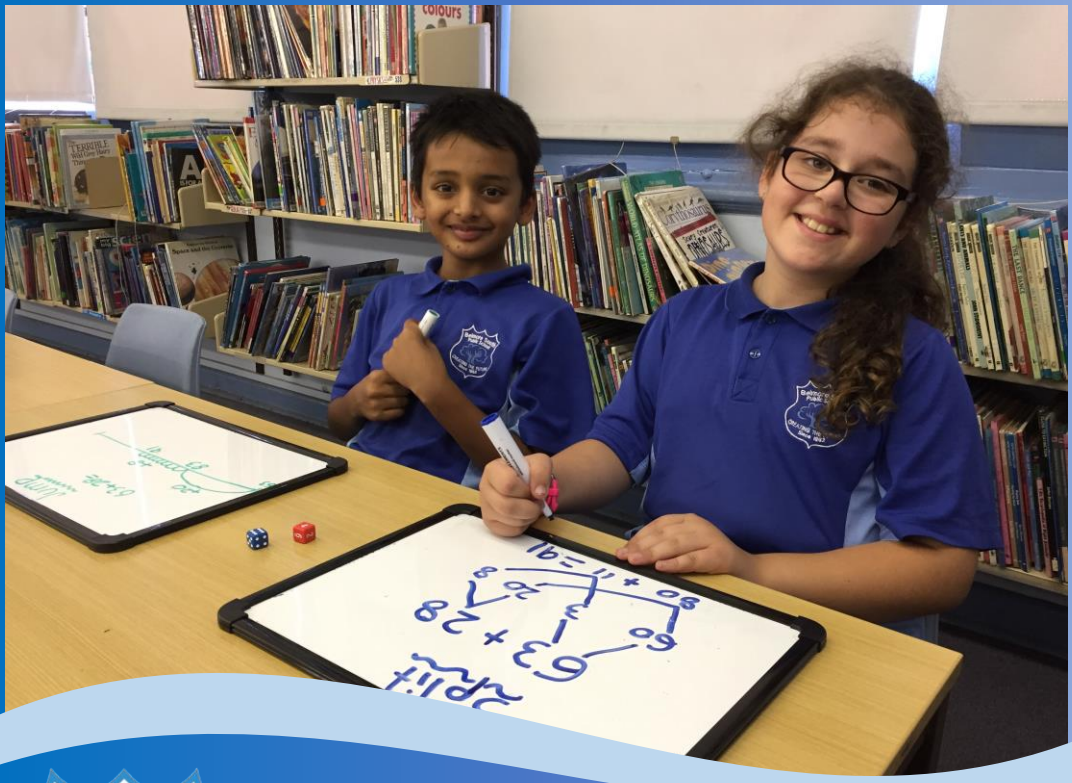
Belmore South Public School



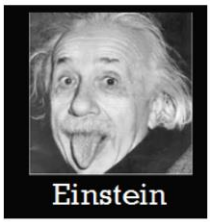
Belmore South Public School
CREATING THE FUTURE
Since 1862

Maths Guide

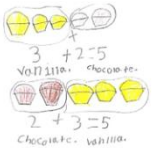
A Guide to Thinking Mathematically

At Belmore South we think like mathmeticians

Problem solve



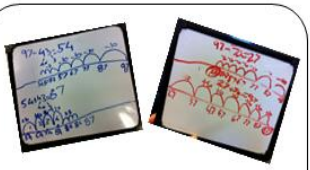
Take thinking time



Record ideas

Use concrete materials

Learn from mistakes



Explain how they find answers

Trial and error

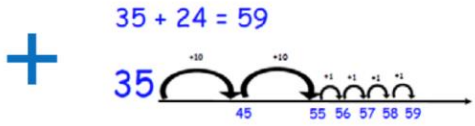
Make estimations

Has a sweaty brain

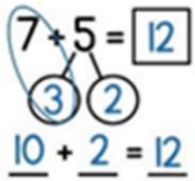
Communicate with partners

Problem Solving Strategies

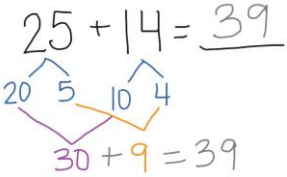
Our students develop a toolbox of flexible strategies to support their maths problem solving.



Jump Strategy



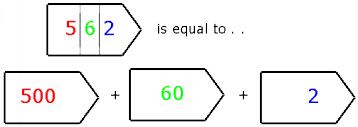
Bridging through ten



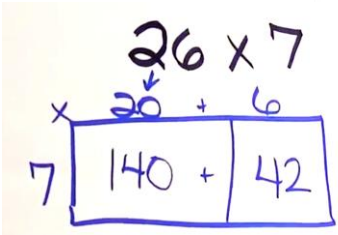
Split Strategy

Counting on

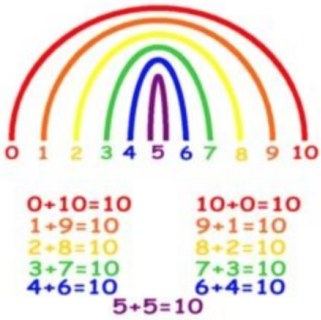
Strategy Toolbox



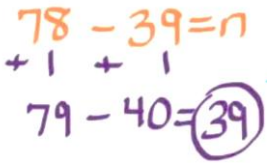
Partitioning



Area multiplication model



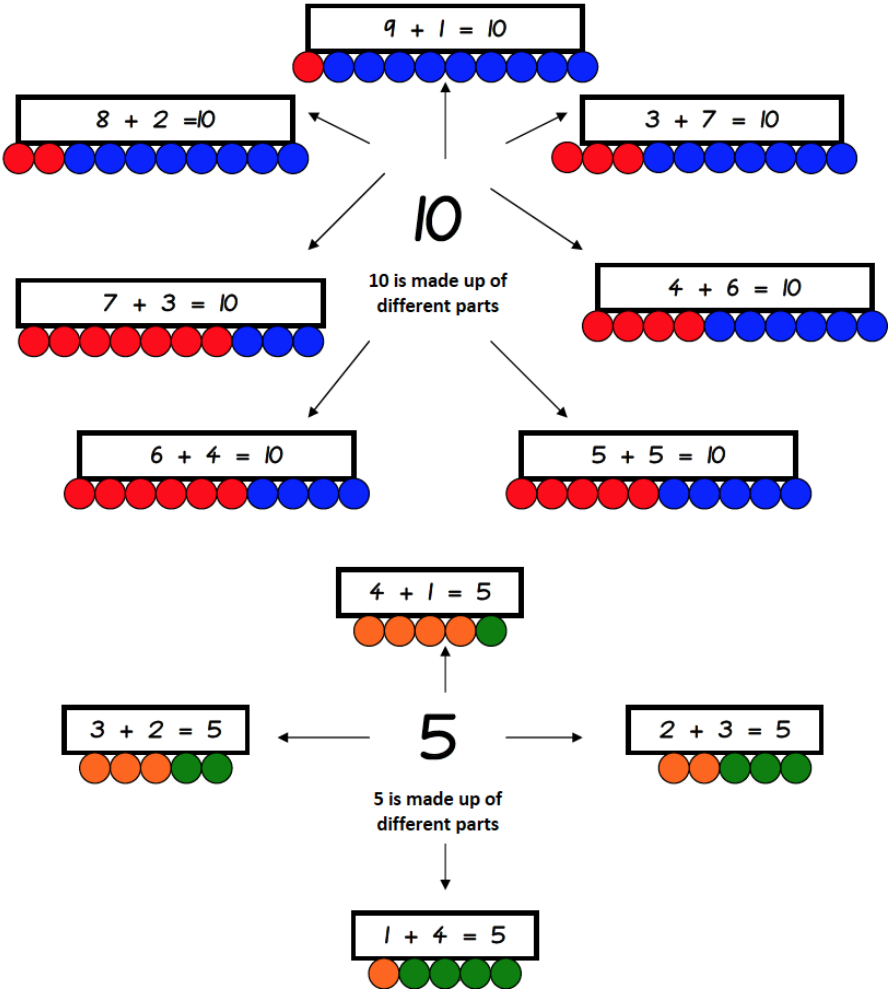
Number combinations



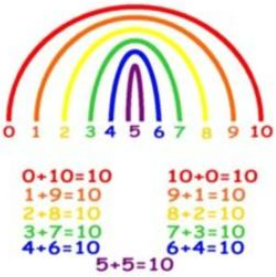
Compensation

Number Combinations

Numbers are made up of parts to make a whole. Knowing the different parts of numbers helps us to use other mental maths strategies like Place Value, Bridging and Number Families. It is helpful to know the combinations for numbers 5, 10, 20, 50 and 100.



Friends of Ten



Friends of Ten work together to make maths problems easier. **Recognition of number combinations to ten must be automatic.**

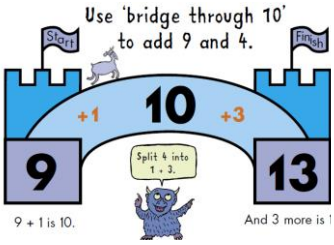
5 + 5 = 10 7 + 3 = 10 8 + 2 = 10 9 + 1 = 10 4 + 6 = 10

19 + 1 = 20 13 + 7 = 20 12 + 8 = 20 11 + 9 = 20 15 + 5 =20

25 + 25 = 50 35 + 15 = 50 45 + 5 = 50 20 + 30 = 50

Bridging

When **bridging** numbers you add or subtract from the numbers in a problem to make it easier to solve. **Bridging** to multiples of 10 helps to make maths problems easier to solve.



Bridge to 30
Take 2 from 34 and give it to 28

34 + 28 = 32 + (28 + 2) = 32 + 30 = 62

Bridge to 40
Take 3 from 55 and give it to 37

37 + 55 = (3 + 37) + 52 = 40 + 52 = 92

Counting On

Count on by ones from the biggest number to calculate an addition number sentence. Count on by ones from the biggest number to calculate an addition number sentence.

15 + 9 = 24

15 16 17 18 19 20 21 22 23 24

8 + 5 = 13

8 9 10 11 12 13

20 + 8 = 28

20 21 22 23 24 25 26 27 28

17 + 7 = 24

17 18 19 20 21 22 23 24

Remember to lock the biggest number in your head and then carefully count along the number line and stop at the second number.

15 + 6

Keep the first number in your memory

Count along the number line 6 spaces and then stop

15 16 17 18 19 20 21

Counting Back

Count back by ones from the biggest number to calculate a subtraction number sentence.

23 - 8 = 15

23 22 21 20 19 18 17 16 15

30 - 6 = 24

30 29 28 27 26 25 24

28 - 12 = 16

28 27 26 25 24 23 22 21 20 19 18 17 16

21 - 12 = 9

21 20 19 18 17 16 15 14 13 12 11 10 9

Remember to lock the biggest number in your head and then carefully count back along the number line and stop at the second number.

13 – 6

Keep the first number in your memory

Count back along the number line 6 spaces and then stop

13 12 11 10 9 8 7

Counting On: finding the difference

We can solve subtraction number sentences by Counting On instead of counting back. Sometimes Counting On makes it easier to solve a subtraction problem.

17 – 14 = 3

Instead of Counting Back

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3

it is easier and quicker to Count On

Start at 14 and stop at 17

14 15 16 17

25 – 16 = 9

Instead of Counting Back

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9

It is easier and quicker to Count On

Start at 16 and stop at 25

16 17 18 19 20 21 22 23 24 25

39 – 23 = 16

Instead of Counting Back

39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16

It is easier and quicker to Count On

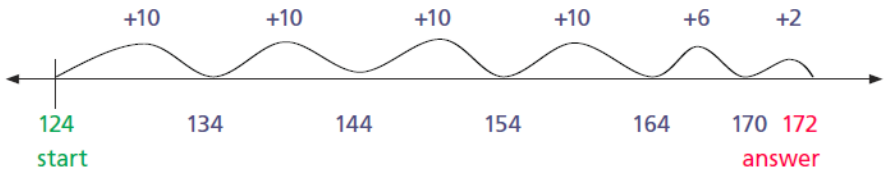
Start at 23 and stop at 39

23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

Jump Strategy

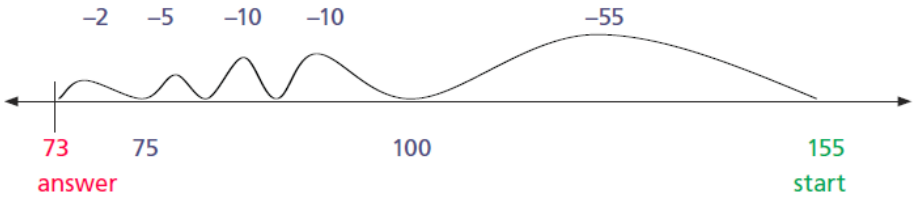
With **Number lines**, we can make jumps to solve number problems.

124 + **48** = **172** could be shown as:



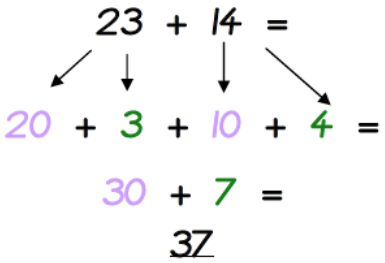
155 – **82** = **73** could be shown as:

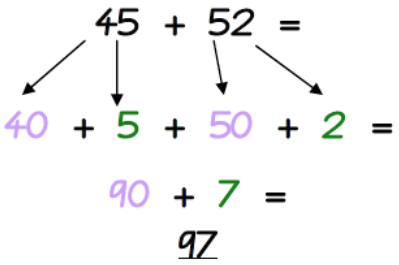
We can show these differences using a number line:

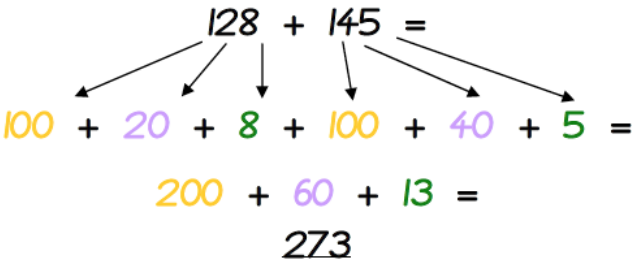


Split Strategy: addition

Separate (or partition) numbers into thousands, hundreds, tens and ones and then calculate the answer.



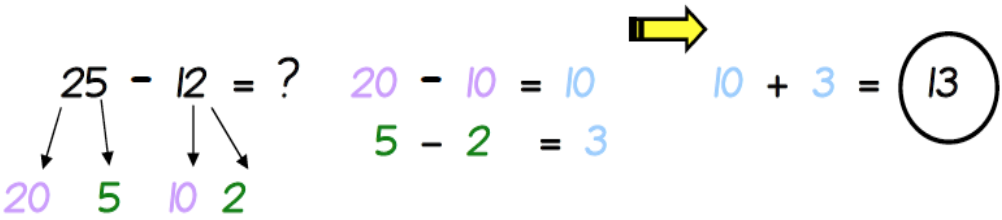


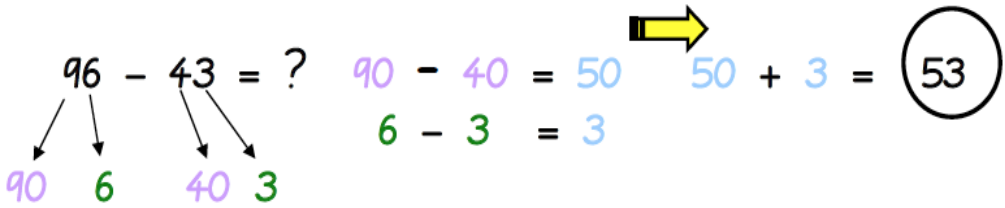


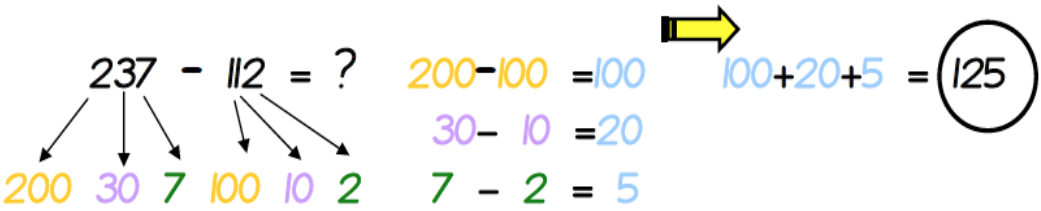
Remember to add the hundreds, the tens and the ones together. Don't forget any of the numbers! Place Value can be used as a mental maths strategy by itself and when using other strategies like counting on.

Split Strategy: subtraction

Separate (or partition) numbers into thousands, hundreds, tens and ones and then calculate the answer.







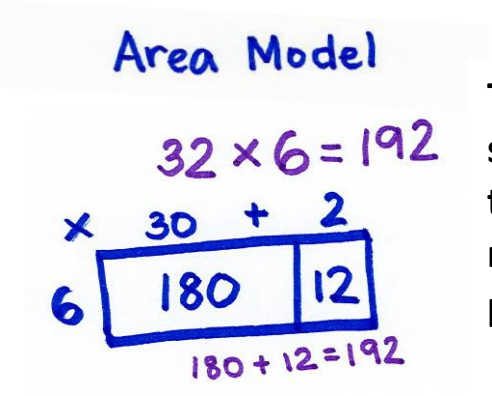
Multiplication: grouping

Multiplying in parts helps us to work with smaller numbers. It helps us to use **basic number facts** (times tables) and **number combinations** to solve multiplication problems.

32 x 6 = 30 x 6 = 180 and 2 x 6 = 12 180 + 12 = 192

5 x 63 = 60 x 5 = 300 and 3 x 5 = 15 300 + 15 = 315

23 x 18= 20 x 10 = 200 and 20 x 8 = 160 200 + 160 = 360
3 x 10 = 30 and 3 x 8 = 24 30 + 24 = 54
360 + 54 = 414

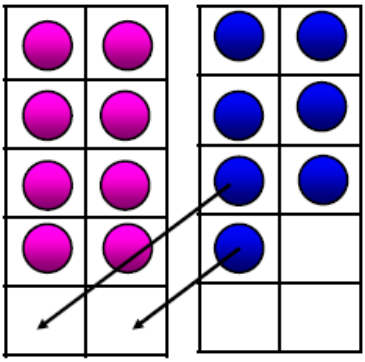


The area model is multiplication strategy students learn in Year 3 that helps break down complex multiplication sums into smaller parts.

Compensation

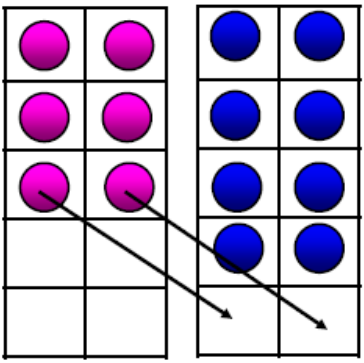
Give some from one number to another to make numbers easier to work with.

8 + 7 is 10 + 5



Move 2 from 7 to the 8.
This will make 10.

6 + 8 is 10 + 4



Move 2 from the 6 to the 8.
This will make ten

The compensation strategy is useful when one of the numbers ends in 7,8 or 9. One number is rounded up to the next 10 and the other number is adjusted to compensate for the original change.

Rounded up to the next 10

64 + 28 =
-2 +2
62 + 30 = 92

64 - 28 =
+2 +2
66 - 30 = 36

Adjusted to compensate original change

Formal Algorithms

One number is placed above the other number according to its value (hundreds, tens and ones). In this step by step method the numbers are added or subtracted vertically in the ONES, then TENS, then HUNDREDS columns.

Addition 135 + 54 = ?

Hundreds	Tens	Ones
1	3	5
+	5	4
1	8	9

+

The sum of these digits is less than 10 so no trading to the TENS is needed.

Subtraction 257 – 43 = ?

Hundreds	Tens	Ones
2	5	7
-	4	3
2	1	4

–

Less TENS are being taken away, so no trading is needed.

Formal Algorithms: trading

Trading is changing a quantity into smaller or bigger parts without changing its value.

Addition 234 + 58 = ?

Addition problems will involve trading when you add digits in a column and they make more than 10.

	Hundreds	Tens	Ones
1			
	2	3	4
	+	5	8
	2	**9**	**2**

4 ones + 8 ones = 12 ones.

We don't put more than 9 in a column.

12 = 1 TEN and 2 ONES so we trade 10 ONES for 1 TEN.

The 1 TEN goes to the TENS column and the 2 remaining ONES stay in their column.

All the TENS in the column are now added together.

Subtraction 245 – 28 = ?

Subtraction problems will involve trading if there are more ONES, TENS, HUNDREDS in the number being taken away.

This means the children will have to trade some from the larger column, ie ONES will trade with TENS, TENS will trade with HUNDREDS etc.

Hundreds	Tens	Ones
2	$^{3}\not{4}$	$^{1}5$
–	2	8
2	**1**	**7**

We can't take 8 away from 5.

There are more ONES in the number being taken away, so we need to trade 1 TEN into the ONES column to give us 15 ONES.
15 ONES – 8 ONES = 7 ONES

Now we only have 1 TEN left.

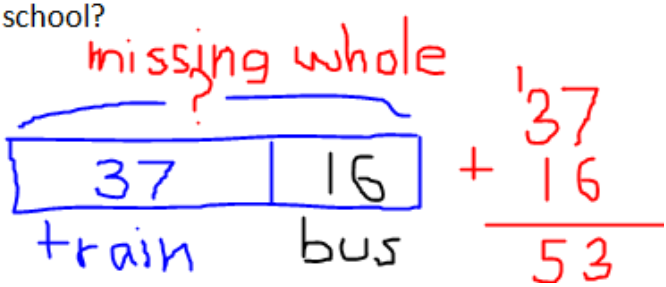
Word Problems

5 Steps to solving maths word problems.	
Read the problem.	
Underline important numbers and words.	K = Knock out uneeded info. A house has 5 bedrooms and [illegible]s. Each bedroom has [illegible] 4 shelves, and [illegible] How many shelves are there in the house?
Which operation will you use?	
Solve the problem by choosing an appropriate strategy.	
Check over your answer and see if it makes sense.	

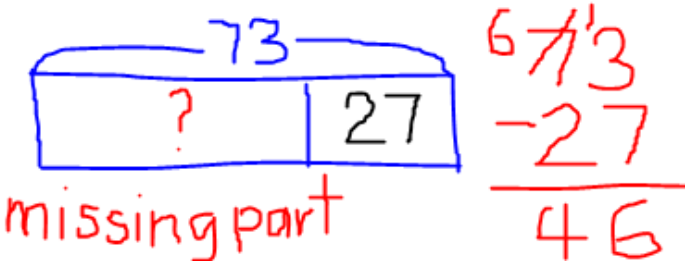
Word Problems: tape diagram

Tape diagrams are a thinking tool to help you decide which operation to use when problem solving.

Lizzie travels to school on a train for 37 minutes and then on a bus for 16 minutes. How long does it take Lizzie to travel to school?



Max swims 73 laps of a swimming pool. He swims 27 laps in backstroke and the rest in freestyle. How many laps did Max swim in freestyle?



Hidden Number Stories

Read the number story carefully. Highlight the important maths words.
Write out the number sentence using the highlighted words to help you
Solve the hidden number by adding or subtracting with the numbers you know.

Number Story	Number Sentence	Calculator Number Sentence
Miss Murray had **some** fish in her fish tank. She went shopping and **bought** **7** **more** fish and now she has **18**. How many fish did Miss Murray have to begin with?	[11] + 7 = 18	18 − 7 = 11
Miss Lee had **17** pencils. She **gave** **some** pencils out to the children and now she only has **12** left. How many pencils did Miss Lee give out to the children?	17 − [5] = 12	17 − 12 = 5
Sam bought some lollies from shop. She had **3** bags with **4** lollies in each bag. How many lollies did Sam have all together?	3 x 4 = [12]	12 ÷ 3 = 4
Mrs Jones had **12** glitter pens. She decided to **share** **them between 3 students**. How many pens did each student get?	12 ÷ 3 = [4]	4 x 3 = 12

Mathematical Language

Addition	plus	**Eg:** 3 plus 2 equals 5
+	add on	3 add on 2 equals 5
	count on	3 count on 2 equals 5
	and	3 and 2 equals 5
	sum of	The sum of 3 and 2 is 5
Subtraction	take away	**Eg:** 8 take away 5 equals 3
−	minus	8 minus 5 equals 3
	subtract	8 subtract 5 equals 3
	less than	5 less than 8 is 3
	difference between	The difference between 8 and 5 is 3
Multiplication	lots of	**Eg:** 3 lots of 5 equals 15
×	groups of	3 groups of 5 equals 15
	times	3 times 5 equals 15
	multiplied by	3 multiplied by 5 is 15
	product of	The product of 3 and 5 is 15
Division	quotient of	**Eg:** The quotient of 15 and 5 is 3
÷	divided by	15 divided by 5 is 3 is 5
	shared equally	15 shared equally between 3 is 5
	how many groups of	How many groups of 5 in 15 ? Answer 3

For More Information:

School A to Z: practical help for parents

http://www.schoolatoz.nsw.edu.au/homework-and-study/mathematics/help-sheets

A Maths Dictionary for Kids

http://www.amathsdictionaryforkids.com/

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