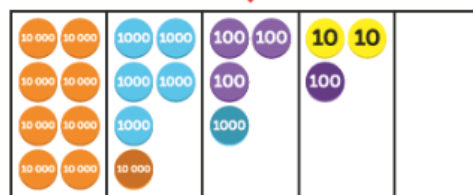
$$\begin{array}{r} 96\,420 \\ - 87\,531 \\ \hline \end{array}$$



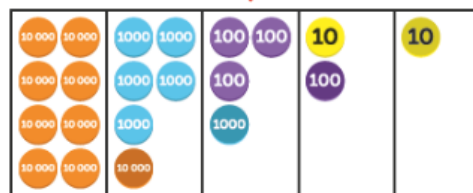
$$\begin{array}{r} 8\,16\,420 \\ - 87\,531 \\ \hline \end{array}$$



$$\begin{array}{r} 15\,8\,16\,1420 \\ - 87\,531 \\ \hline \end{array}$$

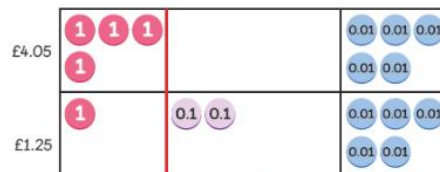


$$\begin{array}{r} 15\,13\,8\,16\,14\,12\,0 \\ - 87\,531 \\ \hline \end{array}$$

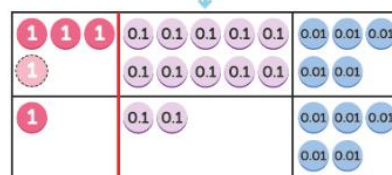


$$\begin{array}{r} 15\,13\,11\,8\,16\,14\,12\,0 \\ - 87\,531 \\ \hline 8\,889 \end{array}$$

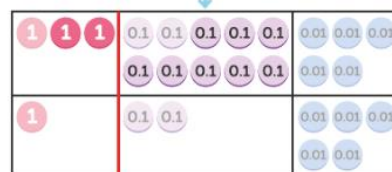
2 A person picks a £4.05 coin and a £1.25 coin and finds the difference.



$$\begin{array}{r} £4.05 \\ - £1.25 \\ \hline \end{array}$$



$$\begin{array}{r} £3.10\,5 \\ - £1.25 \\ \hline \end{array}$$



$$\begin{array}{r} £2.80 \\ - £1.25 \\ \hline \end{array}$$

The price difference is £2.80.



Subtract fractions with the same denominator and denominators that are multiples of the same number

In Focus



How much of the pizza is left over?



I eat $\frac{1}{4}$ of the pizza.



I eat $\frac{1}{8}$ of it.

Let's Learn

1



We need equal denominators.

$$1 - \frac{1}{4} = \frac{4}{4} - \frac{1}{4} = \frac{3}{4}$$

$$\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$$

$$\frac{3}{4} = \frac{6}{8}$$



$\frac{5}{8}$ of the pizza is left over after and eat their share.

2

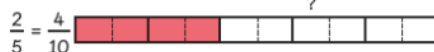
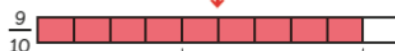
Subtract $\frac{3}{8}$ from 2.



$$2 - \frac{3}{8} = 1 + \boxed{} = \boxed{}$$

2

$$\frac{9}{10} - \frac{2}{5} = \boxed{}$$



$$\frac{2}{5} = \frac{4}{10}$$

$$\begin{aligned} \frac{9}{10} - \frac{2}{5} &= \frac{9}{10} - \frac{4}{10} \\ &= \frac{5}{10} = \frac{1}{2} \end{aligned}$$

The difference between $\frac{9}{10}$ and $\frac{2}{5}$ is $\boxed{}$.



$$\begin{array}{r} \div 5 \\ 5 \overline{) 10} \\ \underline{5} \\ 5 \\ \underline{5} \\ 0 \end{array}$$

1

$$2\frac{1}{2} - 1\frac{1}{4} = 1\frac{1}{4}$$

Method 1



$$\begin{aligned} 2\frac{1}{2} - 1\frac{1}{4} &= 2\frac{2}{4} - 1\frac{1}{4} \\ &= 1\frac{1}{4} \end{aligned}$$

2 - 1



$$\frac{2}{4} - \frac{1}{4}$$

Method 2



$$\begin{aligned} 2\frac{1}{2} - 1\frac{1}{4} &= \frac{10}{4} - \frac{5}{4} \\ &= \frac{5}{4} \\ &= 1\frac{1}{4} \end{aligned}$$

$$1\frac{1}{4} = \frac{5}{4}$$



Multiplication

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

3 $1144 \times 8 =$

$$\begin{array}{r} 1144 \\ \times 8 \\ \hline 52 \end{array}$$

$$\begin{array}{r} 1144 \\ \times 8 \\ \hline 9152 \end{array}$$

$12 \times 132 = 1584$

$$\begin{array}{r} 132 \\ \times 12 \\ \hline 264 \\ + 1320 \\ \hline 1584 \end{array}$$

264 \rightarrow multiply by 2
 + 1320 \rightarrow multiply by 10

$$\begin{array}{r} 123 \\ \times 45 \\ \hline 615 \\ + 4920 \\ \hline 5535 \end{array}$$

615 \rightarrow multiply by 5
 + 4920 \rightarrow multiply by 40

$123 \times 45 = 5535$

Solve problems involving multiplication.



Is the offer a good deal?

I think it is! I will buy
3 sets of 8 boxes.



1 $8 \times £18 = 144$



| | | | | | | | |
|----|---|---|---|---|---|---|---|
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

$8 \times 18 = 144$

$$\begin{array}{r} 18 \\ \times 8 \\ \hline 64 \rightarrow \text{multiply by ones} \\ + 80 \rightarrow \text{multiply by tens} \\ \hline 144 \end{array}$$

$8 \times 10 = 80$

$8 \times 8 = 64$

8 boxes would have cost £144.

They now cost £118.

What is the
saving?



The distance between City A and City B is 1022 miles.

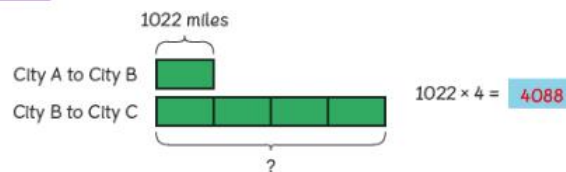
Multiply proper fractions and mixed numbers by whole numbers.

The distance between City B and City C is 4 times the distance between City A and City B. How can we work out the distance between City A and City C?



Let's Learn

1



$$1022 \times 4 = 4088$$

Lulu bought eight $\frac{2}{3}$ l bottles of fruit punch.

How much fruit punch did she buy?

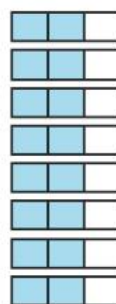
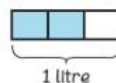
She also bought 8 pies for a party.

$\frac{2}{3}$ of them were eaten.

How many pies were eaten?

Let's Learn

1



$$8 \times \frac{2}{3} = 8 \times 2 \text{ thirds}$$

$$= 16 \text{ thirds}$$

$$= \frac{16}{3}$$

$$\frac{16}{3} = 5\frac{1}{3}$$



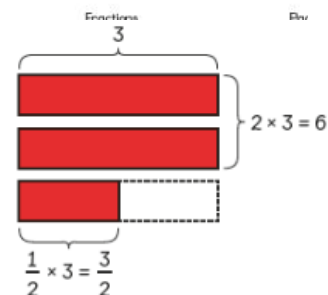
She bought $5\frac{1}{3}$ litres of fruit punch.

1

$$2\frac{1}{2} \times 3 = 6 + \frac{3}{2}$$

$$= 6 + 1\frac{1}{2}$$

$$= 7\frac{1}{2}$$



Division

Divide numbers up to 4 digits by a one-digit number using formal written methods and interpret remainders appropriately for the context

$$3 \overline{) 42} \rightarrow 3 \overline{) \overset{3}{4} \overset{12}{2}}$$

$$(a) 98 \div 7 = 14$$

$$7 \overline{) 98}$$

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

$$(b) 342 \div 6 = 57$$

$$6 \overline{) 342}$$

$$\begin{array}{r} 057 \\ 6 \overline{) 342} \\ \underline{30} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

$$\begin{array}{r} 75 \text{ remainder } 1 \\ 5 \overline{) 376} \\ \underline{35} \\ 26 \end{array}$$

2  's story

2528 ml of juice is put into 8 containers so that each container holds the same volume. What is the volume of juice in each container?

$$2528 \text{ ml} \div 8 = 316$$

$$\begin{array}{r} 2528 \\ 2400 \\ \hline 128 \\ 80 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 316 \\ 8 \overline{) 2528} \\ \underline{24} \\ 128 \\ \underline{80} \\ 48 \\ \underline{48} \\ 0 \end{array}$$

$$80 \div 8 = 10$$

$$48 \div 8 = 6$$

$$2400 \div 8 = 300$$





Solve multi- step / multi -operational problems

Solve addition and subtraction, multiplication and division multi-step problems in contexts, deciding which operations and methods to use and why.

In Focus



 baked 6 batches of cupcakes.
Each batch was made up of 8 trays of ,
Sam packed the cupcakes into boxes of 4.
Find the number of boxes he got.
What if Sam packed the cupcakes into boxes of 7?



Let's Learn

1 Understand the problem.




How many  are there on each tray?

How many trays are there in one batch?

Make a plan.



Find the total number of trays of cupcakes.

Then find the number of .

Carry out the plan.



$$6 \times 8 \text{ trays} = 48 \text{ trays}$$

$$48 \times 12 \text{ cupcakes} = 576 \text{ cupcakes}$$



$$576 \div 4 = 144$$

$$\begin{array}{r} 144 \\ 4 \overline{) 576} \\ \underline{4} \\ 176 \\ \underline{16} \\ 16 \\ \underline{16} \\ 0 \end{array}$$

Sam got 144 .

Check your answer.

$$144 \times 4 = 576$$



100 boxes \rightarrow 400
50 boxes \rightarrow 200
150 boxes \rightarrow 600

144 is just less than 150, so the answer seems reasonable.

$$\begin{array}{r} 144 \\ \times 4 \\ \hline 576 \end{array}$$

2 What if Sam packed the cupcakes into boxes of 7?

$$576 \div 7 = 82 \text{ remainder } 2$$

Sam got 82 boxes and 2 cupcakes left over.

$$\begin{array}{r} 82 \\ 7 \overline{) 576} \\ \underline{- 56} \\ 16 \\ \underline{- 14} \\ 2 \end{array}$$



In Focus

and share the sum of these two amounts

so that gets 3 times as much as

How much more than will get?



Let's Learn

1 Understand the problem.

How much money are they sharing?

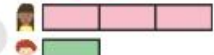
Are they sharing equally?

Make a plan and carry out the plan.

Add to find the total.

$$\begin{array}{r} \text{£}3597 \\ \text{£}1259 \\ \hline \text{£}4856 \end{array}$$

Use a model.



$$\text{£}4856 \div 4 = \text{£}1214$$

$$\text{£}1214 \times 3 = \text{£}3642$$

£1214

gets £3642 - £1214 = £2428 more than gets.

$$\begin{array}{r} 11 \\ 3597 \\ + 1259 \\ \hline 4856 \\ 4 \overline{) 4856} \\ \underline{- 4} \\ 856 \\ \underline{- 8} \\ 56 \\ \underline{- 4} \\ 16 \\ \underline{- 16} \\ 0 \end{array}$$

Check your answer.



I get £3642.



I get £1214.

Are the amounts reasonable?

Percentages

Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal

In Focus



Let's Learn

1 Girl's method

| | |
|--|----|
| | 7 |
| | 15 |
| | 13 |

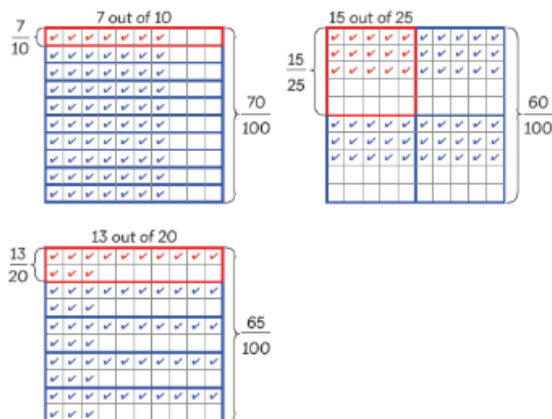


What is wrong with Girl's method?

When does Girl's method work?

2 Boy's method

| | |
|--|---|
| | $\frac{7}{10} = \frac{70}{100} = 70\%$ |
| | $\frac{15}{25} = \frac{60}{100} = 60\%$ |
| | $\frac{13}{20} = \frac{65}{100} = 65\%$ |



3 Boy's method

| | |
|--|---|
| | $\frac{7}{10} = 0.7$ |
| | $\frac{15}{25} = \frac{60}{100} = 0.6$ |
| | $\frac{13}{20} = \frac{65}{100} = 0.65$ |

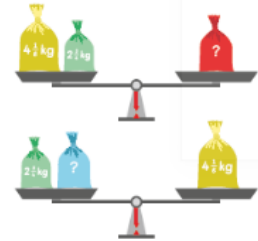


Addition

Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

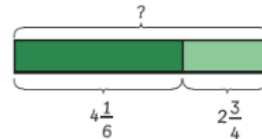
In Focus

Find the mass of ? in each case.



Let's Learn

1 $4\frac{1}{6} + 2\frac{3}{4} = 6\frac{11}{12}$



$$4\frac{1}{6} + 2\frac{3}{4} = 4\frac{2}{12} + 2\frac{9}{12} = 6\frac{11}{12}$$

$$\frac{1}{6} = \frac{2}{12}$$

$$\frac{3}{4} = \frac{9}{12}$$

Why did we use 12 as a common denominator?

has a mass of $6\frac{11}{12}$ kg.

What if it is $4\frac{5}{6} + 2\frac{3}{4}$?

Add using negative numbers.

$-4 + 3 = -1$



$-4 + 3 = -1$

We read -1 as 'negative one'.

-1 is 1 less than 0.

Add increasingly larger numbers using formal column addition, including decimals.

$$\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \end{array}$$

Adding several numbers with different numbers of decimal places (including money and measures):

- Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.

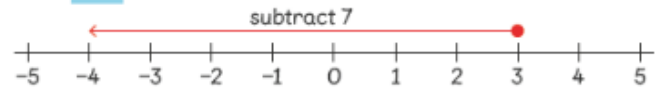
Empty decimal places should be filled with zero to show

Subtraction

Subtract using negative numbers.

Subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

$$3 - 7 = -4$$



$$3 - 7 = -4$$

We read -4 as 'negative four'.





-4 is 4 less than 0.

In Focus

Emma and Elliott have $1\frac{1}{3}$ bars of chocolate between them.



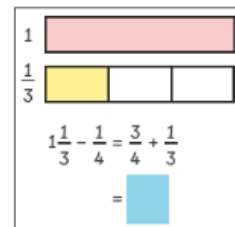
What is left if  takes $\frac{1}{4}$ of  ?

What is left if  takes $\frac{3}{4}$ of  ?

Let's Learn

$$1\frac{1}{3} - \frac{1}{4} = \text{[]}$$

Method 1



$$1 - \frac{1}{4} = \frac{3}{4}$$

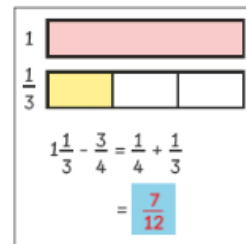
$$\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$$



$$1\frac{1}{3} - \frac{3}{4} = \frac{7}{12}$$

Method 1



$$1 - \frac{3}{4} = \frac{1}{4}$$

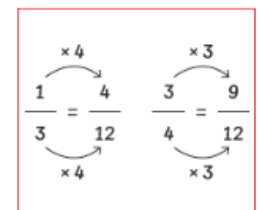


Method 2

$$1\frac{1}{3} - \frac{3}{4} = 1\frac{4}{12} - \frac{9}{12}$$

$$= \frac{16}{12} - \frac{9}{12}$$

$$= \frac{7}{12}$$



Subtract increasingly large numbers using formal written methods, including decimals.

$$\begin{array}{r} 80699 \\ - 89949 \\ \hline 60750 \end{array}$$

$$\begin{array}{r} 15.419 \text{ kg} \\ 36.080 \text{ kg} \\ \hline 69.339 \text{ kg} \end{array}$$

Multiplication

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

$$12 \times 568 = 6816$$

$$\begin{array}{r} 568 \\ \times 12 \\ \hline 1136 \rightarrow 568 \times 2 \\ + 5680 \rightarrow 568 \times 10 \\ \hline 6816 \end{array}$$

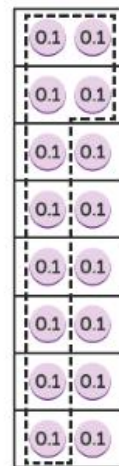
Multiply one-digit numbers with up to two decimal places by whole numbers.

$$\frac{2}{6} = \frac{1}{3}$$

1 $1.2 \times 8 = 9.6$



$$1.2 \times 8 = 8 + 1.6 = 9.6$$



$1 \times 8 = 8$

$0.2 \times 8 = 1.6$



2 $1.2 \times 8 = 9.6$

$$1.2 \times 8 = 12 \text{ tenths} \times 8 = 96 \text{ tenths} = 9.6$$

1.2 = 12 tenths



$$\begin{array}{r} 1.2 \\ \times 8 \\ \hline 9.6 \end{array}$$

3 $1.02 \times 8 = 8.16$



$$1.02 \times 8 = 8 + 0.16 = 8.16$$



$1 \times 8 = 8$

$0.02 \times 8 = 0.16$



4 $1.02 \times 8 = 8.16$

$$1.02 \times 8 = 102 \text{ hundredths} \times 8 = 816 \text{ hundredths} = 8.16$$

1.02 = 102 hundredths



$$\begin{array}{r} 1.02 \\ \times 8 \\ \hline 8.16 \end{array}$$

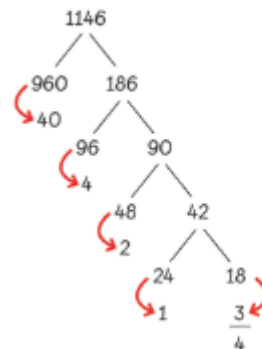
Division

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

$$\begin{array}{r} 5 \\ 96 \overline{) 500} \\ \underline{480} \\ 20 \end{array} \rightarrow 5 \times 96 = 480$$

Divide proper fractions by whole numbers.

1 $£1146 \div 24 = £47.75$



$18 \div 24 = \frac{18}{24} = \frac{3}{4}$



2 $£1146 \div 24 = £47.75$

$24 \overline{) 1146.00}$

$960 \div 24 = 40$

$168 \div 24 = 7$

$18 \div 24 = 0.75$

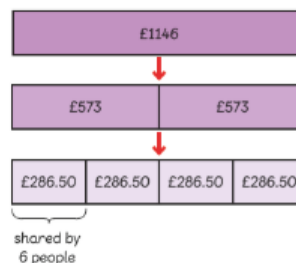
3 $£1146 \div 24 = £47.75$

$£1146 \div 2 = £573$

$£573 \div 2 = £286.50$

$£1146 \div 24 = £573 \div 12$

$= £286.50 \div 6$




$6 \overline{) 286.50}$

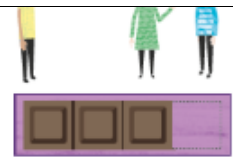
$240 \div 6 = 40$

$42 \div 6 = 7$

$£4.50 \div 6 = 75p$



How can  share $\frac{3}{4}$ of a bar of chocolate with 2 friends so that each of them gets the same amount of chocolate?



Let's Learn

1 $\frac{3}{4} \div 3 = \frac{1}{4}$



$\frac{3}{4} \div 3 = \frac{1}{4}$

Each person gets $\frac{1}{4}$ of the bar of chocolate.



2 $\frac{3}{4} \div 3 = \frac{1}{3} \times \frac{3}{4}$

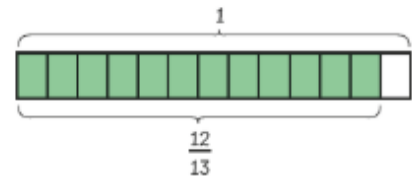


$\frac{3}{4} \div 3 = \frac{1}{3} \times \frac{3}{4} = \frac{1}{4}$

I receive a fraction of $\frac{3}{4}$ of the bar.

Divide.

(a) $\frac{12}{13} \div 2 = \frac{6}{13}$



(b) $\frac{12}{13} \div 3 = \frac{4}{13}$

(c) $\frac{12}{13} \div 4 = \frac{3}{13}$

(d) $\frac{12}{13} \div 6 = \frac{2}{13}$

1  makes $\frac{3}{4} \div 6 = \frac{1}{8}$.

Is she correct?

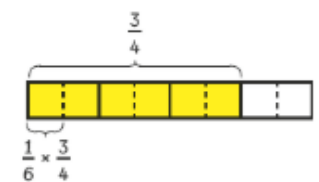
Method 1

$$\frac{3}{4} \div 6 = \frac{6}{8} \div 6 = \frac{1}{8}$$

 $\frac{3}{4} = \frac{6}{8}$

Method 2

$$\frac{3}{4} \div 6 = \frac{1}{6} \times \frac{3}{4} = \frac{1}{8}$$



 is correct.

Divide a 1-digit number with up to two decimal places by 2-digit whole numbers.

2  makes $\frac{2}{4} \div 3 = \frac{1}{6}$.

Is he correct?

Method 1

$$\begin{aligned}\frac{2}{4} \div 3 &= \frac{6}{12} \div 3 \\ &= \frac{2}{12} \\ &= \frac{1}{6}\end{aligned}$$

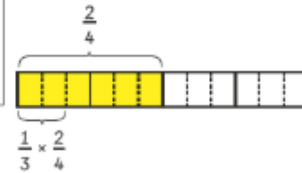
$\frac{2}{4} = \frac{6}{12}$



$\frac{2}{12} = \frac{1}{6}$

Method 2

$$\begin{aligned}\frac{2}{4} \div 3 &= \frac{1}{3} \times \frac{2}{4} \\ &= \frac{1}{6}\end{aligned}$$

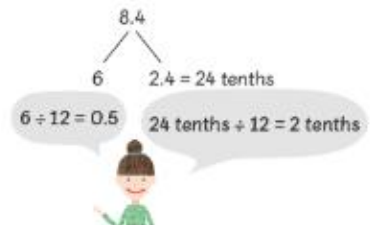


 is correct.

1 $8.4 \div 12 = 0.7$

Method 1

$$\begin{aligned}8.4 \div 12 &= 0.5 + 0.2 \\ &= 0.7\end{aligned}$$



Method 2

$$\begin{aligned}8.4 &= 84 \text{ tenths} \\ 84 \text{ tenths} \div 12 &= 7 \text{ tenths} \\ &= 0.7\end{aligned}$$



$8.4 \text{ kg} \div 12 = 0.7 \text{ kg}$

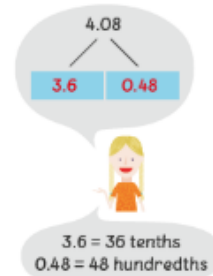
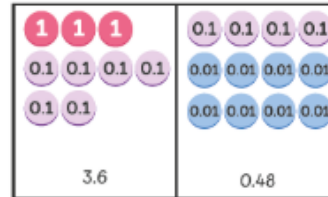
In Focus

How should we rename 4.08 to calculate $4.08 \div 12$?



Let's Learn

1 $4.08 \div 12 = 0.34$

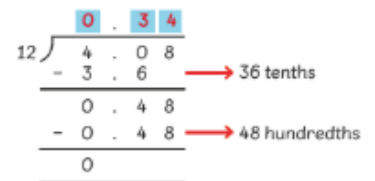


$36 \text{ tenths} \div 12 = 3 \text{ tenths}$
 $= 0.3$

$48 \text{ hundredths} \div 12 = 4 \text{ hundredths}$
 $= 0.04$

$4.08 \div 12 = 0.3 + 0.04$
 $= 0.34$

2 $4.08 \div 12 = 0.34$



Problem solving with all four operations

solve problems involving addition, subtraction, multiplication and division
 solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

In Focus

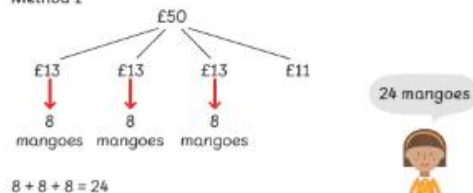
What is the greatest number of mangoes that can be bought with £50?



Let's Learn

1 How many mangoes can be bought with £50?

Method 1

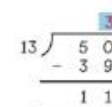


$8 + 8 + 8 = 24$


Method 2





$£50 \div £13 = 3 \text{ remainder } £11$

$3 \times 8 = 24$



In Focus

 took 1 h 50 min to bake first a sponge cake, then a butter cake and then a brownie. The butter cake took twice as long to bake as the brownie. The brownie took 10 minutes more than the sponge cake.

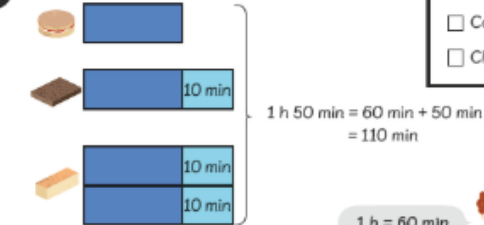
| Baking time | |
|---|---|
|  | twice as much time as  |
|  | 10 minutes more than  |

Is it possible to find the time it takes to bake a sponge cake?

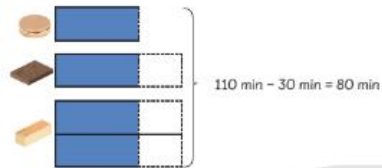
Let's Learn

- ☐ Understand
- ☐ Plan
- ☐ Calculate
- ☐ Check

1



1 h = 60 min



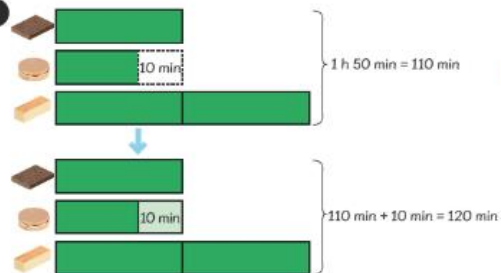
4 units = 80 min
1 unit = 80 min ÷ 4
= 20 min

The sponge cake took 20 min to bake.

How long did it take to bake the butter cake and the brownie?



2




4 units = 120 min
1 unit = 120 min ÷ 4
= 30 min


It took 30 min to bake the brownie.

It took 60 min to bake the butter cake.

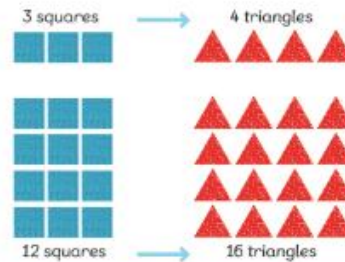
In Focus

 wants to make 20 identical squares and 12 identical equilateral triangles using wire.



He has made 12 squares and 9 triangles using 6 m of wire. The length of wire used for 3 squares is the same as that used for 4 triangles. Find the total length of wire  needs to make all 20 squares and 12 triangles.

Let's Learn



- ☐ Understand
- ☐ Plan
- ☐ Calculate
- ☐ Check

12 squares and 9 triangles need 6 m = 600 cm.
16 triangles and 9 triangles need 600 cm.
25 triangles need 600 cm.

1 m = 100 cm

1 triangle needs $600 \text{ cm} \div 25 = 24$ cm.

$$\begin{array}{r} 24 \\ 25 \overline{) 600} \\ \underline{-500} \\ 100 \\ \underline{-100} \\ 0 \end{array}$$



4 triangles need $24 \text{ cm} \times 4 = 96$ cm.

$$\begin{array}{r} 24 \\ \times 4 \\ \hline 96 \end{array}$$



3 squares need 96 cm.

1 square needs $96 \text{ cm} \div 3 = 32$ cm.

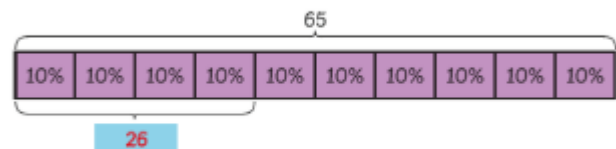
$$\begin{array}{r} 32 \\ 3 \overline{) 96} \\ \underline{-90} \\ 6 \\ \underline{-6} \\ 0 \end{array}$$



Percentages

Calculate percentages of quantities and numbers.

2 40% of 65 = 26



$$10\% \rightarrow 65 \div 10 = 6.5$$

$$40\% \rightarrow 4 \times 6.5 = 26$$

In Focus

Ingredients for lemonade

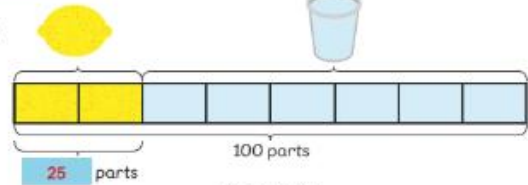
6 cups (1.35 l) cold water
2 cups (450 ml) lemon syrup
a pinch of salt



mixes the cold water and the lemon syrup. Out of 100, how many parts of the mixture is lemon syrup?

Let's Learn

1



$$100 \div 4 = 25$$

25 out of 100 parts of the mixture is lemon syrup.

25% of the mixture is lemon syrup.

That means for every 100 ml of mixture, 25 ml is lemon syrup.



2

wants to prepare a 2-litre batch of lemonade. How much lemon syrup does he need?

$$2 \text{ l} = 2000 \text{ ml}$$

Method 1

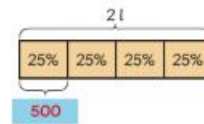
For every 100 ml, needs 25 ml of lemon syrup.

For every 1000 ml, needs 250 ml of lemon syrup.

For every 2000 ml, needs 500 ml of lemon syrup.



Method 2



$$2 \text{ l} \div 4 = 2000 \text{ ml} \div 4 = 500 \text{ ml}$$

Method 3

$$25\% \text{ of } 2 \text{ l} = \frac{25}{100} \times 2000 \text{ ml}$$

$$= \frac{1}{4} \times 2000 \text{ ml}$$

$$= 500 \text{ ml}$$