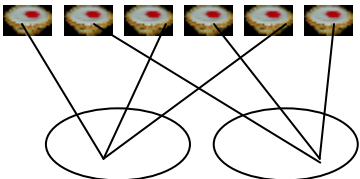

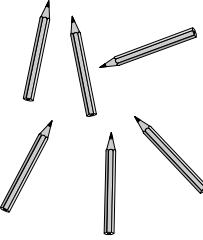
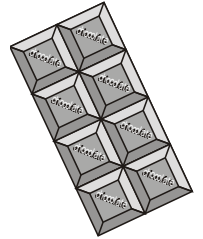


Hillside Primary Calculation Policy: DIVISION



FS	Calculating strand: DIVISION		Y1 MUST
<p>SHOULD End of year expectations</p>	<p>*solve problems involving halving and sharing Count reliably with numbers from one to twenty</p>		
<p>methods</p>		<p>Vocabulary</p>	
<p>Sharing equally E.g. 6 cakes are shared equally between 2 people. How many cakes does each person get?</p>  <p>Share the bananas equally between the monkey and the elephant. How many bananas does each one get? Are there any bananas left over? What could we do with the left over banana?</p>  <p>22 - 36 Months Recite some number names</p> <p>30 - 50 Months Recite numbers in order to ten</p> <p>40 - 60 + Months Use familiar objects to create and recreate patterns Count objects to ten and beginning to count beyond ten Begins to identify own mathematical problems based on own interest</p> <p>Early Learning goals Solve problems involving halving or sharing</p>		<p>Twenty....nineteen....eighteento zero, hundred...ninety....eighty....to zero count, count back (from, to) count in ones, twos... tens..., how many times? Even. Pair, pattern, estimate ,halve, sort, equal, sets of</p> <p>Test Questions</p> <p>Share the biscuits out so that everyone has the same number. -----</p> <p>Share these pencils equally between Asif and Ben. How many pencils will each of them get.</p>  <p>Share the teacups so that each teddy bear gets one teacup. We have 11 cakes. Each teddy bear needs two cakes, will there be any cakes left over? ----- -----</p> <p>How many children can have 2 coins from this pile of ten 10p coins?</p> <hr/> <p>Share the cards between the players so that each player gets 5 cards.</p> <p>Share these coins between three children so that each child gets the same number of coins.</p> <p>How many children can have two squares each of this chocolate?</p>  <p>----- -----</p> <p>Put half of these ten animals in the ark. How many of the animals are in the ark? ----- -----</p> <p>How many towers of 5 cubes can we make from this bucket of cubes? Count the groups of cubes.</p> <hr/> <p>How many pairs of socks can we make from this pile of socks? Count the pairs.</p> <hr/> <p>Share the stickers between 3 children equally. How many stickers does each child get? Are there any stickers left over?-Can you cut the cake in half? How many pieces are there?</p>	

Year 1

Number: DIVISION

FS COULD / Y2 MUST

SHOULD
End of year expectations in bold

- Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

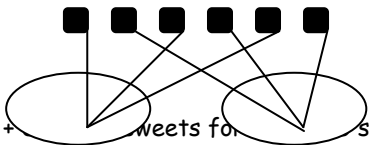
Written Methods

Sharing equally

Share items equally where there are no remainders, (see below.)

E.g. 6 sweets are shared equally between 2 people. How many sweets does each one get?

Recording as a pictorial representation AND related number sentences



3 + 3 sweets for 3 sweets for you makes 6 sweets altogether"

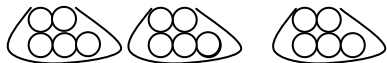
$6 \div 2 = 3$ "6 sweets shared between two people is 3 sweets each"

Also share items equally where there are remainders and discuss the items left over.

Grouping

Understand the operation of division as **Grouping** (or repeated addition)

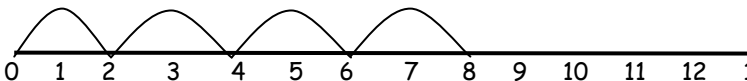
E.g. There are 15 apples in a box. How many bags of 5 apples can be filled? i.e. How many groups of 5 can you make from 15?



Grouping should also be modelled on a **number line** by the teacher and later by pupils.

Use prepared fully marked and fully numbered number lines to begin with and also draw own 'groups' (jumps) as appropriate. Use **GROUPING ITP**.

e.g. 8 children are put into teams of 2. How many teams are there? I.e. How many groups of 2 are there in 8?



$8 \div 2 = 4$ "eight children divided into groups of two, makes four groups."

10 cakes are put into boxes of 5. How many boxes are there? I.e. How many groups of 5 are there in 10?



$10 \div 5 = 2$ "ten cakes divided into groups of five, makes two groups."

Vocabulary

problem, solution, calculate, calculation, number sentence, answer, method, explain, money, coin, pence, penny, pound, pay, change, buy, sell, price, spend

number sequences, count back (from, to) in ones, twos...fives.... tens...less, few, many, odd, even, how many times? pair, multiple, half, halves

Test Questions

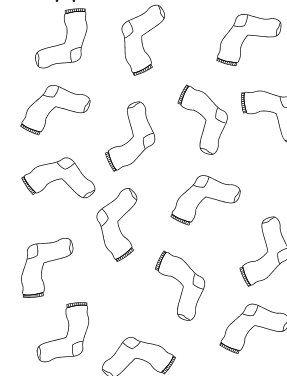
There are twenty children in a classroom.

Half of them are girls.

How many are boys?

KS1 1997 level 2b [oral]

How many pairs of socks are there?

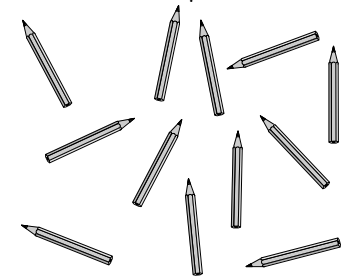


KS1 2000 level 2b

How many wheels do we need to make three cars?

We need to put 12 cakes into boxes of 3. How many boxes will we have? What if we had to put the same number of cakes into boxes of 4?

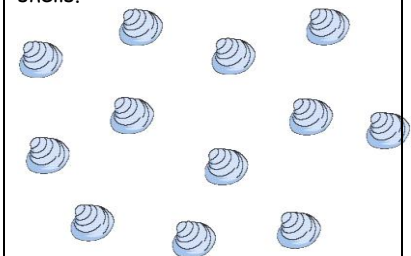
Here is a set of 12 pencils.



How many is half the set?

KS1 2002 level 2c

Four children share these shells. They each get the same number of shells.



How many shells does each child get? KS1 2005 level 2c

SHOULD

- Recall and use division facts for the 2,5,10 tables including recognising odd and even numbers
- Calculate mathematical statements for division, within the multiplication tables and write them using the division and = sign
- Show that division of 2 numbers can not be done in any order
- Solve problems involving division using materials, arrays, division facts, including problems in context

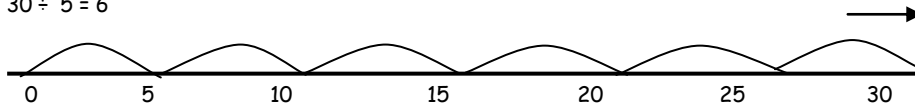
Written Methods

Grouping

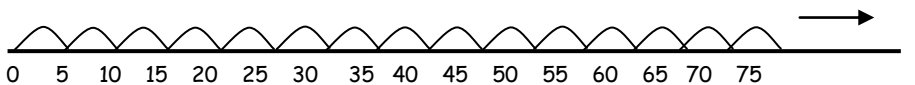
Use repeated addition as a method of grouping by counting up. Without remainders, and then with remainders. Use fully marked and fully numbered number lines, moving towards using empty number lines when pupils gain confidence in the use of number lines.

Begin by dividing with a divisor of 2, 5 or 10, (e.g. $20 \div 5$) moving towards divisors of 3, 4 and 6 (e.g. $18 \div 3$) as pupils begin to gain confidence.

$30 \div 5 = 6$

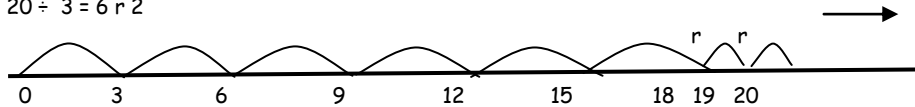


$75 \div 5 = 15$

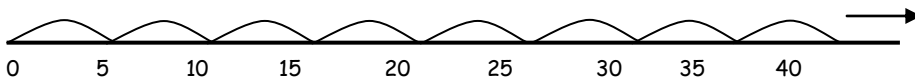


Remainders

$20 \div 3 = 6 \text{ r } 2$



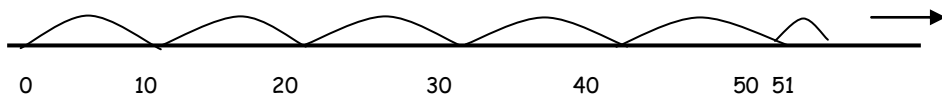
Luke worked out the correct answer to $40 \div 5$. His answer was 8. Show how he could have worked this out.



In Context

Understand the concept of a **remainder in context**.

Eg. How many lengths of 10 cms can you cut from 51 cm of tape? How many will be left?



Answer: 5 lengths of 10cm and 1 cm left over.

Vocabulary

calculate, calculation, inverse, answer, explain, method, sign, operation, symbol, number sentence, number line, mental calculation, written calculation, informal method, jottings, diagrams, pictures, images
grouping, halve, share, share equally, one each, two each, three each... group in pairs, threes... tens, equal groups of, \div sign, divide, divided by, divided into, left over, remainders

Test Questions

There are 35 children. They get into teams of 5. How many teams are there altogether?
KS1 2003 level 3

Luke worked out the correct answer to $40 \div 5$. His answer was 8 Show how he could have worked out his answer.
KS1 2003 level 3 [adapted-]

Harry has a set of 22 pencils. How many is half the set?
KS1 2002 level 2c [adapted]

At the shop, all packets of crisps cost the same. Hannah buys 2 packets. She pays 40 pence. How much does one packet cost?
KS1 2002 level 2c [oral]

Write the missing number in the box.
 $\square \div 2 = 7$
KS1 2001 level 3

What is half of this amount?



KS1 2005 level 3

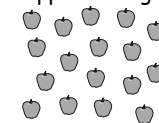
Mary eats half of these cherries.



How many does she eat? KS1 1999 level 2b

Write the answer.
 $45 \div 5 = \square$ KS1 2002 level 3

John puts these apples in bags.



He puts 5 apples in each bag. How many apples will be left over?
KS1 1997 level 2b

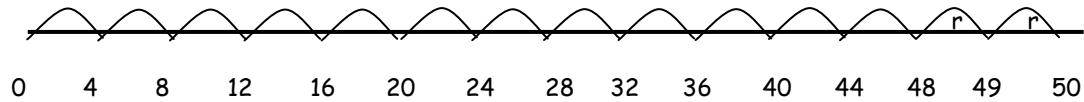
SHOULD
End of year
expectations

Recall and use the division facts for the 3, 4 and 8 times tables
Write and calculate mathematical statements for division, using the tables that they know, including for two-digit numbers, using mental methods and progressing to formal written methods
Solve problems including missing number problems and problems involving division

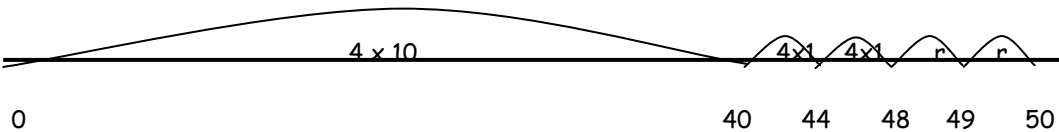
Written Methods

Grouping by repeated addition, counting up, with remainders

$50 \div 4 = 12 \text{ r } 2$



Move on to grouping in larger multiples of the divisor. (e.g. 4×10 in the calculation below) This leads to 'chunking' i.e. 10 times the divisor is calculated in one 'chunk' because it is quicker, more efficient and more reliable. Children need to have a good understanding of this before they go on to 'chunking'.



During year 3 children are taught the formal method of short division
See appendix to programme of study p47

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

Vocabulary

problem, solution, calculate, calculation, inverse, answer, method, explain, predict, estimate, reason, operation, symbol, number sentence, equation, mental calculation, written calculation, informal method, jottings, number line, pound (£), penny/pence (p), note, coin, units of measurement and their abbreviations
share, share equally, one each, two each, three each, group in pairs, threes... tens, equal groups of, ÷ sign, divide, division, divided by, divided into, left, left over, remainder, inverse

Test Questions

Circle the three numbers which divide by 5 with no remainder.

84	85	86
91	92	93
98	99	100
105	106	107

KS2 1997 Paper A level 3

20 children sit at tables in groups of 4. How many groups will there be? (KS1 1999 level 2a [oral])

What is the remainder when twenty-seven is divided by five?
KS2 2005 Mental test level 3

Divide forty-two by six.

Y4 optional test Mental test level 4

Five is a quarter of a number. What is the number?
KS1 2003 level 3 [oral]

Write the missing number in the box.

$\square \div 2 = 7$

KS1 2001 level 3

There are 35 children. They get into teams of 5. How many teams are there altogether?

KS1 2003 level 3

Write the answer.

$45 \div 5 = \square$

KS1 2002 level 3

A carton of orange fills 6 cups.

Mrs Green wants to fill 50 cups with orange.

How many cartons of orange does she need to buy?

KS1 2003 level 3


Write a number in each box to make this correct.

$300 \div 2 = \square \times \square$

KS1 2003 level 3

Year 4	Number: DIVISION		Y3 COULD / Y5 MUST
SHOULD	<ul style="list-style-type: none"> Recall division facts for tables up to 12x12 Use place value, known and derived facts to multiply and divide mentally, including dividing by 1 		
<u>Written Methods</u>		<u>Vocabulary</u>	
<p>The children will continue to use the formal method of short division</p>		<p>calculate, calculation, equation, operation, symbol, inverse, answer, method, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius</p> <p>share, share equally, halve, one each, two each, three each... group in pairs, threes... tens, equal groups of divide, division, divided by, divided into, divisible by remainder, factor, quotient, inverse</p>	
		<u>Test Questions</u>	
<p>During year 4 children continue to use the formal method of short division See appendix to programme of study p47</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> $\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$ <p>answer 86 r2</p> </div> <div style="text-align: center;"> $\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$ <p>answer 45 $\frac{1}{11}$</p> </div> </div>		<div style="display: flex;"> <div style="flex: 1;"> <p>Divide forty-eight by eight. KS2 2004 Mental test level 4 ----- -----</p> <p>What is twenty-seven divided by nine? Y4 optional test 1999 Mental test level 4 ----- -----</p> <p>Divide forty-two by six. Y4 optional test 1998 Mental test level 4 ----- -----</p> <p>If one hundred and seventy children are put into groups of ten children, how many groups will there be? Y4 optional test 1998 Mental test level 3 ----- -----</p> <p>Write in the missing number. $\square \div 10 = 20$ KS2 1996 Paper A level 3 ----- -----</p> <p>Write in the missing number. $\square \div 5 = 22$ KS2 1995 Paper A level 4 ----- -----</p> <p>Divide ninety by three. KS2 2003</p> </div> <div style="flex: 1; padding-left: 20px;"> <p>Nineteen marbles are shared between some children. Each child receives six marbles and there is one marble left over. How many children share the marbles? Y5 optional test 2003 Mental test level 3 ----- -----</p> <p>Divide three hundred and ninety by ten. KS2 2001 Mental test level 4 ----- -----</p> <p>-- Write the answer. $84 \div 7 =$ Y4 optional test Paper A level 4 ----- -----</p> <p>-- Circle each number which has a remainder of 2 when divided by 5. 27 15 26 45 32 24 Y5 Optional test 1998 Paper A level 3 ----- -----</p> <p>Parveen buys 3 small bags of peanuts. She gives the shopkeeper £2 and gets 80p change. What is the cost in pence of one bag of peanuts? KS2 1999 Paper A level 4 ----- -----</p> <p>Write in the missing numbers. $4 \times \square = 200$ KS2 2002 Paper A level 3</p> </div> </div>	

Year 5	Number: DIVISION		Y4 COULD / Y6 MUST
SHOULD	<ul style="list-style-type: none"> • Divide numbers mentally, drawing upon known facts • Divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders appropriately for the context • Divide whole numbers and decimals by 10 100 1000 		
<u>Written Methods</u>		<u>Vocabulary</u>	
<p>During year 5 children continue to use the formal method of short division See appendix to programme of study p47</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$ </div> <div> <p>answer 86 r2</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$ </div> <div> <p>answer 45 $\frac{1}{11}$</p> </div> </div>		<p>calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius</p> <p>share, share equally, halve, one each, two each, three each... group in pairs, threes... tens, equal groups of, divide, divided by, divided into, divisible by, remainder, factor, quotient, divisible by, inverse</p>	
<u>Test Questions</u>			
<p>What is the smallest number that leaves: a remainder of 1 when divided by 2; a remainder of 2 when divided by 3; a remainder of 3 when divided by 4; a remainder of 5 when divided by 6?</p> <p>-----</p>		<p>Divide thirty-one point five by ten. Y5 optional test 2003 Mental test level 5</p> <hr/> <p>Calculate $942 \div 6$ Y5 optional test 2003 Paper A level 4</p> <hr/>	
<p>How many nines are there in fifty-four? KS3 2003 Mental test level 4</p> <p>-----</p>		<p>Write in the missing numbers. $32.62 \div 10 =$ Y5 optional test Paper A level 4</p> <hr/>	
<p>Divide ninety by three. KS2 2003 Mental test level 3</p> <p>-----</p>		<p>Write what the four missing digits could be. $\square\square\square \div 10 = 3\square$ KS2 1997 Paper A level 4</p> <hr/>	
<p>How many sevens are there in two hundred and ten? KS2 2000 Mental test level 4</p> <p>-----</p>		<p>-----</p>	
<p>What is the smallest whole number that is divisible by five and by three? KS3 2004 Mental test level 4</p> <p>-----</p>		<p>There are 54 marbles, and they are put into 6 bags, so that the same number of marbles is in each bag. How many marbles would 2 bags contain? A 108 marbles</p>	
<p>Calculate $847 \div 7$. KS2 2001 Paper A level 4</p> <p>-----</p>		<p>B 18 marbles C 15 marbles D 12 marbles E 9 marbles</p>	
<p>Ten times a number is eighty-six. What is the number? KS2 2002 Mental test level 5</p>		<p>TIMSS 1995 Grade 4</p>	

Year 6	Number: DIVISION	Y5 COULD
SHOULD	<ul style="list-style-type: none"> Divide numbers of up to 4 digits by a 2-digit number whole number using the formal written method of short or long division as appropriate Interpret the remainder as a whole number remainder, fraction or by rounding, as appropriate Perform mental calculations including mixed operations and large numbers Use the knowledge of the order of operations to carry out calculations involving the four operations 	
<u>Written Methods</u>		<u>Vocabulary</u>
<p>During year 6 children continue to use the formal method of short division See appendix to programme of study p47</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$ </div> <div> <p>answer 86 r2</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;"> $\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \\ \underline{44} \\ 56 \\ \underline{55} \\ 1 \end{array}$ </div> <div> <p>answer 45 $\frac{1}{11}$</p> </div> </div>		<p>calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius</p> <p>halve, share, share equally, one each, two each, three each... group in pairs, threes... tens</p> <p>equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by</p> <p>inverse, integer</p>
<u>Written Methods</u>		<u>Test Questions</u>
<p>Children are taught the formal method of long division during year 6. See appendix p 47</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{) 432} \\ \underline{30} \\ 132 \\ \underline{150} \\ 120 \\ \underline{120} \\ 0 \end{array}$ </div> <div> <p>answer 28 r12</p> </div> </div>		<div style="display: flex;"> <div style="flex: 1;"> <p>Divide four point eight by eight. KS2 2004 Mental test level 4 [adapted]</p> <p>-----</p> <p>Divide four point two by six. Y4 optional test 1998 Mental test level 4 [adapted]</p> <p>-----</p> <p>Divide four point two by seven. KS3 2004 Mental test level 4 [adapted]</p> <p>-----</p> <p>Write in the missing number. $\square \div 5 = 22$ (KS2 1995 Paper A level 4)</p> <p>-----</p> <p>Calculate $123 \div 5$. Calculate $16.5 \div 3$.</p> <p>-----</p> <p>Calculate $847 \div 7$. KS2 2001 Paper A level 4</p> </div> <div style="flex: 1; padding-left: 20px;"> <p>Write in the missing digit. $5 \square \times 8 = 456$ KS2 1995 Paper A level 4</p> <p>-----</p> <p>Eggs are put in trays of 12. The trays are packed in boxes. Each box contains 180 eggs. How many trays are in each box? KS2 1999 Paper A level 4</p> <p>-----</p> <p>Shenaz buys a pack of 24 cans of cola for £6.00</p>  <p>What is the cost of each can? KS2 1998 Paper A level 5</p> <p>-----</p> </div> </div>

Year 6+	Number: DIVISION		
COULD	<ul style="list-style-type: none"> Understand how the commutative, associative and distributive laws, and the relationships between operations, including inverse operations, can be used to calculate more efficiently; use the order of operations, including brackets(Y6/7) Consolidate and extend mental methods of calculation to include decimals, fractions and percentages (Y6/7) Extend division to dividing a three-digit integer by a two-digit integer (Y6 / 7) 		
Rules & Laws of arithmetic summary - see guidance paper 'methods of calculation' for more detail			Test Questions
Rules of arithmetic	Instructions	Examples	
Brackets	Always carry out first any calculations that are within brackets	$40 - (3 + 2) = 40 - 5 = 35$ $20 \div (18 - 13) = 20 \div 5 = 4$	What is three thousand divided by twenty? KS2 2002 Mental test level 5 ----- -----
Multiplication and division	After working out those calculations in the brackets do the multiplication and division calculations next before addition and subtraction. If the expression involves only multiplication and division calculations work from left to right or reorder moving a number with its associated operation.	$5 \times 2 - 8 \div 2 = 10 - 4 = 6$ $9 \times 8 \div 3 = 72 \div 3 = 24$ $9 \times 8 \div 3 = 9 \div 3 \times 8 = 3 \times 8 = 24$	What is the smallest whole number that is divisible by five and by three? KS3 2004 Mental test level 4 ----- ----- Write two factors of twenty-four which add to make eleven. KS2 2005 Mental test level 5 ----- -----
Addition and subtraction	Finally do the addition and subtraction calculations. If the expression involves only addition and subtraction calculations work from left to right or reorder moving a number with its associated operation.	$25 + 19 - 11 - 18 = 44 - 11 - 19 = 33 - 19 = 14$ $25 + 19 - 11 - 18 = 25 - 11 + 19 - 18 = 13 + 1 = 14$	----- ----- Calculate $900 \div (45 \times 4)$. KS2 2004 Paper A level 5 ----- -----
Laws of arithmetic	Description	Examples	
Commutative laws for addition and multiplication	When adding two numbers the order of the numbers can be reversed. When multiplying two numbers the order of the two numbers can be reversed.	$4 + 18 = 18 + 4$ $5 \times 7 = 7 \times 5$	----- ----- What is three point nine divided by two? KS3 2003 Mental test level 6 ----- -----
Associative laws for addition and multiplication	When adding three or more numbers any adjacent pair of numbers can be added first. When multiplying three or more numbers, any pair of adjacent numbers can be multiplied together first.	$3 + 6 + 4 = (3 + 6) + 4 = 3 + (6 + 4)$ $3 \times 4 \times 5 = (3 \times 4) \times 5 = 3 \times (4 \times 5)$	----- ----- Write in the missing digit. $\square 92 \div 14 = 28$

<p>Distributive laws for multiplication and division over addition and subtraction</p>	<p>When a sum or difference is being multiplied by a number, each number in the sum or difference can be multiplied first and the products are then used to find the sum or difference. When a sum or difference is being divided by a number, each number in the sum or difference can be divided first and the dividends are then used to find the sum or difference.</p>	<p>$(30 + 8) \times 7 = (30 \times 7) + (8 \times 7)$ $(30 - 3) \times 9 = (30 \times 9) - (3 \times 9)$ $(20 + 8) \div 4 = (20 \div 4) + (8 \div 4)$ $(60 - 12) \div 3 = (60 \div 3) - (12 \div 3)$</p>	<p>KS2 1995 Paper A level 5 ----- ----- Calculate $924 \div 22$. KS2 2002 Paper A level Write in the missing number. $50 \div \square = 2.5$ KS2 2003 Paper A level 5 Calculate $157 \div 5$. Calculate $1.75 \div 5$. Calculate $37.2 \div 8$. Write in the missing digits. $323 \times \square 7 = 1518 \square$ KS2 1995 Paper A level 5</p>
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