


Mathematics Calculation Routeway- Multiplication & division




Step 1 - Multiplying Equal groups/rows

2




Each pack has 2



2, 4, 6

There are 3 packs.


3 packs of 2 = 6
3 groups of 2 = 6
3 twos = 6




There are 6

Let's Learn


1



3 cookies in 1 row
6 cookies in 2 rows
12 cookies in 4 rows



6 rows of threes



6 threes

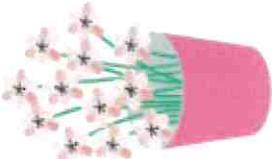

cookies in 6 rows

Step 1 - Division

Grouping equally

2

There are 12 flowers.
Lulu uses 3 flowers in each bouquet.
How many bouquets does she get?

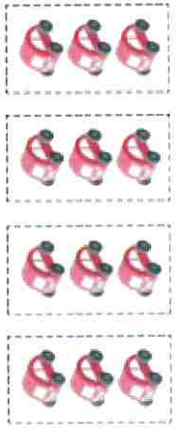



She gets 4 bouquets.



Sharing equally

2

There are 12 toy cars.
Put the toy cars equally into 4 boxes.
How many toy cars are there in each box?




Circle to make 4 groups.


There are 3 toy cars in each box.

Step 2 – Multiplication: Drawing groups/arrays


1 1 stick has 5 marshmallows.



1 group of 5
 $1 \times 5 = 5$



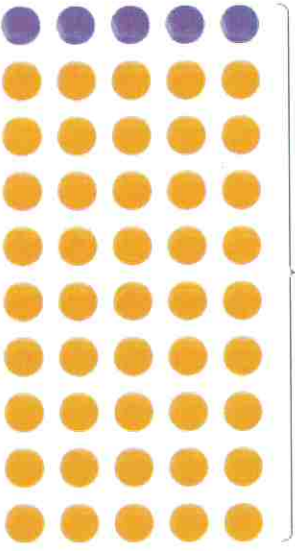
2 groups of 5
 $2 \times 5 = 10$



3 groups of 5
 $3 \times 5 = 15$

There are 15 marshmallows altogether.

2 $9 \times 5 =$



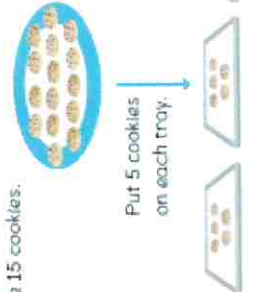
$9 \times 5 = 50 - 5 = 45$

Step 2 – Division: Grouping / sharing



Let's Learn

Ravi puts 5 cookies on each tray.
How many trays of cookies are there?

There are 15 cookies.



Put 5 cookies on each tray.



Use  to stand for cookies and  to stand for the trays.

$3 \times 5 = 15$
 $15 \div 5 = 3$

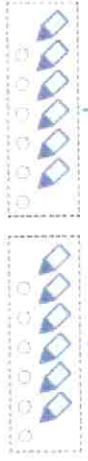
What if Ravi puts the 15 cookies equally on 5 trays?

$15 \div 5 = 3$
There are 3 trays of cookies.

Amina has 12 key chains.
She shares the key chains equally between 2 children.
How many key chains does each child get?

Method 1 Use  to stand for each child.
Use  for each child.

Method 2 Draw a picture.



$6 \times 2 = 12$
 $12 \div 2 = 6$

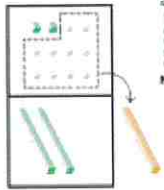
Method 3 Use a division equation.
 $12 \div 2 = 6$
Each child gets 6 key chains.

Step 3 – Multiplication: Written methods


Method 1: Expanded column

Let's Learn

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




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

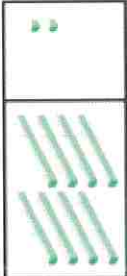


Step 1 Multiply the ones by 4.

t	o
2	3
x	
1	2




Step 2 Multiply the tens by 4.




2 tens \times 4 = 8 tens

t	o
2	3
x	
1	2
8	0

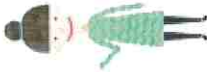


Step 3 Add the products.



12 + 80 = 92

t	o
2	3
x	
1	2
8	0
9	2



23 \times 4 = 92


There are 92 fish in 4 tanks.

Method 2 (once children are secure with Method 1)

In Focus


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

h	t	o
4	7	
x		
1	8	8




Let's Learn

1 This is 47



Step 1 Multiply the ones by 4

2	tens	t	o
4		7	
x			
		8	
8 ones			




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

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

Step 2 Multiply the tens by 4

h	t	o
4	7	
x		
1	8	8



47 \times 4 = 188

Hannah is correct

Step 3 - Division

In Focus



A shopkeeper has 52 ice creams. She packs them equally into 4 boxes. How many ice creams are there in each box?

Let's Learn

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

$$52 \div 4 =$$

Step 1 Split 52 into 40 and 12.



Step 2 Divide the tens by 4.



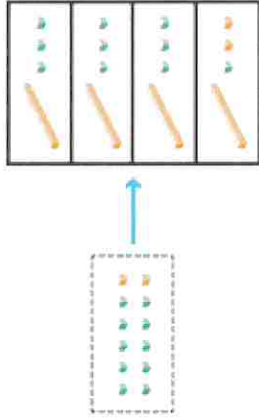
$$4 \text{ tens} \div 4 = 1 \text{ ten}$$



Step 3 Regroup 1 ten into 10 ones.



Step 4 Divide the ones by 4.



$$12 \text{ ones} \div 4 = 3 \text{ ones}$$

Step 5 Add the results.

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

There are 13 ice creams in each box.

Step 4 - Multiplication

Multiplying by partitioning

In Focus

Each ticket from London to Middlesbrough costs £116.

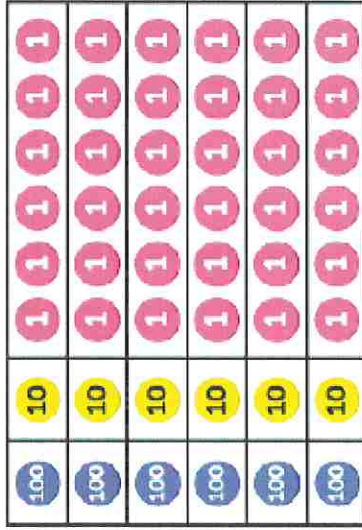
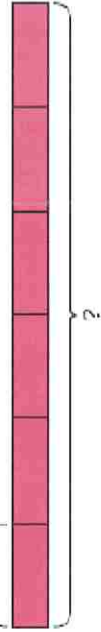


How can we find the cost of 6 tickets from London to Middlesbrough?

Let's Learn

1 $£116 \times 6 =$

£116



$$100 \times 6 = 600$$

$$10 \times 6 = 60$$

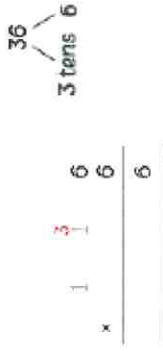
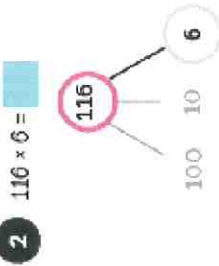
$$6 \times 6 = 36$$

$$116 \times 6 = 696$$

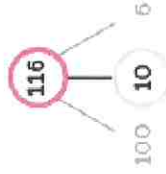
$$100 \times 6 \quad 10 \times 6 \quad 6 \times 6$$

The tickets cost £696.

Written calculation



1 ten $\times 6 = 6$ tens
6 tens + 3 tens = 9 tens



1 hundred $\times 6$
= 6 hundreds

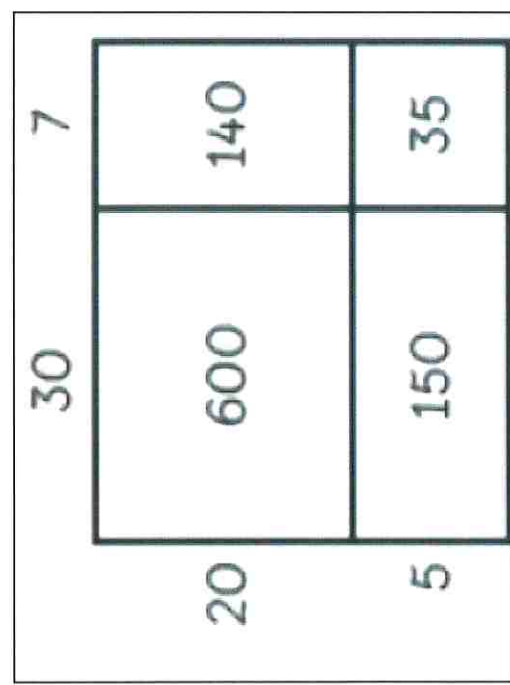


$$116 \times 6 = 696$$

Step 5 - 6 - Multiplication

Grid Method

$$25 \times 37 = \boxed{?}$$



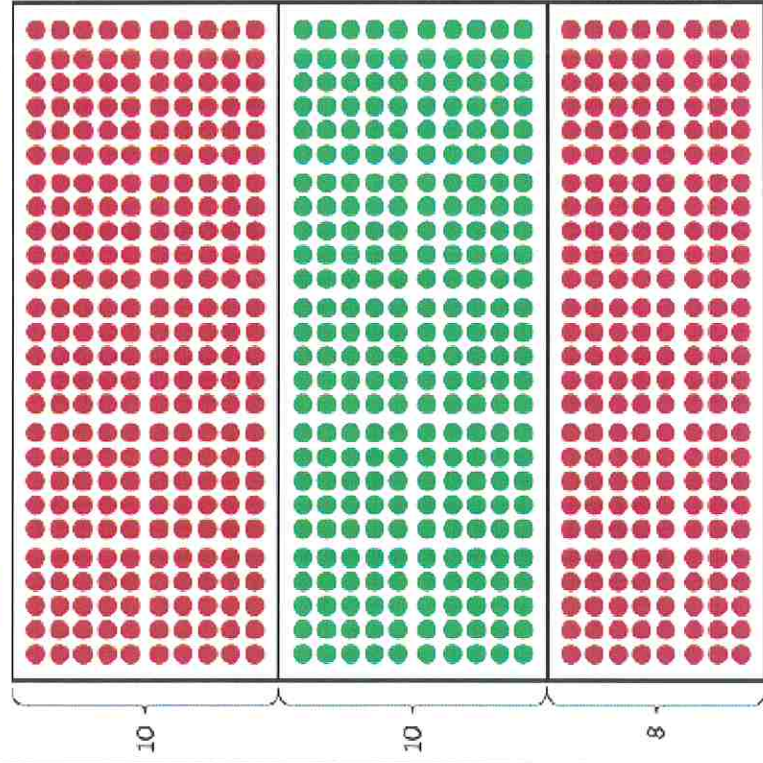
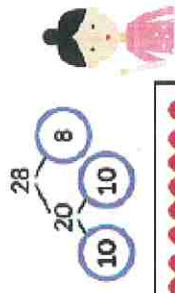
$$25 \times 37 = 600 + 150 + 140 + 35$$

$$= \boxed{925}$$

Partitioning

There are 28 rows.
Each row consists of 26 seats.

$$28 \times 26 = \boxed{}$$



$$10 \times 26 = 260$$

$$10 \times 26 = 260$$

$$8 \times 26 = 208$$

$$28 \times 26 = 728$$

$$\begin{array}{r} 26 \\ \times 28 \\ \hline 208 \\ \hline \end{array}$$

There are 728 seats.

Written method

$$24 \times 2568 = 61\,632$$

$$\begin{array}{r} 2\ 2\ 3 \\ 2\ 5\ 6\ 8 \end{array}$$

$$\begin{array}{r} \times \quad 2\ 4 \\ \hline 1\ 0\ 2\ 7\ 2 \end{array}$$



$$2568 \times 4$$



$$2568 \times 20$$

$$\begin{array}{r} 1\ 1\ 1 \\ 2\ 2\ 3 \\ 2\ 5\ 6\ 8 \end{array}$$

$$\begin{array}{r} \times \quad 2\ 4 \\ \hline 1\ 0\ 2\ 7\ 2 \end{array}$$

$$5\ 1\ 3\ 6\ 0$$



$$\begin{array}{r} \times \quad 2\ 4 \\ \hline 1\ 0\ 2\ 7\ 2 \end{array}$$

$$+ 5\ 1\ 3\ 6\ 0$$

$$\hline 6\ 1\ 6\ 3\ 2$$

$$24 \times 2568 = 61\,632$$



$$\text{Estimate } 20 \times 3000 = 60\,000$$

Add the products.

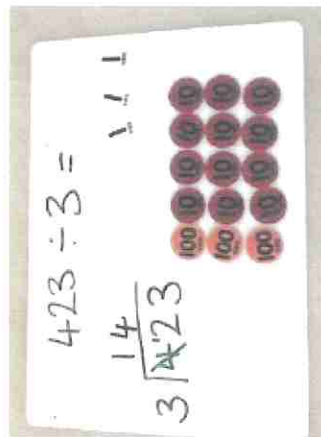
Steps 4-6- Division

Bus stop Method

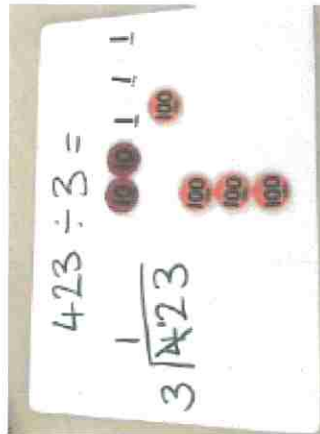
$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array}$$



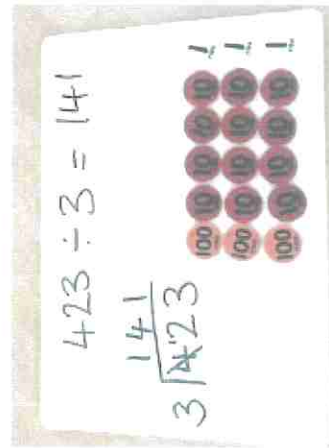
Create amount with counters



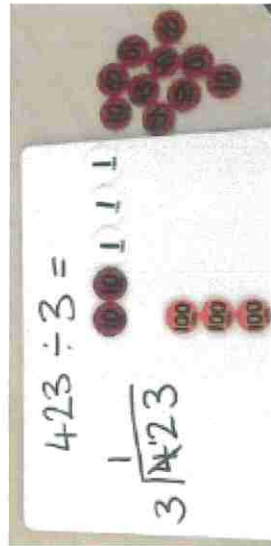
Group the ten counters into 3s



Group the hundreds counters into 3s




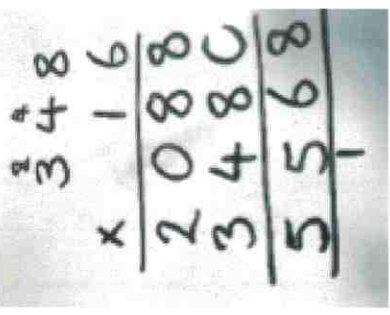


Group the ones counters into 3s



Exchange left over hundreds into tens

Long Division (Division by 2-digit number)

<p>Step 1: Write down the multiplication facts for the number you are dividing by.</p> <p>Example 1. The division is by 16. Here is the multiplication table of 16:</p> <p> $3 \times 16 = 48$ $4 \times 16 = 64$ $5 \times 16 = 80$ $6 \times 16 = 96$ $7 \times 16 = 112$ $8 \times 16 = 128$ $9 \times 16 = 144$ </p>	<p>Step 2: Ask, how many times does 16 go into 5? It is zero so we ask: How many times does 16 go into 55?</p> <p>Check using your list of multiples. 16 goes into 55 three times with a remainder of 7. The 3 goes above the bus stop and the 7 remaining are carried over.</p> 	<p>Step 3: Ask, how many times does 16 go into 76?</p> <p>Check using your list of multiples. 16 goes into 76 four times with a remainder of 12. The 4 goes above the bus stop and the 12 remaining are carried over.</p> 	<p>Step 4: Ask, how many times does 16 go into 128?</p> <p>Check using your list of multiples. 16 goes into 128 eight times with no remainder. The 8 goes above the bus stop.</p> 	<p>Step 5: We can check the calculation is correct by completing the inverse operation.</p> 
---	--	--	---	---